UNEP

21 Issues for the 21st Century

Results of the UNEP Foresight Process on Emerging Environmental Issues

What is an Emerging Issue ?

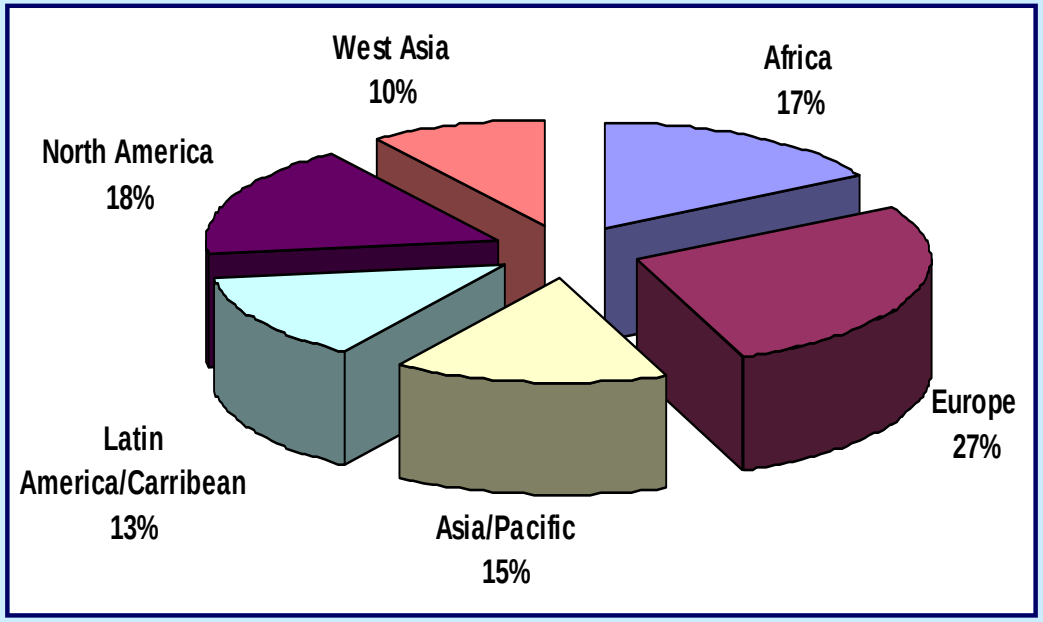
An emerging issue in the UNEP Foresight Process …

- is critical to the global environment; can be either positive or negative.
- must be environmental in nature, or environmentally-related.
- should be given priority over the next one to three years in work programmes of UNEP and/or other UN institutions and/or other international institutions.
- has to be of large spatial scale → global, continental, "universal".
- must be recognized as *very important* by the scientific community, but has not yet received *adequate attention* from the policy community. Hence, it is considered an "emerging issue" from the perspective of the policy community.
- → Definitions of "very important" and "adequate attention" left open.

Why a UNEP Foresight Process?

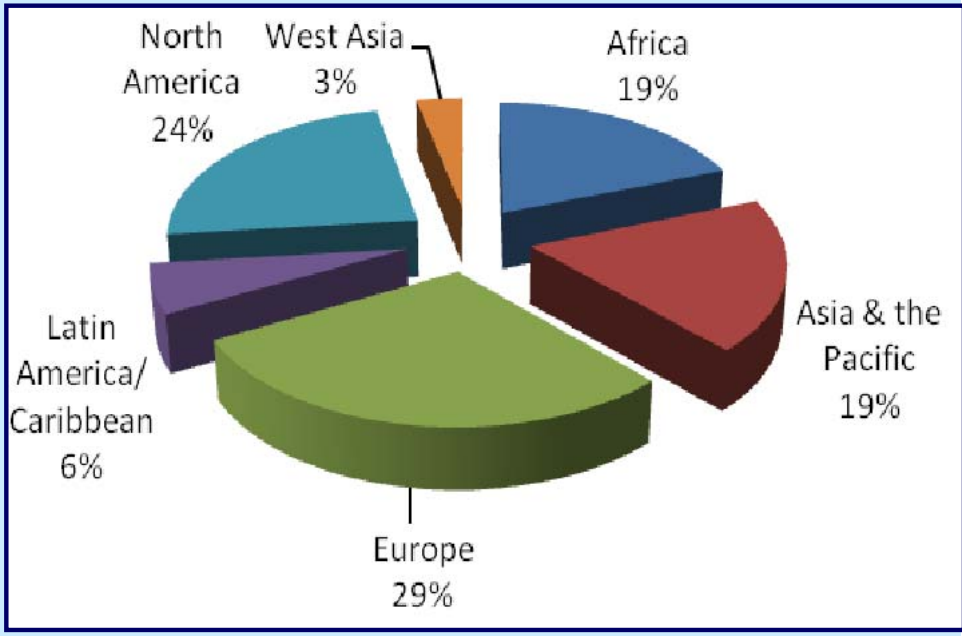
- **UNEP Science Strategy – UNEP stronger leadership role in identifying and prioritizing emerging global environmental issues.**
- **Ensure that the UN community and the environmental policy community are aware of most critical emerging issues having to do with the environment → help set the policy agenda.**
- **Make identification of issues more systematic for PoW.**
- **→** ***Input to Rio +20.***

What is the UNEP Foresight Process?



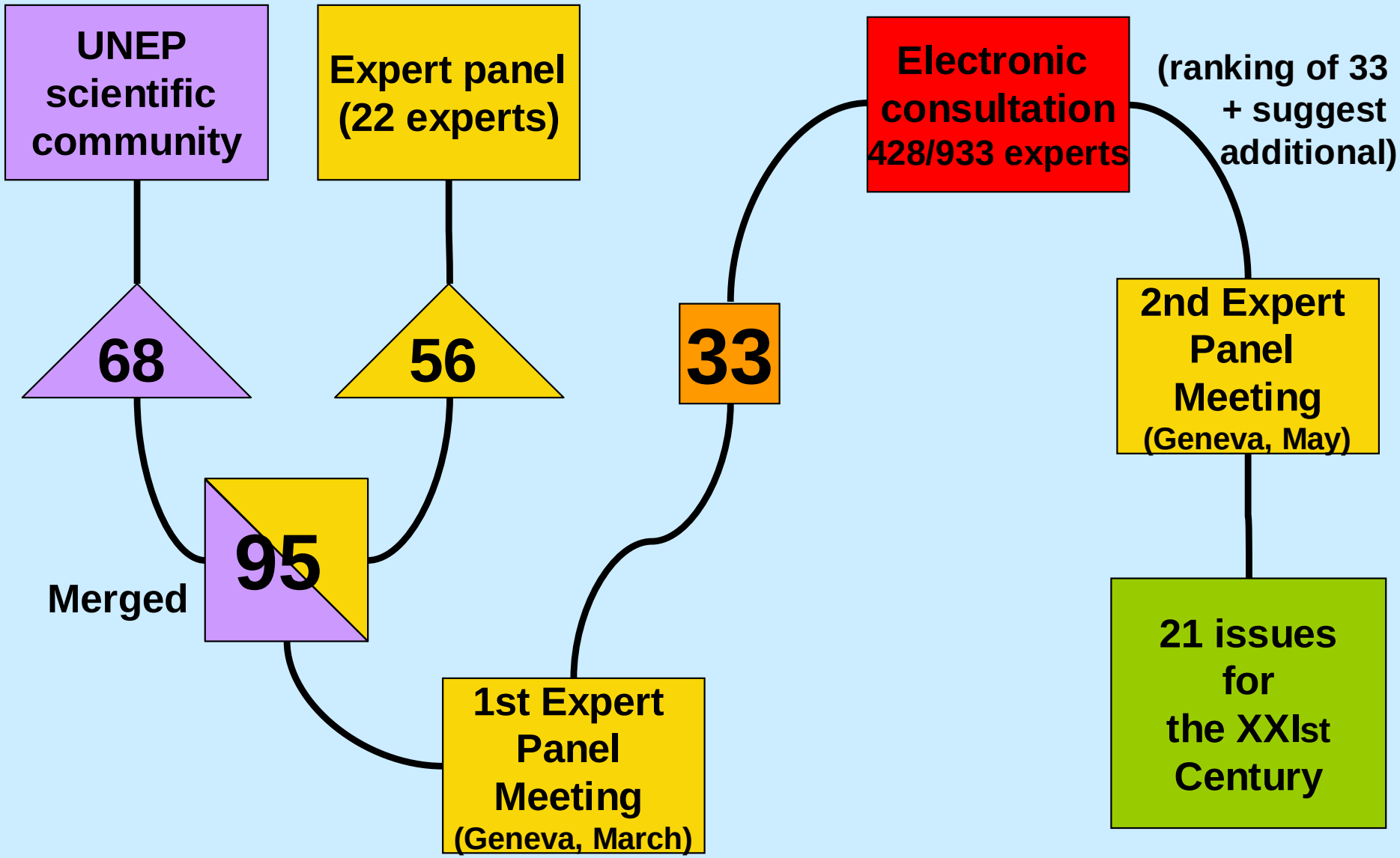
Regional Profile of Respondents to the Electronic Consultation

Scientists



Major Groups

A 5 steps process



Final List of Issues

Covers the major environmental themes of:

- ✓ Food and Land
- ✓ Freshwater and Marine
- ✓ Biodiversity
- ✓ Climate Change
- ✓ Energy, Technology, Waste

Also includes cross-cutting issues, e.g.

Governance, sustainable resource consumption, bridging science and policy

Cross-cutting Issues

Aligning Governance to the Challenges of Global Sustainability (Ranked #1).

Challenge: Current system of international environmental governance (complexity of MEAs) unsuited for the 21st century? System lacks representativeness, accountability, and effectiveness for the transition to sustainability

Action: Higher level of participation and transparency. Harmonization of MEAs. Explore range of governance structures – public-private partnerships; alliances of civil society groups.

Transforming Human Capabilities for the 21st Century: Meeting Global Environmental Challenges and Moving Towards a Green Economy (Ranked #2)

Challenge: Needed: New variety of skills and capabilities; capacity building in developing countries to leap-frog traditional development pathways.

Action: Training in new areas – renewable energy planning and production, integrated water resource management, assessments of ecosystem services, multi-use ecosystem management, ecosystem-based adaptation to climate change; Strengthening multi-disciplinary education at universities.

Cross-cutting Issues

Broken Bridges: Reconnecting Science and Policy (Ranked #4)

The Challenge: Weakening connection between the policy and science communities: public confidence lower, knowledge fragmented across many institutions and databases. Hinders development of solutions to global environmental change.

Actions: Need to reexamine how science is organized & how science-policy interface can be improved: participatory assessments, improved communication tools, innovative approaches?

Egypt, 2011

Social Tipping Points? Catalyzing Rapid and Transformative Change in Human Behavior for the Environment **(Ranked #5)**

The Challenge: New social science research → How public policy can "rapidly" modify human behaviour in positive direction (e.g. public attitudes towards smoking).

Actions: How to apply to sustainable consumption? What public incentives – economic, informative, prohibitive – would work best to achieve a transition to sustainable consumption?

Cross-cutting Issues

New Concept for Coping with Creeping Changes and Imminent Thresholds (Ranked #18).

Challenge: Many human interaction with the natural environment are causing slow, incremental and cumulative degradation; e.g., stratospheric ozone depletion, acid rain, air pollution, and deforestation → These are normally overlooked when they are easiest to address.

Action: Creeping changes should be addressed early on to avoid reaching tipping points or crisis situation. New monitoring strategy and new types of warning and response systems are needed.

Coping with Migration Pressures caused by New Aspects of Environmental Change (Ranked #20)

Challenge: Climate change and other global environmental change may become an important factor in increasing human migration. Also, some policies to limit global environmental change such as increasing production of biofuels or hydropower dam may result in increased migration.

Action: New institutions and services are needed to adequately plan/prepare for, and deal with such massive population movements, at all levels of governance.

Food and Land Issues

New Challenges for Ensuring Food Safety and Food Security for 9 Billion (Ranked #3)

Challenge – Competition from bioenergy production, diminishing phosphorus supplies, increasing water scarcity …

Actions – Improving the food-processing pathway, reducing food waste, boosting agricultural efficiency, new Green Revolution?

Boosting Urban Sustainability and Resilience (Ranked #11)

Challenge: Urban areas will play a key role in future local and global environmental change due to continuing urbanization. This will affect land use and cover, biodiversity, and the hydrologic cycle locally and regionally.

Action: Practical steps such as building ecological and environmentally-friendly cities are needed to boost the sustainability and resilience of urban areas and to assist in the transition to a green economy.

The New Rush for Land: Responding to New National & International Pressures (Ranked #12)

Challenge – Increasing outside investments in African agricultural land, new wave of mining, energy cropping, carbon plantations, ….

Actions – Assessment of scale of land pressures, main countries at risk, implications for livelihoods, food security, and conflict.

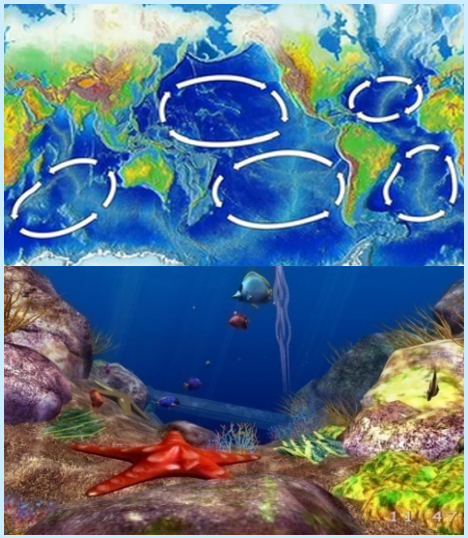
Freshwater and Marine Issues

New Insights on Water-Land Interactions:

Shift in the Management Paradigm **(Ranked #6)**

Challenge – New understanding of interactions between land and water → e.g., change in land use affects downwind rainfall → this has important implications for how water and land are managed

Actions – A new impetus for boosting water use efficiency and for bringing water and land management closer is needed



Potential Collapses of Oceanic Systems Requires Integrated Ocean Governance (Ranked #13)

Challenge – Acidification, overfishing, land & marine-based pollutions, widespread habitat destruction and proliferation of invasive species → posing threat to long-term integrity of oceans → current management approach are ineffective for avoiding potential ocean collapse because responsible bodies are currently widely dispersed

Actions – Reforms and new form of governance system which would encourage countries to partner or have similar approach to governance is needed → This could also take the form of a new coordinating body under which countries can cooperate.

Freshwater and Marine Issues

Shortcutting the Degradation of Inland Waters in Developing Countries (Ranked Joint #15)

Challenge – Water quality degradation, channel modifications, overfishing → posing growing threat to freshwater ecosystems of developing countries.

Actions – Developing countries have the option of shortcutting degradation by taking advantage of forward-looking water technology and management, e.g., artificially constructed wetlands.

"Constructed wetlands" for wastewater treatment

Adaptive Governance for Addressing Increasing Pressures on Coastal Ecosystems (Ranked #19)

Challenge – Increased pressure from the exploitation of coastal resources is degrading coastal ecosystems → Affecting the economic, social and environmental gains from coastal ecosystems → current coastal management options are inadequate for stemming the degradation

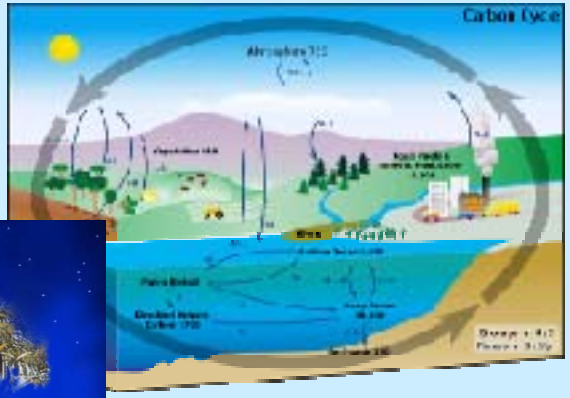
Actions – Needed → An adaptive governance approach that involves the delegation of management rights and power in a way that ensures the participation of all stakeholders.

Biodiversity Issue

Beyond Conservation: Integrating Biodiversity Across the Ecological and Economic Agendas **(Ranked Joint #7)**

Challenge – New trends of research have documented the interrelationship between biodiversity and other aspects of society and nature → one thread highlights the linkage between biodiversity and other ecological issues, while the other highlights the interrelationship between biodiversity and economics → These two scientific insight warrants a paradigm change in the way biodiversity is currently being managed.

Actions – It is time for biodiversity management to go beyond mere nature conservation → Biodiversity should be fully integrated into the global ecological and economic agendas.



Climate Change Issues

Climate Change Mitigation & Adaptation:
Managing the Unintended Consequences
(Ranked Joint #7)

Challenge – Mitigation & adaptation measures aimed at coping with climate change may cause unintended problems

Actions – Minimize unintended side effects → e.g., problems with scale-up – wind parks & their ecosystem impacts; reduction of ecosystem services – e.g. sea walls replacing wetlands; risks to global climate system – geoengineering schemes; economic impacts – high cost of renewable energy for developing countries

Acting on the Signal of Climate Change in the Changing Frequency of Extreme Weather Events (Ranked #16)

Challenge – Recent studies comparing modelling and observatory results have confirmed hypothesis that climate change could alter the frequency of occurrence of extreme weather events.

Actions – These new studies underline the urgency for adapting to a changing frequency of extreme weather events and suggest that "medium term" early warning systems may be possible.

Climate Change Issues

Consequences of Glacier Retreat: Economic and Social Impacts **(Ranked #21)**

Challenge – Recent research shows that the rates of glacier retreat are much faster than previously predicted → These changes pose threats to many, especially in the Himalayas, Central Asia and South American Andes regions → Risks include a disruption of water supply patterns which could aggravate conflicts and threaten livelihoods.

Actions – A good understanding of the hydrological consequences and social impact of glacier retreat is needed. Equally urgent is the development of adaptation strategies.

Energy Issue

Accelerating the Implementation of Environmentally-Friendly Renewable Energy Systems (Ranked Joint #7)

Challenge – As the world seeks solutions to climate change it looks increasingly towards implementing renewable energy systems → But the large potential for renewable energy has not been realized due to many barriers.

Actions – An important task is to identify the means to remove the economic, regulatory, and institutional disadvantages that make renewable energy less competitive than other conventional sources.

Waste and Technology Issues

Greater Risk than Necessary: The Need for New Approaches to Minimizing Risks of Novel Technologies and Toxic Chemicals **(Ranked #10)**

Challenge – We are fixed in a pattern by which society first produces new technologies and chemicals and then *ex post facto* tries to evaluate their impacts; e.g., synthetic biology & nanotechnology

Actions – A new approach is needed in which the implications of new technologies and chemicals are first systematically and comprehensively assessed before they reach production phase with the aim to minimize their risks to society and nature.

Changing the Face of Waste: Solving the Impending Scarcity of Strategic Minerals and Avoiding Electronic Waste **(Ranked #14)**

Challenge – Increased demand for high-tech and renewable energy equipment, planned obsolescence, and other wasteful manufacturing habits are contributing to a depletion in strategic minerals and also causing build-up of electronic wastes (e-waste).

Actions – An alternative approach by which recovery of metals and other materials from e-waste and other waste streams is maximized need to be considered, with the aim to slowdown the extraction and depletion of minerals, reduce the quantity of wastes, and thereby lessen their associated environmental and other impacts.

Waste and Technology Issues

The Decommissioning of Nuclear Reactors and their Environmental Consequences (Ranked Joint #17)

Challenge – Existing nuclear reactors are aging. Earlier estimate: number of plants to be decommissioned doubles over next decade. Fukushima accelerates trend. Large quantity of radioactive materials. Minimize threat to humans & environment.

Actions – International assessments, interventions, procedures, policies needed to minimize the danger of decommissioning activities to humans and the environment.

21 issues for the 21st Century

Issue Title	Ranking *
Aligning Governance to the Challenges of Global Sustainability	1
Transforming Human Capabilities for the 21st Century: Meeting Global Environmental Challenges and Moving Towards a Green Economy	2
New Challenges for Ensuring Food Safety and Food Security for 9 Billion	3
Broken Bridges: Reconnecting Science and Policy	4
Social Tipping Points? Catalyzing Rapid and Transformative Change in Human Behavior for the Environment	5
New Insights on Water-Land Interactions: Shift in the Management Paradigm	6
Accelerating the Implementation of Environmentally-Friendly Renewable Energy Systems	7 **
Climate Change Mitigation and Adaptation: Managing the Unintended Consequences	7 **
Beyond Conservation: Integrating Biodiversity Across the Ecological and Economic Agendas	7 **
Greater Risk than Necessary? The Need for New Approaches to Minimizing Risks of Novel Technologies and Chemicals	10
Boosting Urban Sustainability and Resilience	11
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Consequences of Glacier Retreat: Economic and Social Impacts	21

* Ranking based on scoring of UNEP Foresight Panel after extensive deliberations and after consideration of polling results of over 400 scientists worldwide.
** Score not statistically different

What's next ?

- **Launch of the FP report at the UNEP governing council (Feb. 2012)**
- **Using the FP results in Rio+20.**
- **Conduct analyses of the 21 issues (a first study was published on issue #17 decommissioning nuclear power plants)**
- **A foresight process on best solutions?**

Summing Up Foresight Process

- ✓ 21 compelling issues with broad consequences for many audiences
- ✓ Cover all major themes → climate, biodiversity, hazardous substances and waste, freshwater, land/food, energy, cities, oceans, coastal zone
- ✓ But also 7 cross-cutting issues → governance, resource consumption, human capabilities, science-policy chasm, social tipping points, migration
- ✓ Cover both natural science & social science perspectives
- ✓ Based on credible & legitimate process – beyond *ad hoc* approach: Derived from debate amongst a distinguished, representative Foresight Panel with wide consultations within UNEP and external scientific communities

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