SDC A+FS Network

Food Systems Learning Journey

A learning adventure taking us around the globe to understand and act more systemically

Food Systems – Resilience, Foresight and Scenarios

Intro webinars

Webinar Jan ‘23

Webinar Jan ‘23

Webinar Apr ‘23

Webinar May ‘23

Summative event June ‘23

W. Africa

MENA

S/E-Africa

Asia

Lat. Am.

Regional workshop

Network webinar


Bamako


Cairo


Tashkent


Bangkok


Harare

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Agenda

Part I : Resilience building – five questions and three approaches

Part II : Foresight and Scenarios for Food Systems planning

Part III : Food System Typologies – choices and implications

Part I :
Enhancing Food Systems Resilience

Food System Challenge

Achieving food security for a growing, wealthier, urbanising population in a fair and just manner while minimising further environmental degradation and maintaining vibrant food system livelihoods and enterprises.

against a background of 'megatrends':

- natural resource depletion

  and

- reduced agrobiodiversity

  and

- many stagnating rural economies

  and

- changing climate

  and

- a host of social, geopolitical, economic and cultural changes

So what's coming down the track and who for?

Yet More
or
Yet Less

?

Food System Stresses and Shocks

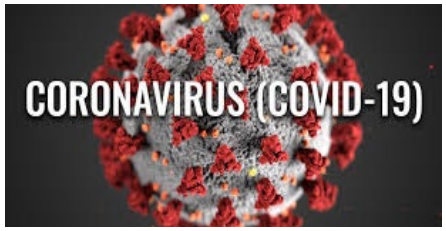
Gradual or Sudden Changes in:

- Demography
- Economics
- Social & cultural norms
- Geopolitics
- Science & Technology
- Climate & Extreme weather
- Other environmental factors

New agenda emerged ~10 yrs ago:

- Different to 'sustainability'
- Needs more forward thinking
- How to handle uncertainties

Then…



What next …?

World Economic Forum Global Risks Report

2023

Defining Resilience
4 Questions

Resilience…

1. Of what?

2. To what?

3. From who's perspective?

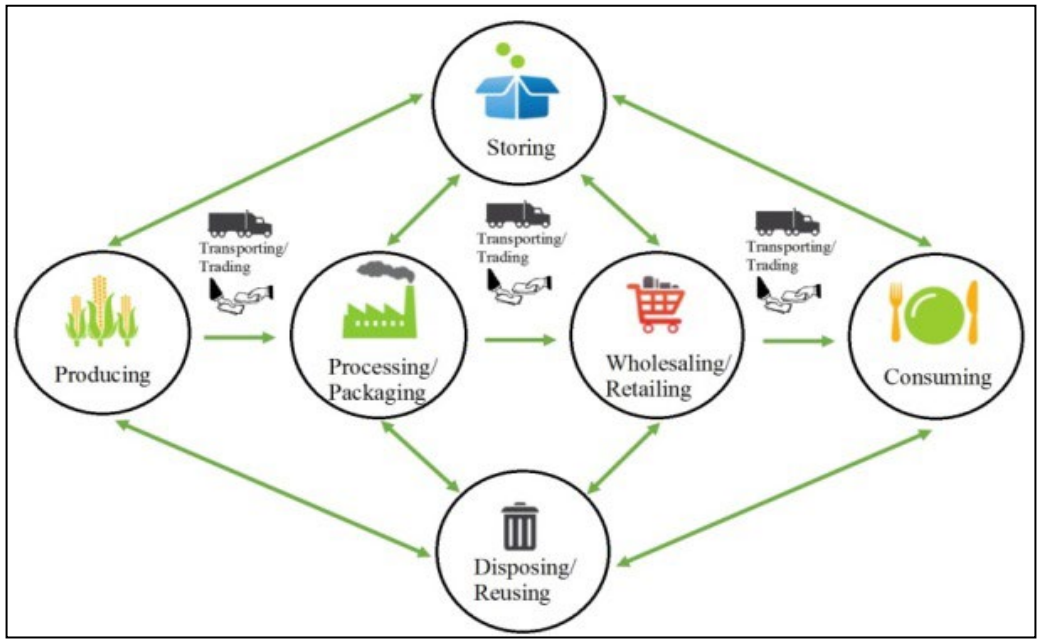
4. Over what time period?

=> Clear 'boundary' of the issue at hand

Adapted from: Helfgott, European Journal of Operational Research, 2017

1. Of what?

Food System *Functioning* (Activities)



OR

Food System *Function* (Outcomes)

Food System OUTCOMES

Social Welfare
- Health
- Employment
- Health
- Social capital
- Political capital
- Ethics
- …

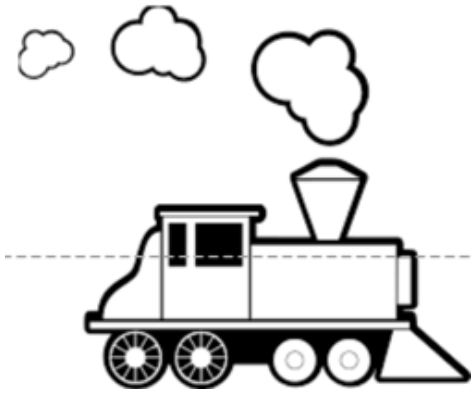
Food Security
- Food Utilisation
- Food Access
- Food Availability

Environment
- Climate change
- Water availability
- Water quality
- Biodiversity
- Biogeochemistry
- Soil degradation
- …

Adapted from: Ingram, Food Security, 2011

2. To what?
Food System Stresses and Shocks

Stresses
"Steam Trains"



Easily perceived drivers and trends that will influence change - direct and indirect

Shocks
"Black Swans"

Unimagined, rare and/or unpredictable events that have a big impact

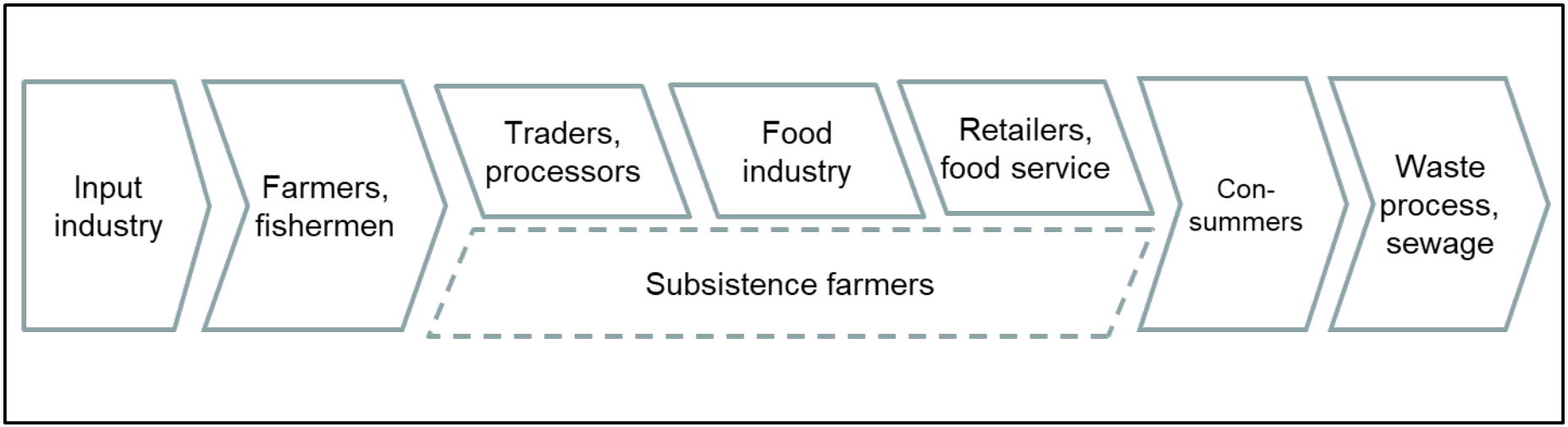
Food System Stresses and Shocks

Risk of multiple whammies

Stress ***pressure or tension exerted on a system [Steam Trains]***	**Shock** ***sudden surprising event affecting a system [Black (Grey?) Swans]***
Demography	Trade wars
Social & cultural norms	Geophysical events
Natural resource degradation	Food scares
Climate change	Extreme weather
Urbanisation	Election and Referenda results
Automation	Pandemics
Science and Technology	
Geopolitics	

3. From who's perspective?

Food system 'actors'



And/Or from others' perspectives?

Policy, private interests, 3rd Sector, society, …

4. Over what time period?

- **Short-term *interruptions* (usually due to shocks)** to e.g.:
  - Fishing or agricultural activities (due to e.g. extreme weather)
  - Critical ingredient shortfall (due to e.g. disease outbreak)
  - Just in time groceries delivery (due to e.g. IT malfunction)
  - Consumer shopping patterns (due to e.g. food scares)
- **Longer-term *disruptions* (usually due to stresses)** to e.g.:
  - Natural resource degradation
  - Energy price
  - Low-carbon emission regulations
  - Change in dietary preferences

Defining Resilience
Adding a 5th Question

Resilience…

5. For what purpose?

=> Accommodates different perspectives

Adapted from: Ingram et al, Nature Food, in press

Strategies for Resilience of Food System Outcomes

1. Robustness Aim to resist disruption to ***existing*** FS outcomes

2. Recovery Aim to return to ***existing*** FS outcomes after disruption [bounce back]

3. Reorientation Aim to accept ***alternative*** FS outcomes before or after disruption [bounce forward]

All involve

Adaptation Adapting the system activities

1 & 2 normally shorter term
3 normally medium to longer term

Strategies for enhancing resilience of food system outcomes

Adapting food systems activities

Either:

For Robustness & Recovery:

Adapt food system activities to maintain or return to food system outcomes

Or:

For Reorientation:

Adapt food system activities to transform food system outcomes

Hypothetical examples

Increased of risk of flooding grazing land

1. **Robustness**: Adapting defence-building activities by using ever higher concrete walls rather than earth
   => can enhance resilience but is not sustainable.

2. **Recovery**: Adapting pumping activities by using diesel pumps rather that windmills to clear water after ever bigger floods
   => can enhance resilience but is not sustainable.

3. **Reorientation**: Adapting land management before or after flood to reduced animals while also promoting tourism value of wetland biodiversity (reorienting farm livelihood strategy)
   => *can enhance both resilience and sustainability*.

The degree of adaptation of FS activity(s) will generally determine the degree of transformation of FS outcomes; major transformation of outcomes will generally require major adaptation of FS activity(s).

Q & A

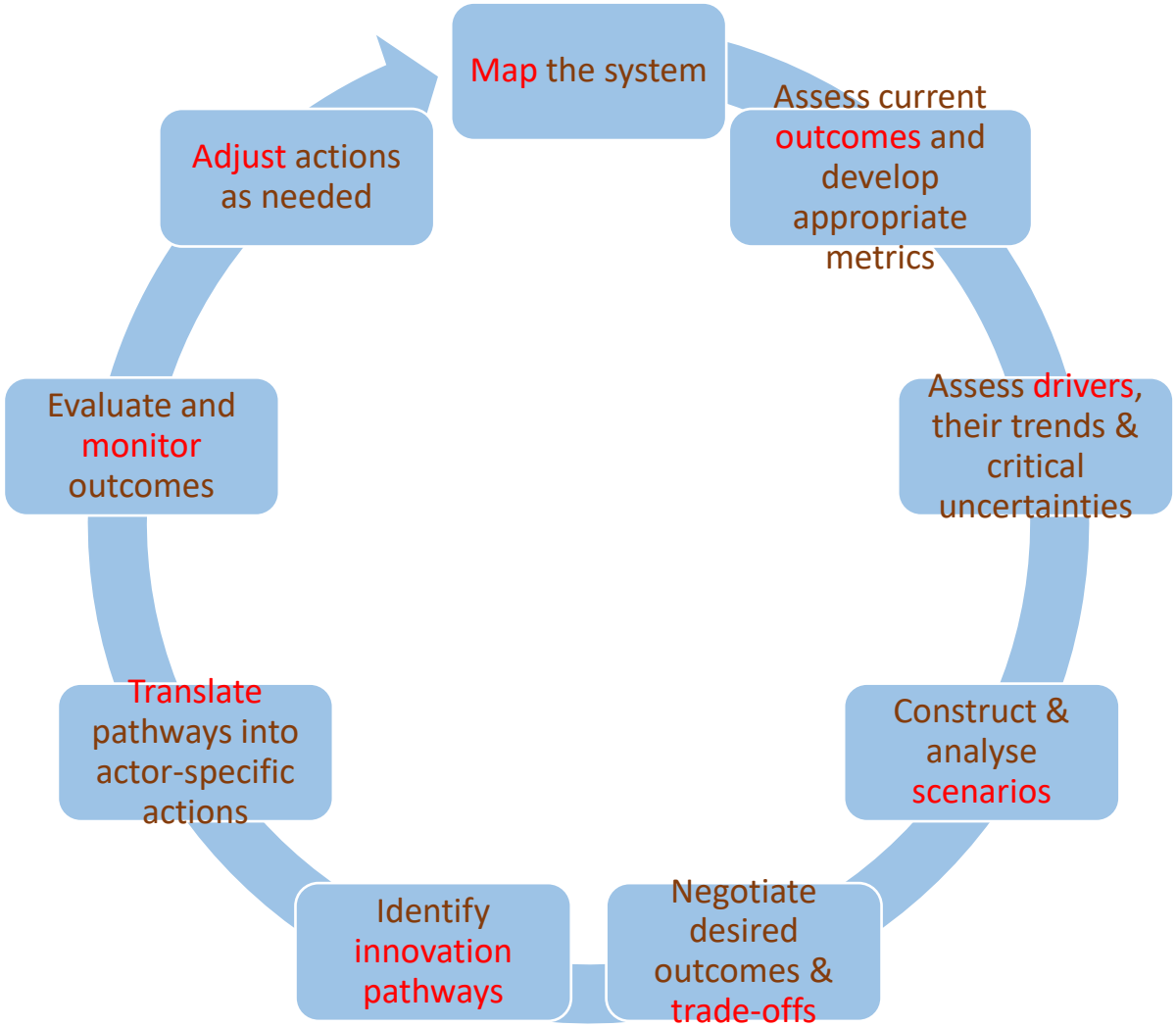
Part II :
Foresight and Scenarios for Food Systems planning

WHY LOOK INTO THE FUTURE FOR FOOD SYSTEM CHANGE ?

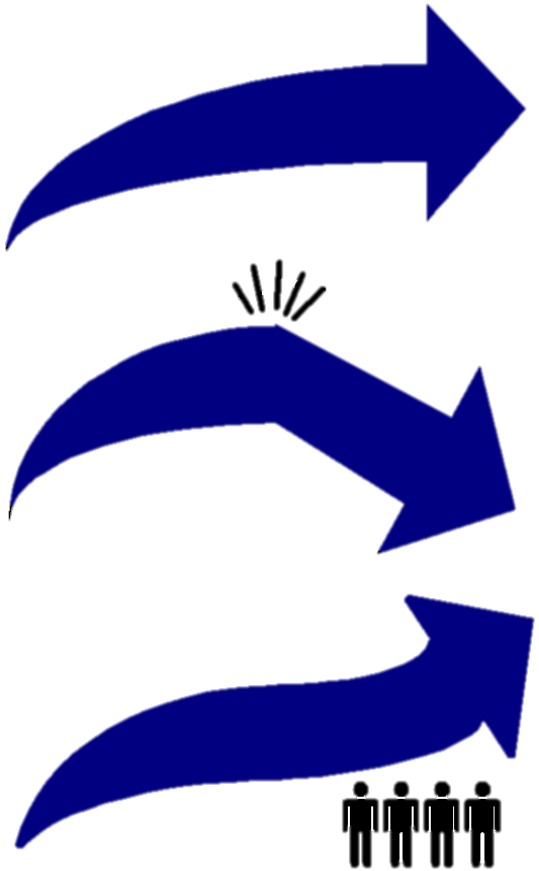
FSLJ
Group exercises

Identification of the problem & System mapping 1 Setting up the challenge 2 Rich images	**Ideas for possible change** 3 Transformation declarations 4 Analysis of trade-offs (BATWOVE)
Who? 5 Mapping the actors	**How?** 6 Backcasting

Foresight and scenario analysis


Map the system
Assess current outcomes and develop appropriate metrics
Assess drivers, their trends & critical uncertainties
Construct & analyse scenarios
Negotiate desired outcomes & trade-offs
Identify innovation pathways
Translate pathways into actor-specific actions
Evaluate and monitor outcomes
Adjust actions as needed

SOURCES OF UNCERTAINTY WHEN THINKING ABOUT THE FUTURE



Ignorance

Understanding is limited

Surprise

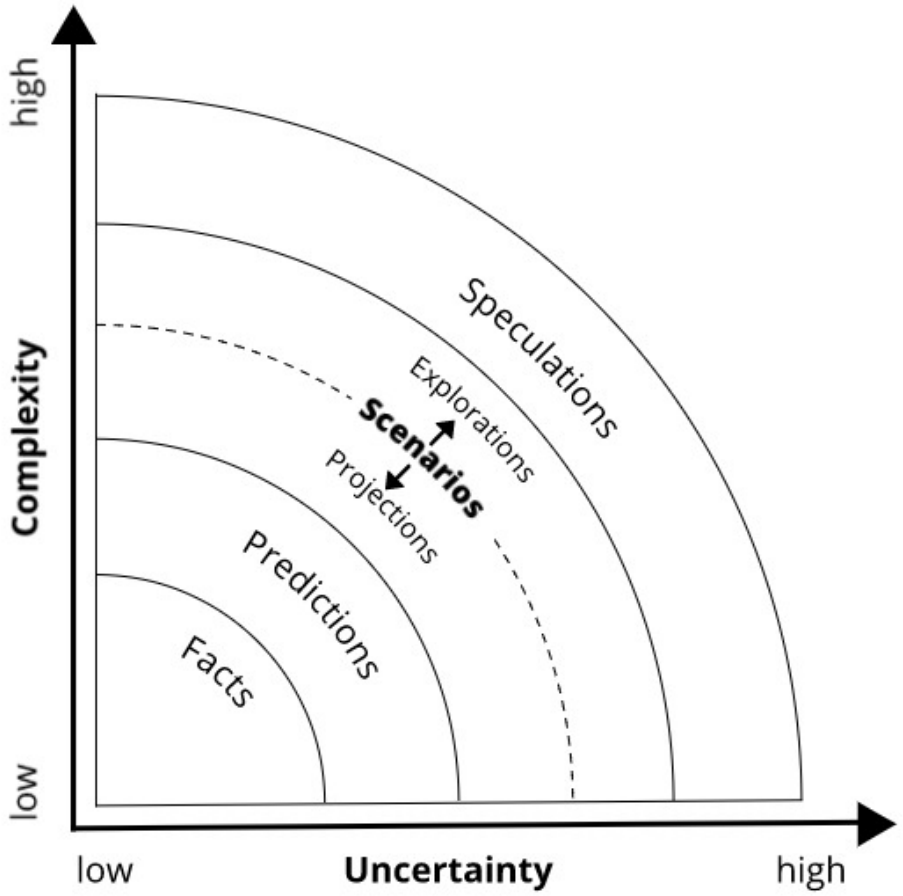
The unexpected and the novel can alter directions

Volition

Human choice matters

Source: P. Raskin

VARIOUS METHODS FOR LOOKING INTO THE FUTURE



Zurek & Henrichs 2007

HOW THE SCENARIOS METHOD HAS BEEN USED SO FAR

- Strategic planning exercises during cold war period
- Future studies in 1970s (e.g. Club of Rome)
- Royal Dutch Shell develops scenarios method for business planning in 1970/80s
- Scenarios used as conflict management tool (Montefleur scen. in SA, Colombia)
- Scenarios exercises as part of integrated, global, environmental assessments, such as the IPCC, GEO, MA in 1990 and 2000s

SCENARIO DEFINITIONS

*"**Plausible stories** about how the future might unfold **from existing patterns, new factors and alternative human choices**. The stories can be told in the language of both words and numbers."*

(Raskin 2005).

*"**Plausible descriptions of how the future may develop**, based on a coherent and internally consistent **set of assumptions** about key relationships and driving forces."*

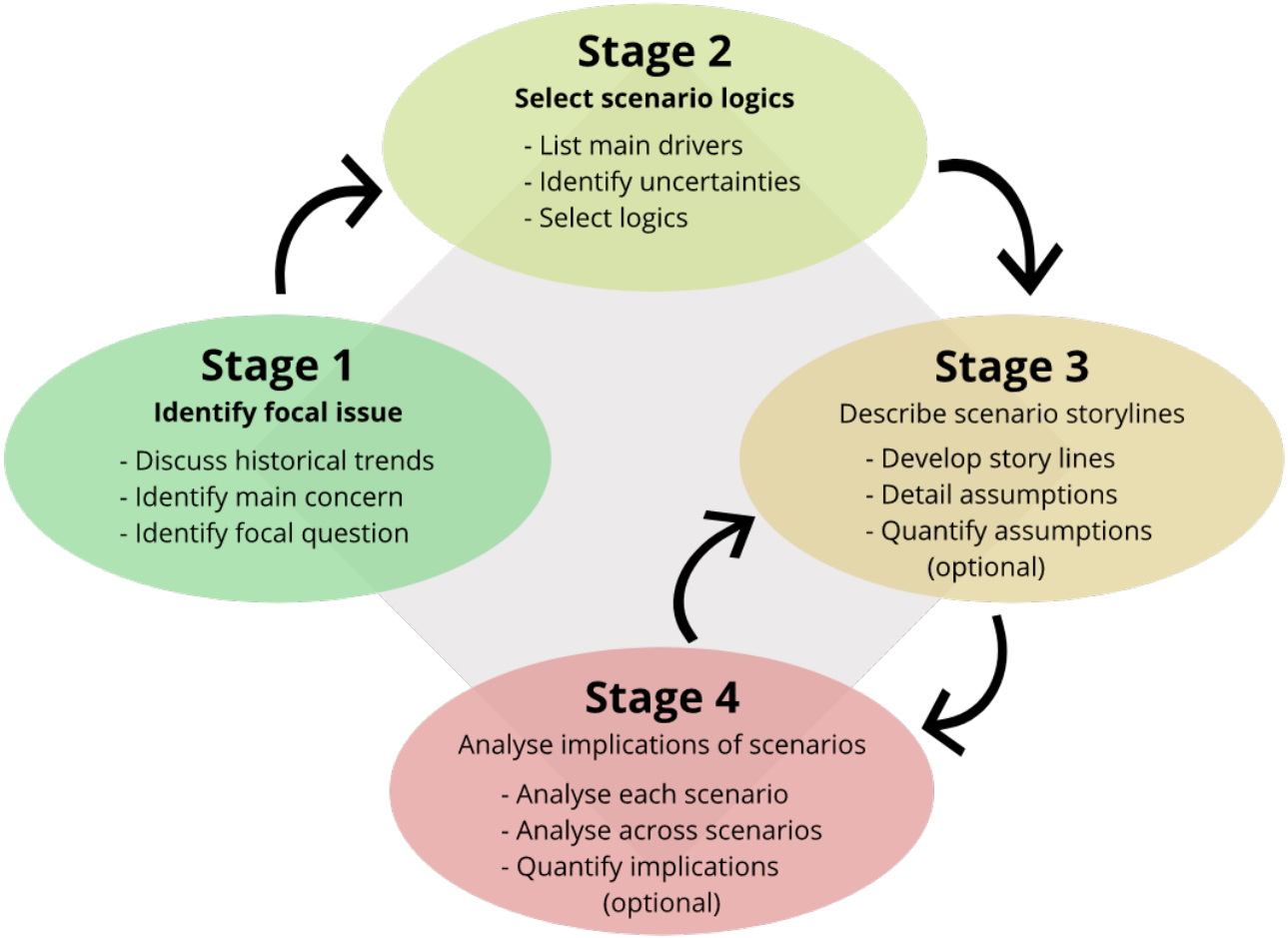
(Nakicenovic 2000).

*"A tool for **ordering one's perceptions about alternative future environments** in which one's decision might be played out."*

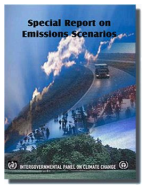
(Schwartz 1996).

*"**Plausible alternative futures**, each an example of what might happen under particular assumptions."*

(MA 2005).

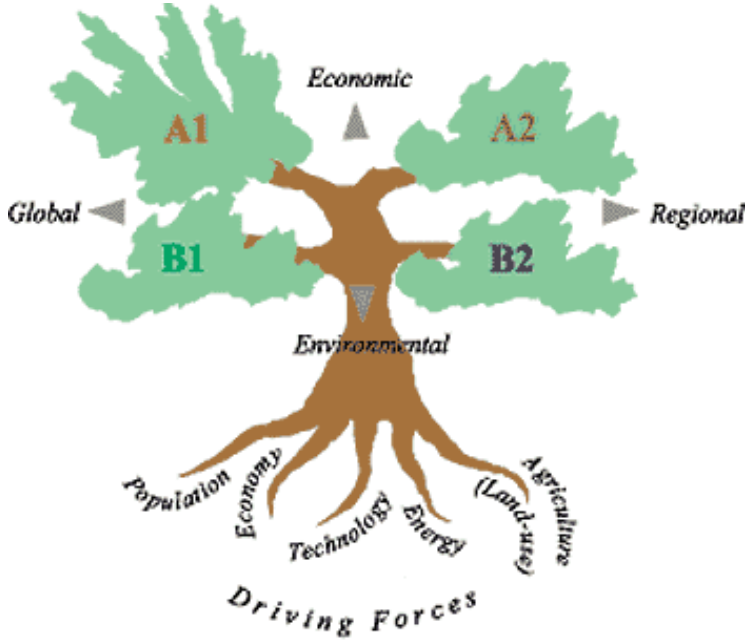


Source: Ecosystems and Human Wellbeing: A Handbook for Practitioners 2010



SRES-IPCC Scenarios

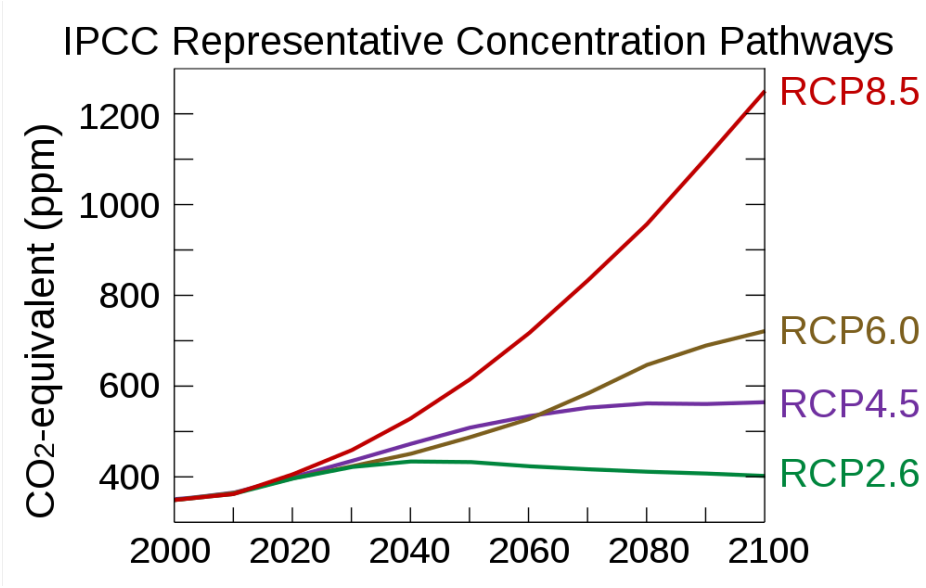
Special Report on Emission Scenarios



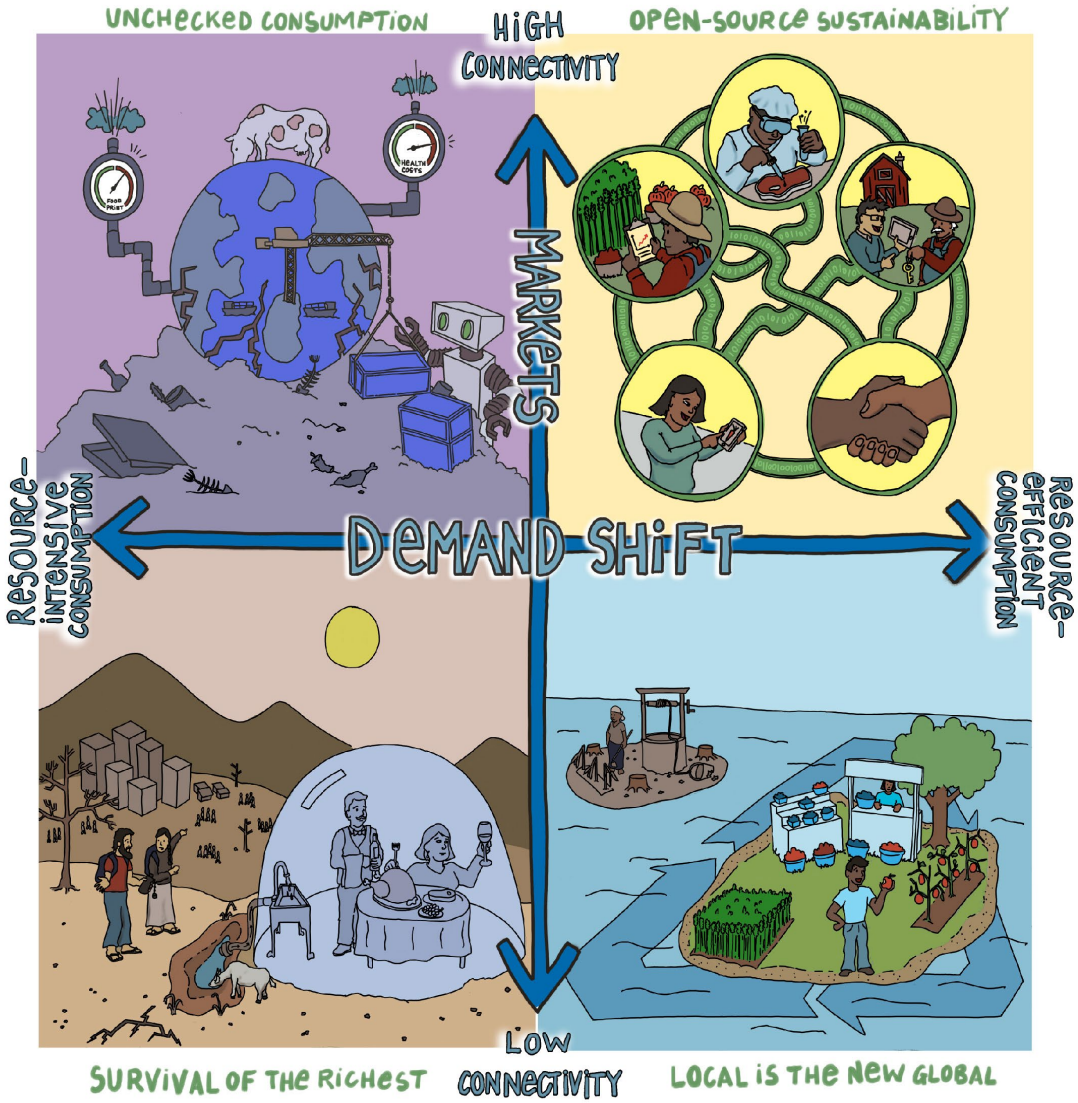
Source: Nakicenovic et al (2000)

IPCC:

Shared socio-economic pathways
Representative Concentration Pathways



World Economic Forum (2017): Shaping the Future of Global Food Systems: A Scenarios Analysis



TYPES OF SCENARIOS

- Exploratory vs. anticipatory scenarios
- Baseline vs. alternative/policy scenarios
- Qualitative vs. quantitative scenarios, or a combination

EXPLORATORY VS. ANTICIPATORY SCENARIOS

exploratory scenarios

- present -> future
- to explore uncertainties/driving forces/developments
- to test impacts of implementing specific policies

anticipatory scenarios (also 'normative' scenarios)

- present <- future
- to investigate how specific end state can be reached
- to show alternative routes to reach targets

Source: Henrichs, EEA 2003

BASELINE VS. ALTERNATIVE SCENARIOS

baseline scenarios (also 'business-as-usual' scenarios)

- describe a future development / state in which no new policies or measures are implemented apart from those already adopted or agreed upon

alternative scenarios (also 'policy' scenarios)

- take into account new policies or measures additional to those already adopted or agreed upon and/or that assumptions on key driving forces diverge from those depicted in a baseline scenario.

Source: Henrichs, EEA 2003

QUALITATIVE VS. QUANTITATIVE SCENARIOS

qualitative scenarios

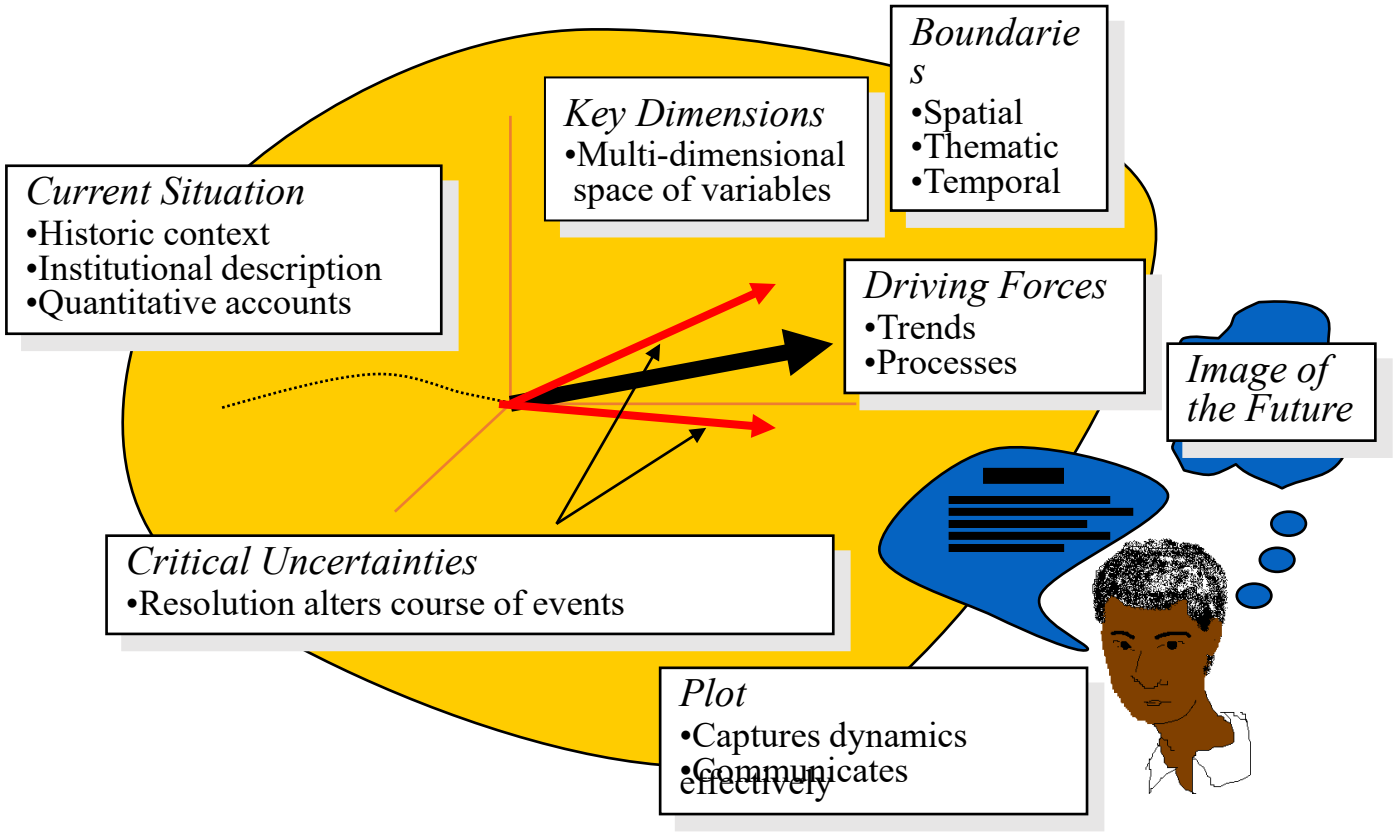
- are narrative descriptions of future developments
  (i.e. presented as storylines, diagrams, images, etc.).

quantitative scenarios

- are numerical estimates of future developments
  (i.e. presented as tables, graphs, maps, etc.)
- usually based on available data, past trends and/or mathematical models.

Source: Henrichs, EEA 2003

ANATOMY OF SCENARIOS



Source: P. Raskin 2002

WHAT CAN OBSTRUCT FORESIGHT WORK

- Emotional barriers
  - Fear of the future
  - Anxiety about uncertainties
- Cultural barriers
  - Short term thinking
  - Lack of behavioural incentives
- Institutional barriers
  - Lack of culture of conversation
  - Strong silos
  - Leadership power contest

Source: A. Wilkinson & K. van der Eslt

Questions ?

Part III :
Using Resilience and Foresight concepts to inform and develop operational guidelines on incorporating food system approaches into project planning and delivery

The Agrarian Transition

Rural and Traditional

Informal and Expanding

Emerging and Diversifying

Modernising and Formalising

Industrial and Consolidated

WWF (2022). Solving the Great Food Puzzle: 20 levers to scale national action

Six variables chosen:

1) may have a disproportionate impact on a country's ability to achieve climate and biodiversity goals

2) can influence the trade-offs that a country must contend with when implementing policy

PRODUCTION SYSTEM[35]	SELF SUFFICIENCY[36]	FOOD SECURITY[37]
The type of production system can have a large influence on the scale of land conversion and environmental impacts. Countries can be dominated by large-scale industrialized agriculture, family farms, smallholders, fisheries and aquaculture or a mix of all types.	Having sufficient land and water resources to produce enough food to meet domestic demand has a large influence on where land conversion and environmental impacts are felt. It can also have a large influence on the type of production system needed to become less import dependent.	The levels of food security within a country can have a large influence on the priority placed on achieving either human health or environmental goals. The often competing demands many countries contend with can force difficult trade-offs between achieving either health or environmental goals in the short term.
CONSUMPTION PATTERNS[16]	**BIODIVERSITY HOTSPOT[38]**	**IRRECOVERABLE CARBON[39]**
Consumption patterns within a country are a good indicator of the level of environmental impact from a country's food system and can also indicate both current and future threats to ecosystems, both domestically and abroad.	Biodiversity hotspots are regions characterized both by exceptional levels of plant endemism and serious levels of habitat loss. These areas are important because they contain high levels of biodiversity richness and endemic species.	There are some natural places that we cannot afford to lose due to their irreplaceable carbon reserves. Irrecoverable carbon is ecosystem carbon that if lost, could not be recovered by mid-century, by when we need to reach net-zero emissions to avoid the worst climate impacts

Table 2. Overview of how the three food system types were identified using the six variables chosen for this study to inform the typology.

VARIABLES	TYPE I BRAZIL AND COLOMBIA	TYPE II KENYA	TYPE III UAE
Production System	Most of the land/waters are dominated by industrial food production with a smaller share farmed/fished by smallholders and artisans.	Most of the land/waters are farmed/fished by smallholders and artisans, although some industrial food production may exist.	Most of the land/waters are dominated by industrial food production with a smaller share farmed/fished by smallholders and artisans.
Self-Sufficiency	Sufficient land and water resources exist to produce enough food to meet domestic demand. Food may still be imported but this is not driven by land and resource constraints.	Sufficient land and water resources exist to produce enough food to meet domestic demand. Food may still be imported but this is not driven by land and resource constraints.	Insufficient land and water resources exist to produce enough food to meet domestic demand. A high percentage of food needs to be imported to meet demand.
Food Security	Although enough food can be produced domestically, a large percentage of the population remain food insecure due to internal problems related to access, availability, and affordability of food.	Although enough food can be produced domestically, a large percentage of the population remain food insecure due to agricultural inefficiencies and internal problems related to access, availability, and affordability of food.	Most individuals are food secure through having physical and economic access to sufficient safe and nutritious foods to meet their dietary needs.
Consumption Patterns	Although a high level of food insecurity exists, the per capita impacts from food consumption are above planetary boundaries, mainly driven by high levels of per capita intake of animal-source foods.	The per capita impacts from food consumption are below planetary boundaries. Intake of certain foods may need to be increased to tackle burdens of undernutrition.	The per capita impacts from food consumption are above planetary boundaries, mainly driven by high levels of per capita intake of animal source foods and overconsumption of calories.
Biodiversity Hotspot	High levels of biodiversity richness are found in much of the country, with large areas considered biodiversity hotspots.	High levels of biodiversity richness are found in much of the country, with large areas considered biodiversity hotspots.	Low to moderate levels of biodiversity richness are found in the country, with no areas considered biodiversity hotspots.
Irrecoverable Carbon	High levels of carbon reserves can be found in the country with large areas containing high density reserves of irrecoverable carbon.	Moderate levels of carbon reserves can be found in the country with little to no areas containing high density reserves of irrecoverable carbon.	Low levels of carbon reserves can be found in the country with little to no areas containing high density reserves of irrecoverable carbon.

FOOD SYSTEM TYPES

In addition to the clear differences in ecology and food production systems, we can see large differences in environmental impacts. While Kenya and UAE have relatively lower greenhouse gas emissions and biodiversity loss per capita, Brazil and Colombia have significantly larger impacts (Figures 4 and 5). There is also a notable difference in per capita calorie intake, with Brazil and UAE in particular exceeding Kenya (Figure 6). These charts are illustrative of how countries' food system types differ. We have identified three food system types (Table 2) for the countries studied in this report.

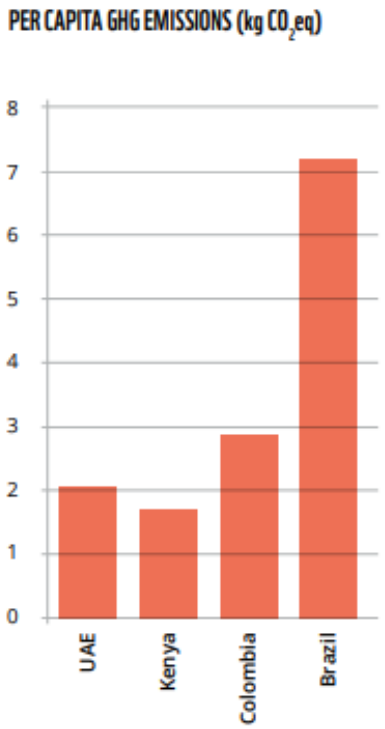


Figure 4 – Per capita food related GHG emissions in each country from farm to fork.

Source WWF (2020)[16]

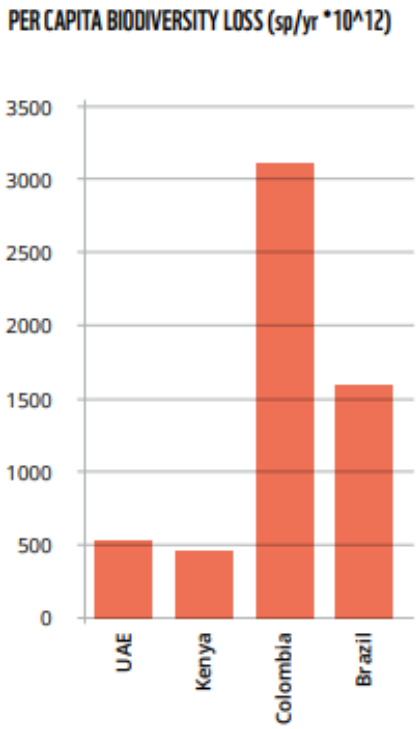


Figure 5 - Per capita biodiversity loss in each country because of current food consumption patterns.

Source WWF (2020)[16]

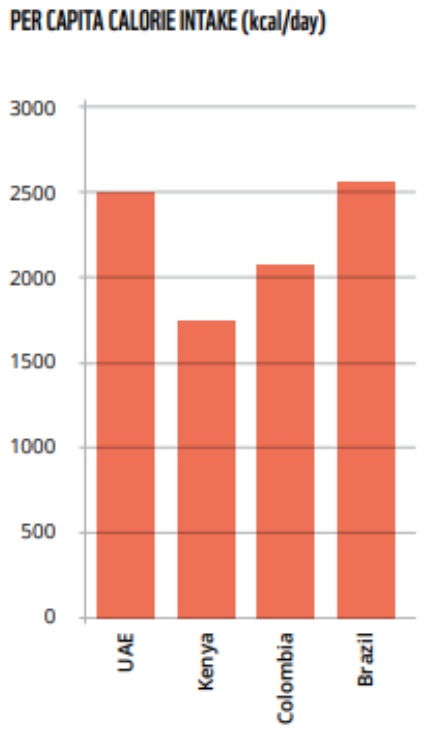
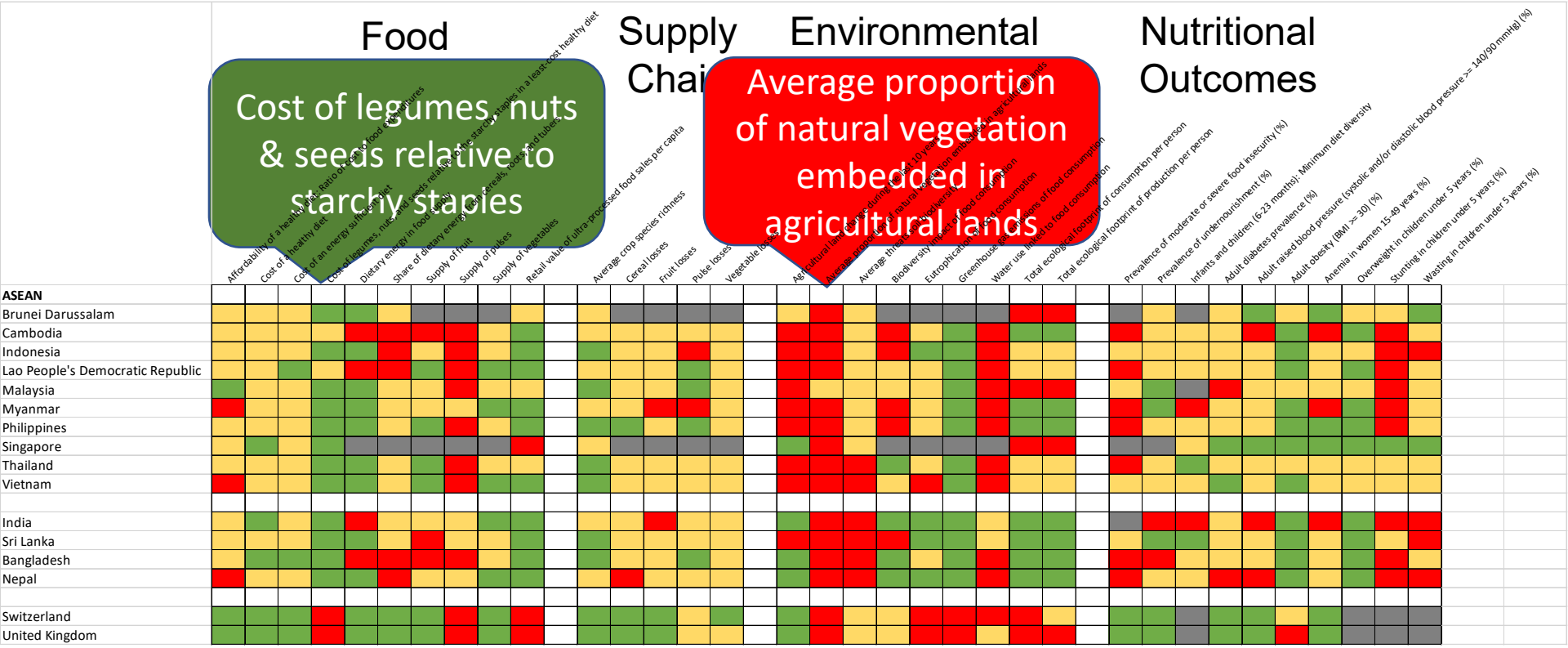


Figure 6 - Per capita calorie intake in each country based on current food consumption patterns.

Source WWF (2020)[16]

https://www.foodsystemsdashboard.org/



Unlikely to be a challenge	1	Green
Potential to be a challenge	2	Yellow
Likely to be a challenge	3	Red
Missing	0	Grey

Using Resilience and Foresight concepts on incorporating food system approaches into project planning and delivery

Reassess

Adapt

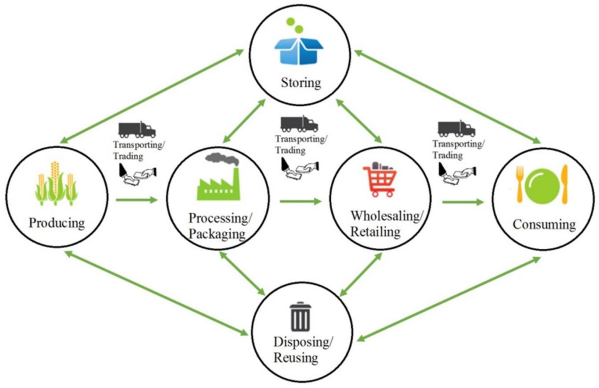
Reconsider

Transform

Project Planning & Delivery

Interventions to enhance Resilience

Food System **Activities**



Social, Economic, Political, Science & Technology and Biophysical Contexts

Exploratory

Normative

Scenarios: Shocks and Stresses

Food System **Outcomes**

Socioeconomic Outcomes

Food Security Outcomes

Environmental Outcomes

Q & A

What's next ?

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Upcoming Webinars : Final Summative Events

→ ***14th June : Technical Segment Working Sessions***

- *interactive 2 half-day sessions*
- *with ENG/FR/ESP translation available*
  - → *Please sign up !*

→ ***15th June : Summative final session***

- *last global webinar with summary and closing speeches*
- *2 slots for all timezones, with ENG/FR/ESP translation available*
  - → *received invitations for both, Please choose !*

Thank you for joining us!

See you soon….

… online ?

… in person ?