Experiences and lessons learned from the "Horizon scan of global conservation issues" and UNEP's Foresight Process

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What's the future like?

All decisions are made to influence the future.

Extrapolation

Global Biodiversity: Indicators of Recent Declines

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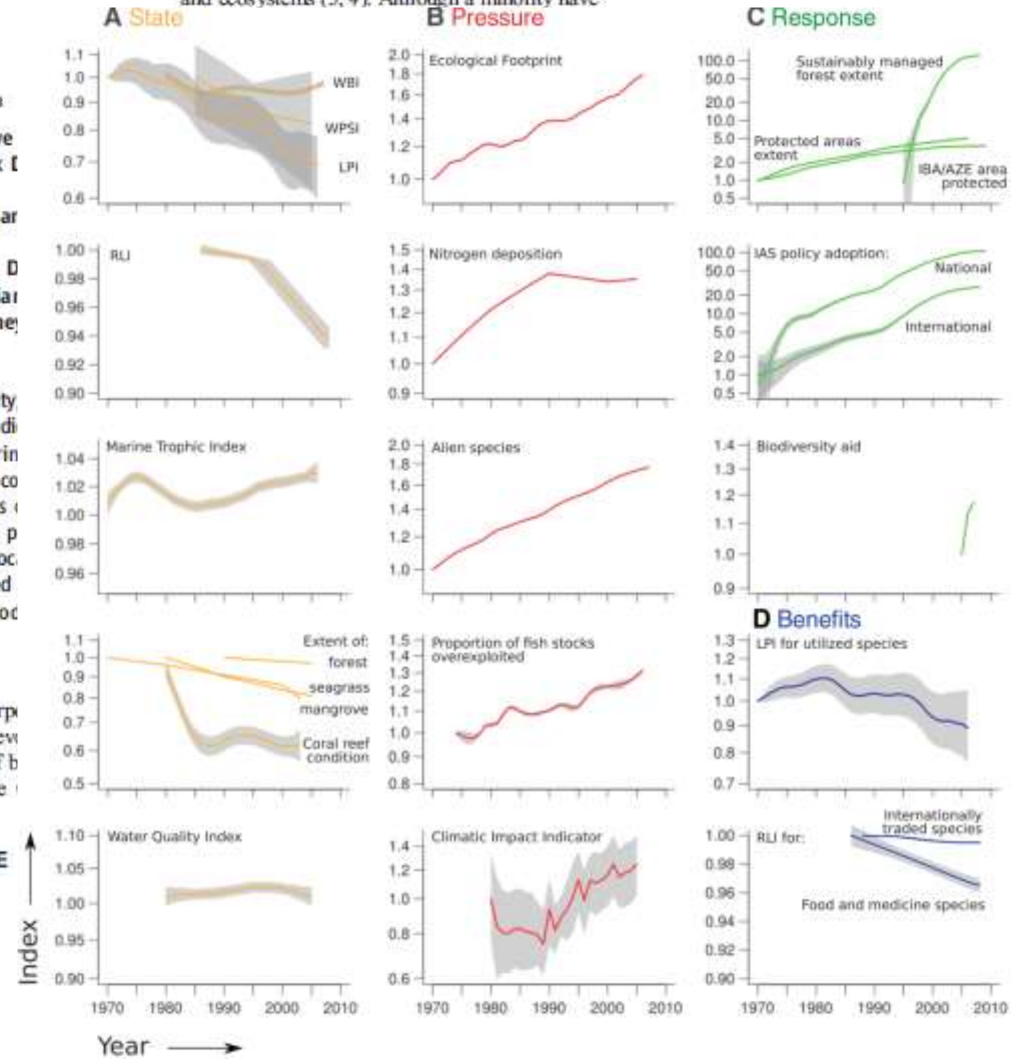
In 2002, world leaders committed, through the Convention on Biological Diversity
a significant reduction in the rate of biodiversity loss by 2010. We compiled 31 indi
on progress toward this target. Most indicators of the state of biodiversity (coverin
population trends, extinction risk, habitat extent and condition, and community co
showed declines, with no significant recent reductions in rate, whereas indicators
on biodiversity (including resource consumption, invasive alien species, nitrogen p
overexploitation, and climate change impacts) showed increases. Despite some loc
and increasing responses (including extent and biodiversity coverage of protected
sustainable forest management, policy responses to invasive alien species, and biod
aid), the rate of biodiversity loss does not appear to be slowing.

In 2002, world leaders committed, through the Convention on Biological Diversity (CBD), "to achieve by 2010 a significant reduction of the current rate of biodiversity loss" (*1*), and this

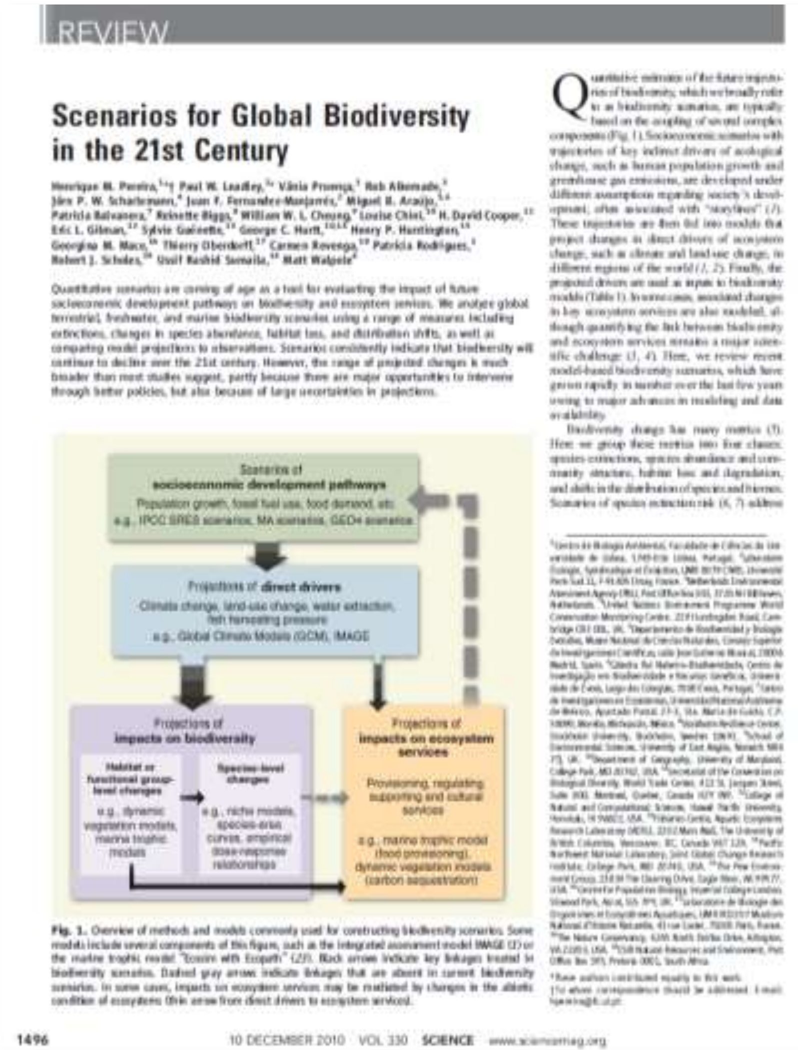
"2010 target" has been incorp
United Nations Millennium Dev
in recognition of the impact of b
on human well-being (*2*). The

framework of indicators to measure biodiversity loss at the level of genes, populations, species, and ecosystems (*3*, *4*). Although a minority have



Butchart *et al*. 2010 *Science*

Modelling



REVIEW

Scenarios for Global Biodiversity in the 21st Century

Quantitative scenarios are coming of age as a tool for evaluating the impact of future socioeconomic development pathways on biodiversity and ecosystem services. We analyze global terrestrial, freshwater, and marine biodiversity scenarios using a range of measures including extinctions, changes in species abundance, habitat loss, and distribution shifts, as well as comparing model projections to observations. Scenarios consistently indicate that biodiversity will continue to decline over the 21st century. However, the range of projected changes is much broader than most studies suggest, partly because there are major opportunities to intervene through better policies, but also because of large uncertainties in projections.

Pereira *et al*. 2010 *Science*

COMMENT

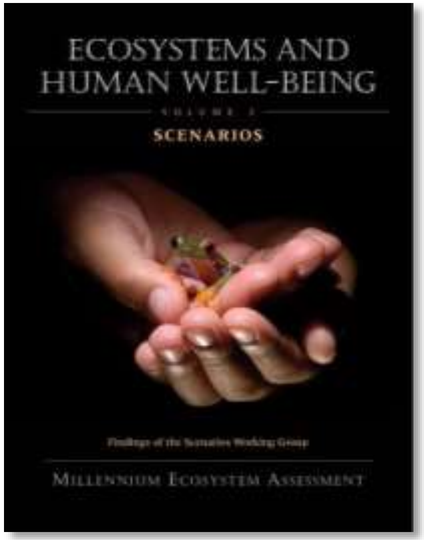
A hyena surveys a flock of flamingos in South Africa.

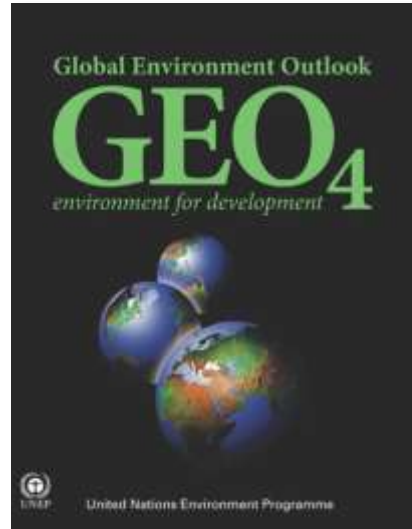
Time to model all life on Earth

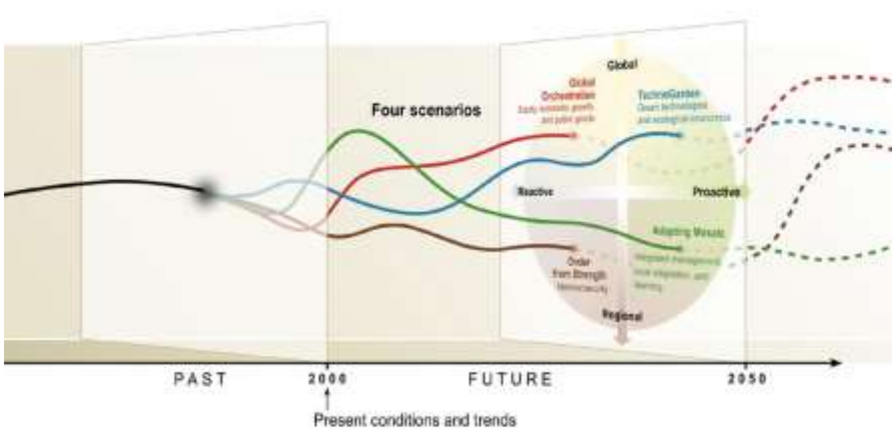
To help transform our understanding of the biosphere, ecologists — like climate scientists — should simulate whole ecosystems, argue **Drew Purves** and colleagues.

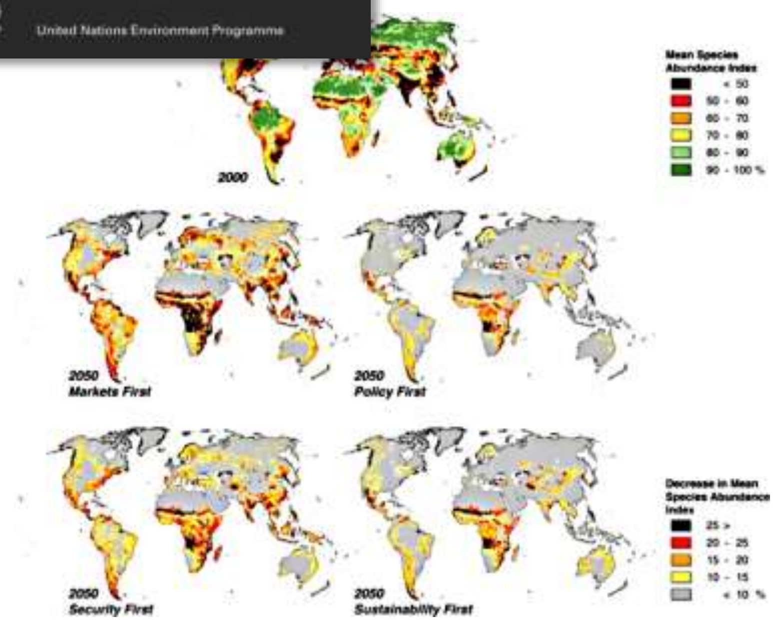
Purvis *et al*. 2013 *Nature*

Scenarios


ECOSYSTEMS AND HUMAN WELL-BEING
SCENARIOS
MILLENNIUM ECOSYSTEM ASSESSMENT


Global Environment Outlook
GEO4
environment for development
United Nations Environment Programme


Four scenarios
Global
Global Orchestration
TechnoGarden
Reactive
Proactive
Adapting Mosaic
Order from Strength
Regional
PAST
2000
FUTURE
2050
Present conditions and trends


Mean Species Abundance Index
< 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100 %
2000
2050 Markets First
2050 Policy First
2050 Security First
2050 Sustainability First
Decrease in Mean Species Abundance Index
25 >
20 - 25
15 - 20
10 - 15
< 10 %

Horizon scanning

systematic examination of potential threats, opportunities and likely developments including but not restricted to those at the margins of current thinking and planning.

exploration of novel and unexpected issues as well as persistent problems or trends.

Two horizon scanning processes

CambridgeConservationInitiative

transforming the landscape of biodiversity conservation

collaboration between University of Cambridge and 9 biodiversity conservation organisations clustered in and around Cambridge, UK

UNEP

voice for the environment within the United Nations system

Aims

CambridgeConservationInitiative
transforming the landscape of biodiversity conservation

UNEP

Identify emerging issues in time to *initiate research* and *develop policy and practical responses*.

Identify technological advances, environmental changes, novel ecological interactions, changes in society that could have impacts on the conservation of biodiversity.

International *consensus* and *priority* list of most important emerging issues related to the global environment.

Inform UN and wider international community, feed into UNEP's PoW.

Definitions of "emerging issues"

CambridgeConservationInitiative
transforming the landscape of biodiversity conservation

Unknown to participants

Globally important, or local effect on species, ecosystem or regions of global interest

Not prioritised, but issues sufficiently important to warrant new research, policy consideration or pre-emptive, cost-effective action.

UNEP

Already recognized by scientific community, insufficiently attended to by policy community

Newness of issue because of

- new scientific knowledge
- new scales or accelerated rates of impacts
- heightened level of awareness
- new ways to respond

Global, continental or 'universal'

Priority over next 1-3 years

Process

CambridgeConservationInitiative
transforming the landscape of biodiversity conservation

UNEP

CambridgeConservationInitiative	UNEP
Process informal, transparent & democratic, briefly summarised in papers	Process more complex, described in detail Ensure legitimacy through wide consultation Regional, gender and subject representation
18-25 academic and NGO scientists, horizon scanning experts, journalist	22 academic scientists
3 months	8 months
Repeated annually	Repeated every 2 years

Cambridge Conservation Initiative
transforming the landscape of biodiversity conservation

UNIVERSITY OF CAMBRIDGE
Department of Zoology

NATURAL ENVIRONMENT RESEARCH COUNCIL

University of Essex

defra
Department for Environment Food and Rural Affairs

LLOYD'S

Living With Environmental Change
LWEC

ANU
THE AUSTRALIAN NATIONAL UNIVERSITY

Environment Agency

THE ROYAL SOCIETY

UCSB

PENINSULA MEDICAL SCHOOL
UNIVERSITIES OF EXETER & PLYMOUTH

British Ecological Society

WIRED

WILDLIFE TRUST
WILDLIFE · ECOSYSTEMS · HUMANS

WETLANDS INTERNATIONAL

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

UNEP WCMC

RSPB

WILDLIFE CONSERVATION SOCIETY

British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

SFU
SIMON FRASER UNIVERSITY
THINKING OF THE WORLD

The Nature Conservancy
Protecting nature. Preserving life.

Process

Cambridge Conservation Initiative *transforming the landscape of biodiversity conservation*	UNEP
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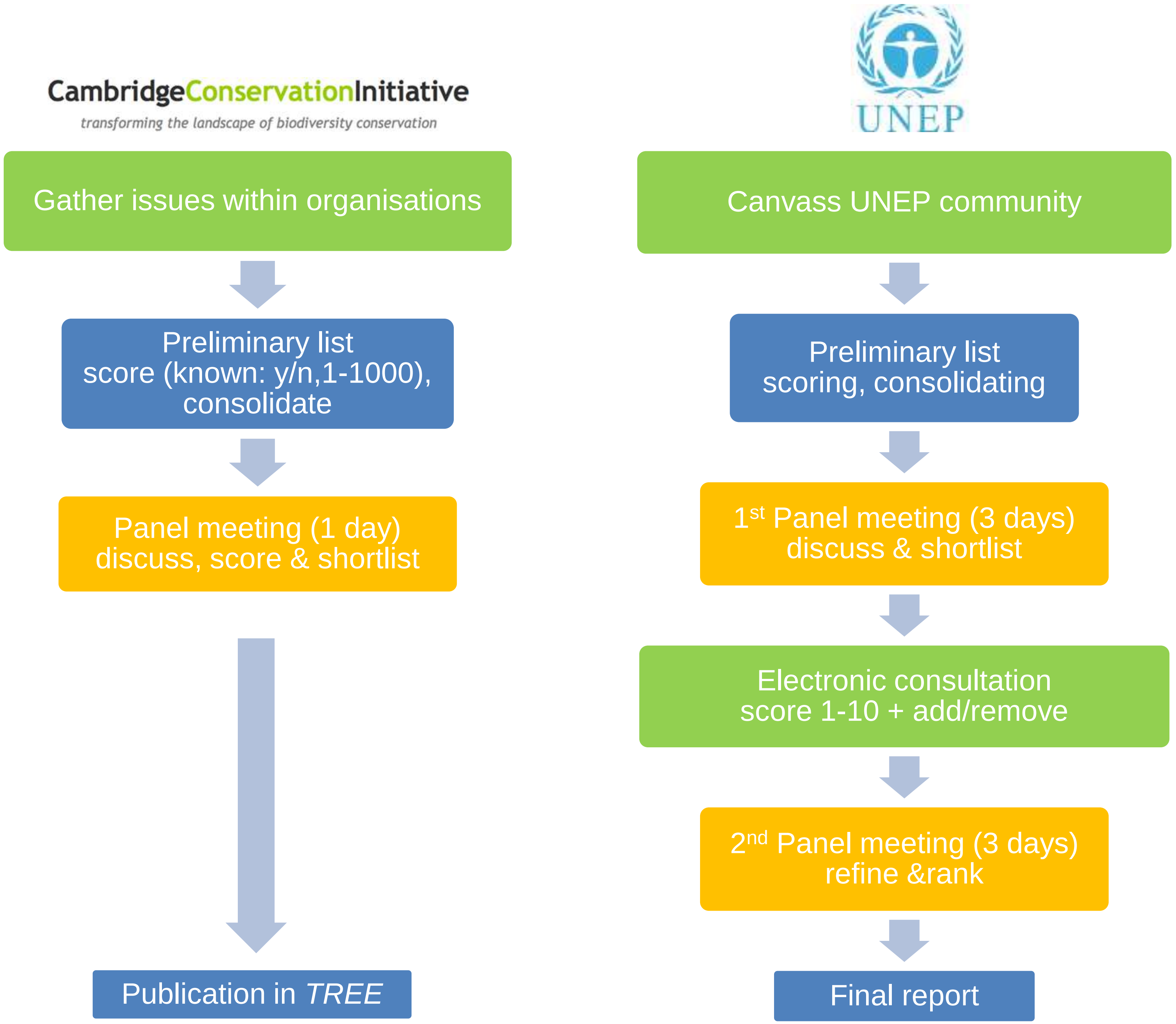
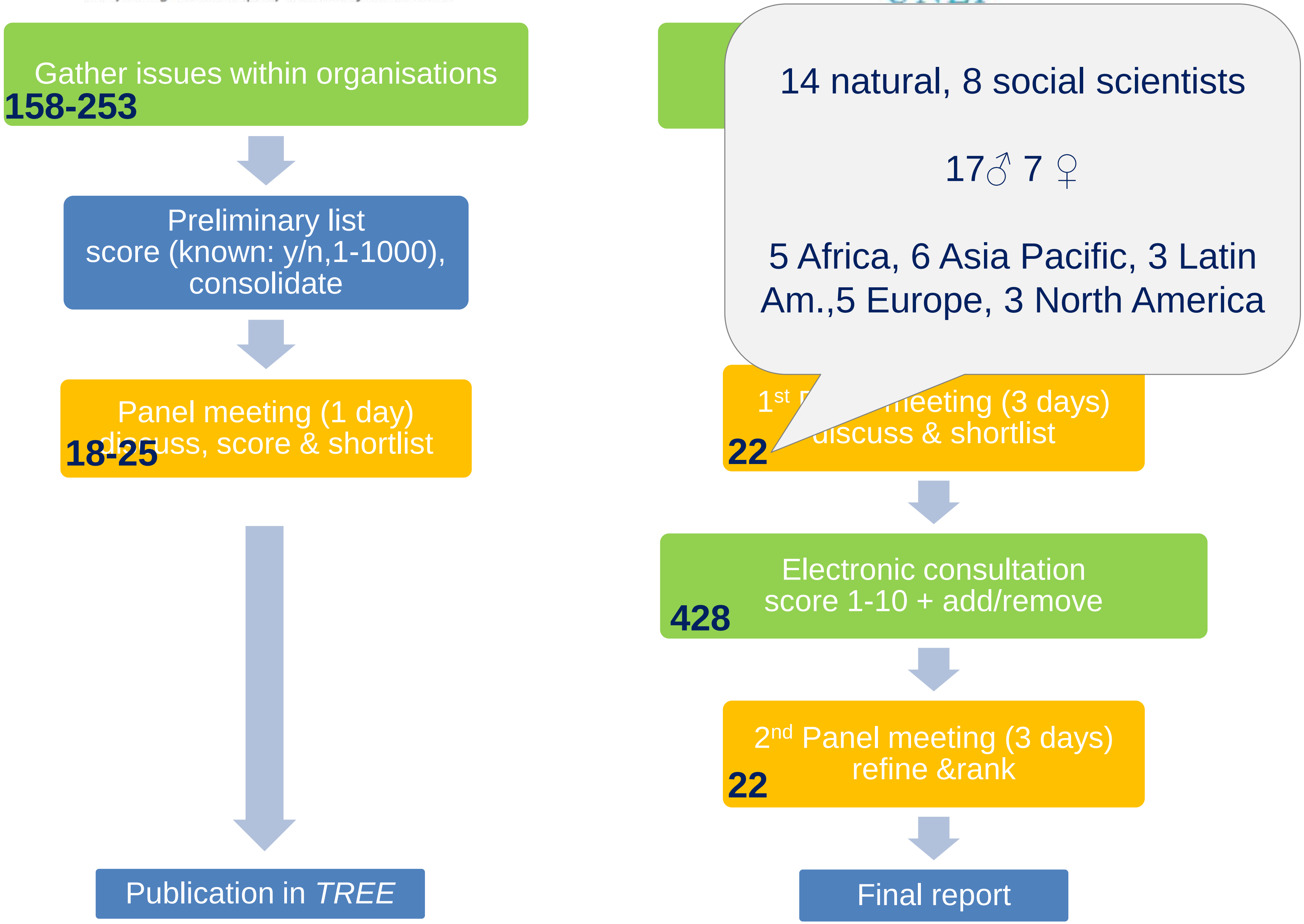
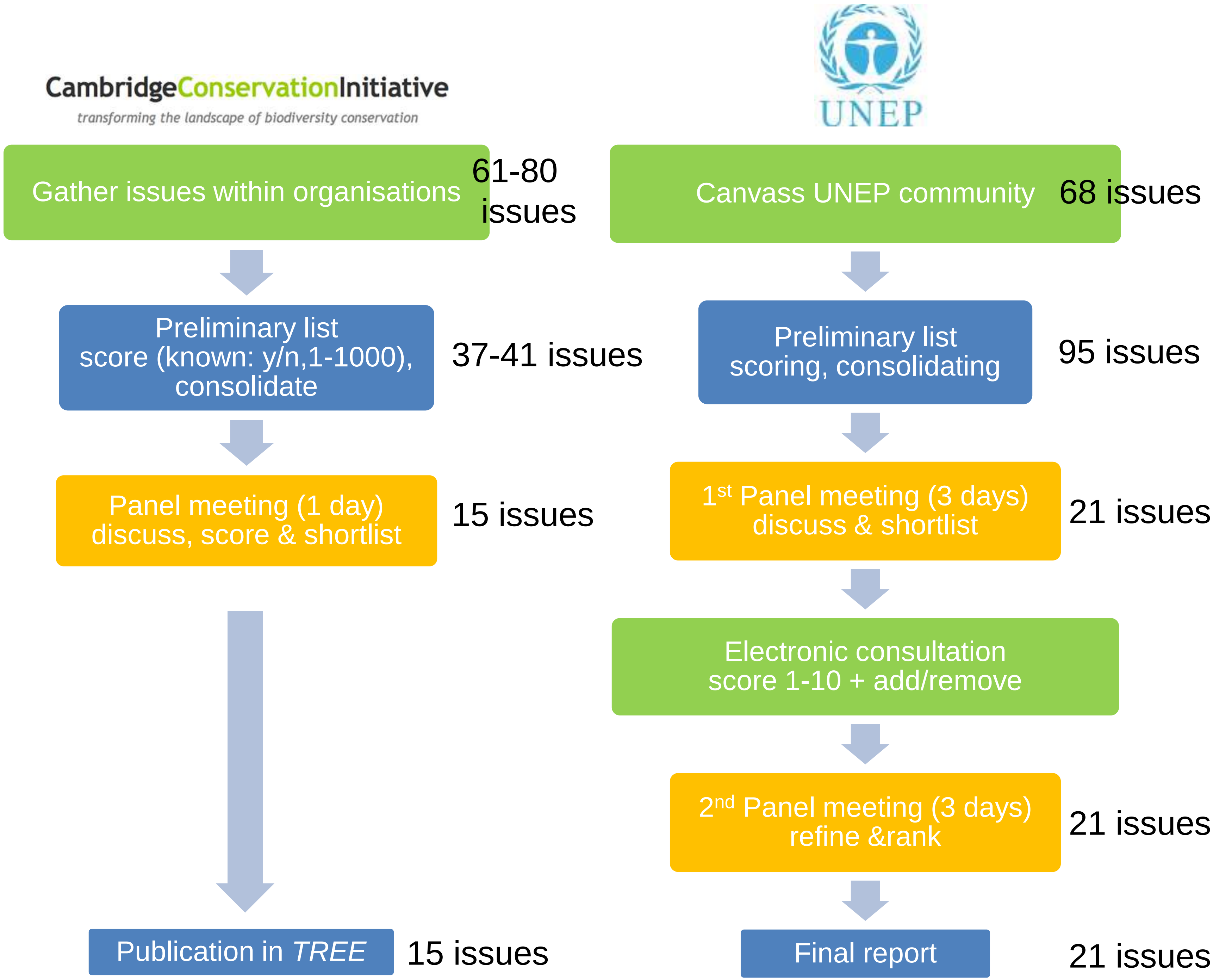

CambridgeConservationInitiative
transforming the landscape of biodiversity conservation
Gather issues within organisations
Preliminary list
score (known: y/n,1-1000),
consolidate
Panel meeting (1 day)
discuss, score & shortlist
Publication in TREE
UNEP
Canvass UNEP community
Preliminary list
scoring, consolidating
1st Panel meeting (3 days)
discuss & shortlist
Electronic consultation
score 1-10 + add/remove
2nd Panel meeting (3 days)
refine &rank
Final report

Cambridge Conservation Initiative

transforming the landscape of biodiversity conservation

UNEP



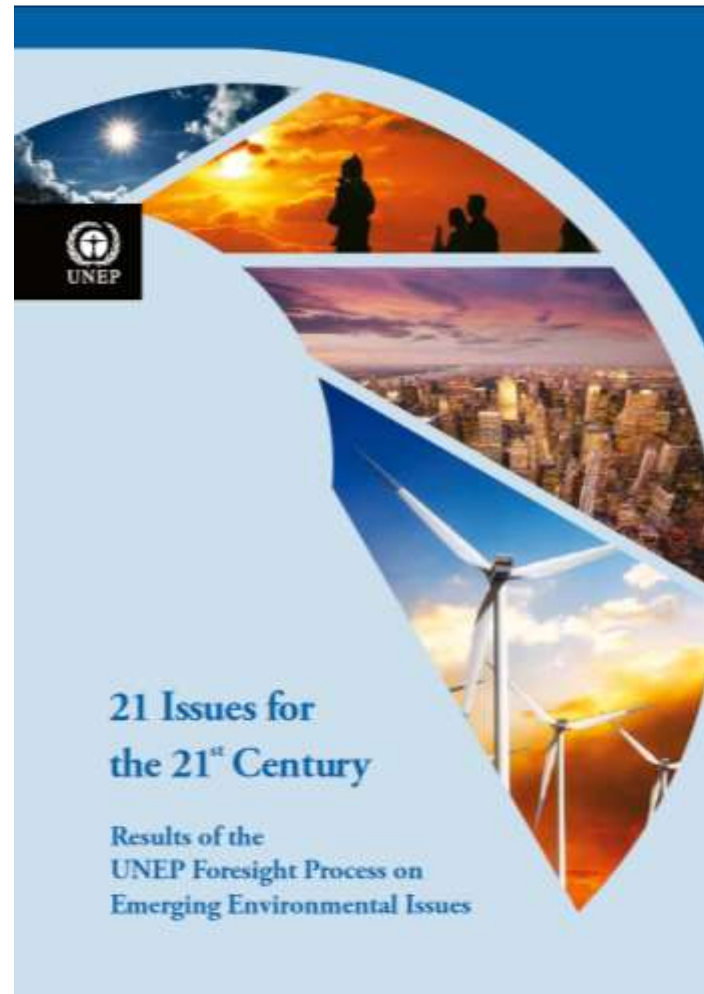

CambridgeConservationInitiative
transforming the landscape of biodiversity conservation
UNEP
Gather issues within organisations
61-80 issues
Canvass UNEP community
68 issues
Preliminary list
score (known: y/n,1-1000), consolidate
37-41 issues
Preliminary list
scoring, consolidating
95 issues
Panel meeting (1 day)
discuss, score & shortlist
15 issues
1st Panel meeting (3 days)
discuss & shortlist
21 issues
Electronic consultation
score 1-10 + add/remove
2nd Panel meeting (3 days)
refine &rank
21 issues
Publication in *TREE*
15 issues
Final report
21 issues

Outputs

CambridgeConservationInitiative

transforming the landscape of biodiversity conservation

UNEP



Outputs

CambridgeConservationInitiative

transforming the landscape of biodiversity conservation

Synthetic meat

As a response to environmental pressures, ethical concerns and human health issues, a variety of research efforts worldwide are now using technologies developed for bioengineering medical tissue to grow synthetic meat in the laboratory [20]. Muscle stem cells can be taken from live animals, multiplied in a growth medium and stretched to make muscle fibres [21]. Meat cells grown in a dish obviously do not move like their real animal counterparts, so scientists use a stimuli-sensitive scaffold of collagen or alginate to add texture to the meat. Periodic stretching of this scaffold, in response to changes in temperature or pH, exercises the cells. Despite the various technological challenges, a Dutch sausage maker has developed a process that transforms pig stem cells into muscle fibres in two weeks [22]. The greatest hurdle is still price: estimates of cost per kg vary between $10,000 [21] and $100,000 [23]. There is a promised reward of US $1 million for the first tasty *in vitro* chicken meat successfully sold to the public by the end of June 2012. Should synthetic meat become commonplace and protein production move from agricultural areas and oceans to factories, it could reduce livestock-produced greenhouse gases, demand for agricultural land and pressure on fish stocks. It might also have an adverse influence on those vegetation types dependent upon livestock grazing. The consequences would depend upon a range of factors, such as whether a majority of people would eat synthetic meat.

UNEP

Issue 021 The Environmental Consequences of Decommissioning Nuclear Reactors (Ranked #17)

15 issues

~200 word summary, references

21 issues

2-page summary, references

Outputs

Cambridge Conservation Initiative

transforming the landscape of biodiversity conservation

- Rapid growth of concentrated solar
- Widespread development of thoriun
- Seabed-located oil drilling and proc
- Accelerating water cycle
- Proliferation of hydropower in the A
- Species loss as a driver of global er
- Vegetarian aquaculture feed
- Rapid rise in global demand for coc
- Detecting aquatic species with envi
- Use of coral nurseries for reef resto
- Forest conservation and restoration vehicles
- The 3D printing revolution
- Link between biodiversity, allergy, a
- Commercial use of antimicrobial pe
- Synthetic genetics

UNEP

Issue ID	Issue Title	Ranking*
	Cross-cutting issues	
001	Aligning Governance to the Challenges of Global Sustainability	1
002	Transforming Human Capabilities for the 21st Century: Meeting Global Environmental Challenges and Moving Towards a Green Economy	2
003	Broken Bridges: Reconnecting Science and Policy	4
004	Social Tipping Points? Catalyzing Rapid and Transformative Changes in Human Behaviour towards the Environment	5
005	New Concepts for Coping with Creeping Changes and Imminent Thresholds	18
006	Coping with Migration Caused by New Aspects of Environmental Change	20
	Food, biodiversity and land issues	
007	New Challenges for Ensuring Food Safety and Food Security for 9 Billion People	3
008	Beyond Conservation: Integrating Biodiversity Across the Environmental and Economic Agendas	7
009	Boosting Urban Sustainability and Resilience	11
010	The New Rush for Land: Responding to New National and International Pressures	12
	Freshwater and marine issues	
011	New Insights on Water-Land Interactions: Shift in the Management Paradigm?	6
012	Shortcutting the Degradation of Inland Waters in Developing Countries	15
013	Potential Collapse of Oceanic Systems Requires Integrated Ocean Governance	13
014	Coastal Ecosystems: Addressing Increasing Pressures with Adaptive Governance	19
	Climate change issues	
015	New Challenges for Climate Change Mitigation and Adaptation: Managing the Unintended Consequences	7
016	Acting on the Signal of Climate Change in the Changing Frequency of Extreme Events	16
017	Managing the Impacts of Glacier Retreat	21
	Energy, technology, and waste issues	
018	Accelerating the Implementation of Environmentally-Friendly Renewable Energy Systems	7
019	Greater Risk than Necessary? The Need for a New Approach for Minimizing Risks of Novel Technologies and Chemicals	10
020	Changing the Face of Waste: Solving the Impending Scarcity of Strategic Minerals and Avoiding Electronic Waste	14
021	The Environmental Consequences of Decommissioning Nuclear Reactors	17

Lessons learned

- Aim, incl. audience & use of outputs
- Interdisciplinary
  – Participant composition/expertise
- Threats & opportunities
- Scanning of issues – link to existing databases (e.g. ministries, military)
- Discussion, panel size
- Definitions (what is emerging, scope/severity/probability/timing)

When is the right time?

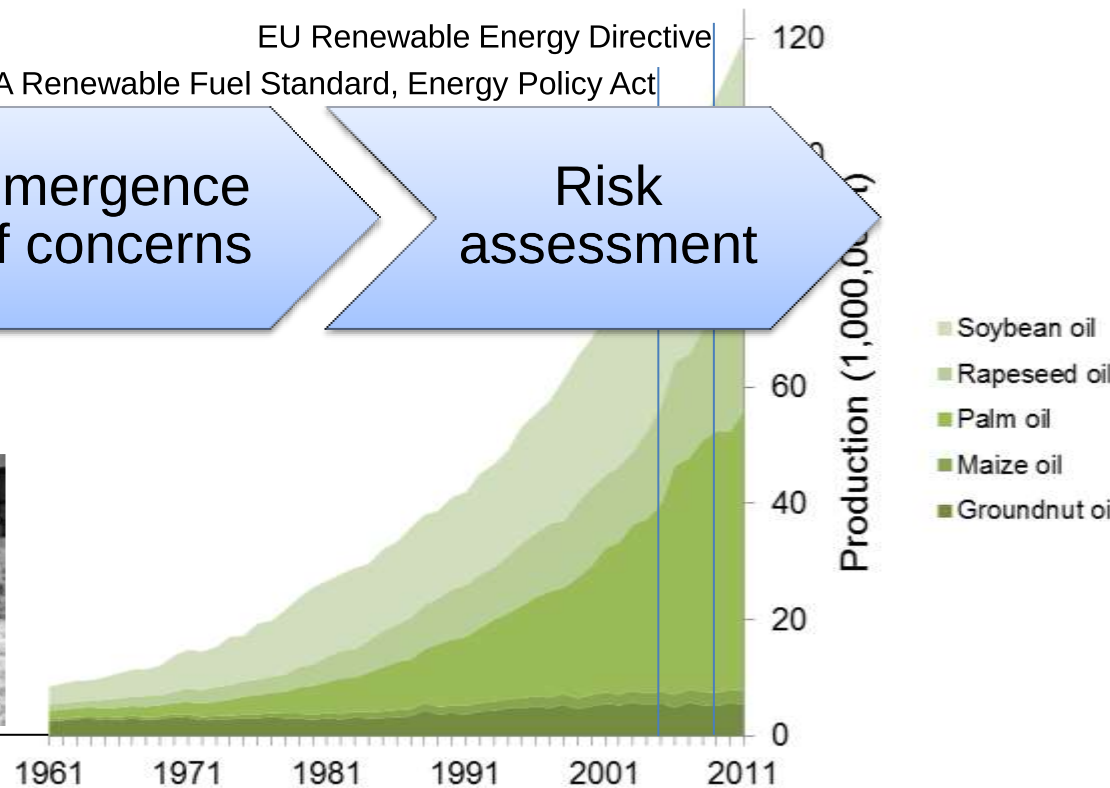
Technology development → Initial production → Advocacy

Exponential increase in use → Emergence of concerns → Risk assessment

1892

1886

1933



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- Discussion, panel size
- Definitions (what is emerging, scope/severity/probability/timing)
- Make results accessible, follow with action
- Evolving process, flexible
- Feels uncomfortable

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