LECTURE 1 · 60-MIN LECTURE + 30-MIN DISCUSSION

Geotourism for a Sustainable Future

How Geoparks Empower Communities and Protect Earth Heritage

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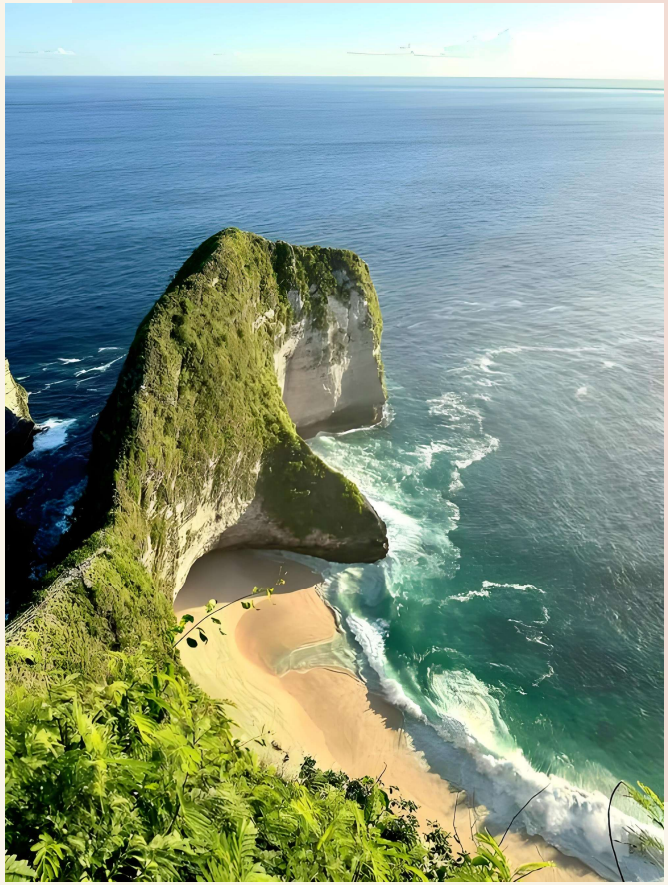
Faculty of Humanities, UNIVERAITAS PADJADJARAN, Indonesia



Scope: concepts, the UNESCO geopark model, five case studies, and open tensions.

> “The ground beneath your feet is a library. Every rock layer, every fossil, every landform holds a record of Earth's history.”

In some places, local communities are turning that record into a living — while protecting it.

Ban Gioc Waterfall, Cao Bang UNESCO Global Geopark, Vietnam — where 500 million years of Earth history meet the livelihoods of Tày, Nùng, Mông, and Dao communities.

00 | OPENING

Three questions frame everything we do today

Keep them in mind through all four sections — by the end, you should answer each with evidence and critical nuance.

01 **What is geotourism?**

And how does it differ from conventional nature tourism?

02 **How do geoparks translate geological heritage into community benefit?**

The mechanisms: income, skills, decision-making power, cultural pride.

03 **What are the tensions and trade-offs?**

What can we learn from both successes and failures?

Three questions — definition, mechanism, trade-off — one lecture.

Roadmap: from definitions to ground truth to debate

Cases include success stories and one cautionary tale.

A

Concepts

Geotourism, geoheritage, geodiversity — the vocabulary of the field.

B

The Geopark Model

UNESCO Global Geoparks and the bottom-up approach.

C

Case Evidence

Cao Bang, Guangwushan-Nuoshuihe, Jeju, Azores, Merangin.

D

Challenges & the Way Forward

Tensions, principles, and the unresolved question.

We move from definitions to governance to grounded cases to critical reflection. Section D sets up the discussion.

PART A

Concepts: Defining Geotourism, Geoheritage, and Geodiversity

Geotourism is about the character of a whole place

Broad definition — National Geographic / Tourtellot.

> "Tourism that sustains or enhances the geographical character of a place — its environment, culture, aesthetics, heritage, and the well-being of its residents." — National Geographic / Tourtellot

Geotourism = place-based development, not a niche for geologists.

> " A form of natural area tourism that specifically focuses on geology and landscape... promoting tourism to geosites and the conservation of geodiversity and an understanding of earth sciences through appreciation and learning." — Newsome & Dowling

READING THE DEFINITION

Not just about rocks — about **place**.

Five objects of care: environment, culture, aesthetics, heritage, resident well-being.

This framing positions geotourism as place-based development, not a niche interest for geologists.

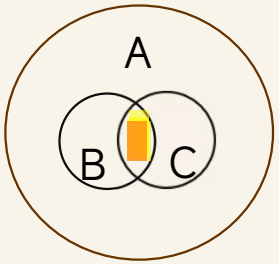
N & D: Dual mandate – Protect & Educate

The geological definition sharpens the focus

Geology – Landscape - Earth sciences.

> "Sustainable tourism which focuses on an area's geology and landscape as the basis for providing visitor engagement, learning and enjoyment."
>
> - Geological Society of Australia (GSA) 2013

> "Geotourism is sustainable, place-based tourism that connects people with Earth's landscapes, heritage, and communities, while protecting their natural and cultural values for future generations."
>
> - Australian Geoscience Council (AGC) 2025



A= Abiotic B= Biotic C= Cultural

FOCUS

GSA
Learning, Enjoyment

AGC
Place-based
Sustainabilty
Connection
Community

Geotourism must protect, educate and connect

Multiple objectives, not just oen or two

Connecting A-B-C

Two duties travel together: conserve geodiversity and build understanding.

Geotourism is not ecotourism — the asset differs

The abiotic foundation underpins both biodiversity and cultural diversity.

	ECOTOURISM	GEOTOURISM
Focus	Biological nature	Geodiversity — rocks, minerals, fossils, landforms, soils
Link	Ecosystems, wildlife	Geology, landscape, ecology, culture, history, sense of place
Asset	Renewable (if managed)	Non-renewable

A destroyed cave formation does not grow back.

Crucially, geoheritage is non-renewable — this changes the conservation logic.

Geotourism foregrounds the abiotic foundation that underpins both biodiversity and cultural diversity.

Ecotourism tends the living; geotourism guards the non-renewable foundation.

Five essential characteristics of geotourism

Characteristic four is the normative core of the geopark model.

01 **Geologically based**
focuses on geology and landscape

02 **Environmentally sustainable**
conservation logic throughout

03 **Informative / interpretive**
educates and inspires

04 **Beneficial to local communities**
not optional — constitutive

05 **Tourist-satisfactory**
delivers a quality experience

> "Beneficial" is not a nice-to-have. It is what distinguishes geotourism from extractive tourism.

Many forms of tourism claim sustainability. Geotourism makes community benefit constitutive.

No community benefit, no geotourism — it is constitutive, not decorative.

Geoheritage: the asset visitors come to see

Geological features of a territory carrying four kinds of value.

Scientific

research value of sites and strata

Educational

teaching Earth history in place

Cultural

meaning held by local communities

Aesthetic

beauty that draws visitors

TYPICAL EXAMPLES

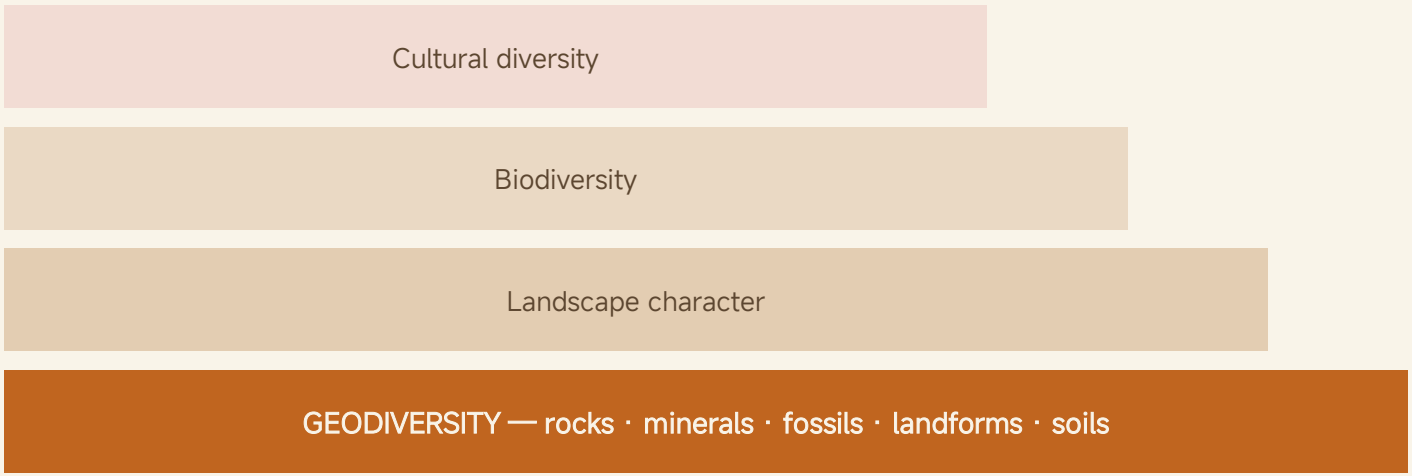
Fossils · rock formations · caves · waterfalls · karst landscapes

Value is not only scientific — cultural and aesthetic value matter enormously to communities who have lived with these landscapes for generations.

Geoheritage is the asset — valued scientifically, culturally, aesthetically.

Geodiversity is the foundation; biodiversity the building

The range of geological, geomorphological, and soil features of a territory.



Think of it as the abiotic equivalent of biodiversity.

WHY IT MATTERS

Without geodiversity there is no biodiversity — no habitats, no ecosystems, no landscapes.

Geodiversity underpins biodiversity, cultural diversity, and landscape character alike.

Everything above ground rests on what lies beneath it.

The non-renewability problem

Why geotourism must operate on a conservation logic, not just an economic one.

RENEWABLE	GEOHERITAGE
A forest can regrow.	A damaged speleothem (cave formation) is lost forever.
A wetland can be restored.	An eroded fossil horizon cannot be restored.
A reef can recover.	A destroyed karst landscape cannot be rebuilt.

Implication: geotourism must operate on a **conservation logic**, not just an economic one.

The asset is finite and fragile — economic benefit cannot justify irreversible damage.

> If geoheritage is the asset, what institutional form has emerged to protect it and share it with visitors?

→ The Geopark Model

PART B

The Geopark Model: UNESCO Global Geoparks & the “Bottom-Up” Approach

A geopark is a development strategy, not just a protected area

Formal definition — a nationally protected area within one single boundary with geological heritage of importance, rarity, or aesthetic appeal.

01

Protection

conserving geological heritage of particular importance, rarity, or aesthetic appeal

02

Education

interpreting Earth history for visitors and residents alike

03

Sustainable development

managing the territory through one integrated concept

Managed through an **integrated concept** of protection, education, and sustainable development — the three pillars are inseparable in practice.

Three pillars, one territory: protection · education · development.

Geoparks are living territories, not fenced-off enclaves

Three things a geopark is not — and what it is instead.

✕ **Not a museum**

heritage is lived with, not locked behind glass

✕ **Not a national park clone**

no fences keeping residents out

✕ **Not an uninhabited wilderness**

people live, work, and farm the territory

WHAT IT IS

A **living territory** where people live, work, and farm.

Geological heritage is the organising principle — but the goal is sustainable territorial development for the people who call it home.

Heritage is the organising principle; territorial development is the goal.

A global movement, still growing

UNESCO Global Geoparks — scale as of April 2026.

241

UNESCO GLOBAL GEOPARKS

designated worldwide

51

COUNTRIES

across all inhabited continents

882,000 km²

TOTAL AREA

comparable in size to Venezuela

+12

NEW GEOPARKS IN 2026

first geopark in Tunisia; new sites in China, France, Greece, Ireland, Japan, Malaysia, Portugal, Russia, Uruguay

Source: UNESCO Global Geoparks Network, April 2026 designations.

Not a niche experiment — a worldwide approach to heritage-based development.

Geological heritage alone is not enough

Three core values required — plus designation criteria assessed by expert evaluators.

THREE CORE VALUES

01 **Conservation of geological heritage**
of international, national, or regional significance

02 **Inclusion of local cultural values**
living culture alongside rocks

03 **Characteristic biodiversity**
the territory's living fabric

DESIGNATION ALSO REQUIRES

— A coherent territory

— A management plan

— Visibility and outreach

— Demonstrated international value (assessed by expert evaluators)

Designation is not permanent — it is reviewed. Geoparks must demonstrate ongoing commitment to the three core values.

A holistic model: geology, culture, and biodiversity together.

The bottom-up principle is governance, not decoration

UNESCO: conservation and sustainable development combined, with local communities involved at every stage.

> "A shared commitment to knowledge transmission, with local communities at its centre."

— UNESCO Director-General

Local communities are not consulted as an afterthought. The principle is embedded in the designation criteria and the management plan requirements.

WHAT DISTINGUISHES GEOPARKS

Traditional protected areas: consult after deciding.

Geoparks: communities at the centre, at every stage.**This is not decorative consultation. It is governance.**

This is not decorative consultation — it is governance.

Design the tourism economy to keep value local

Interpretation, guiding, homestays, craft production, and food services are designed for residents.

01 **Circulate economic benefit to residents**

homestays run by families, guides from the community

02 **Build local capacity**

skills in guiding, hospitality, and craft production

03 **Strengthen cultural identity**

pride and ownership, made and sold locally

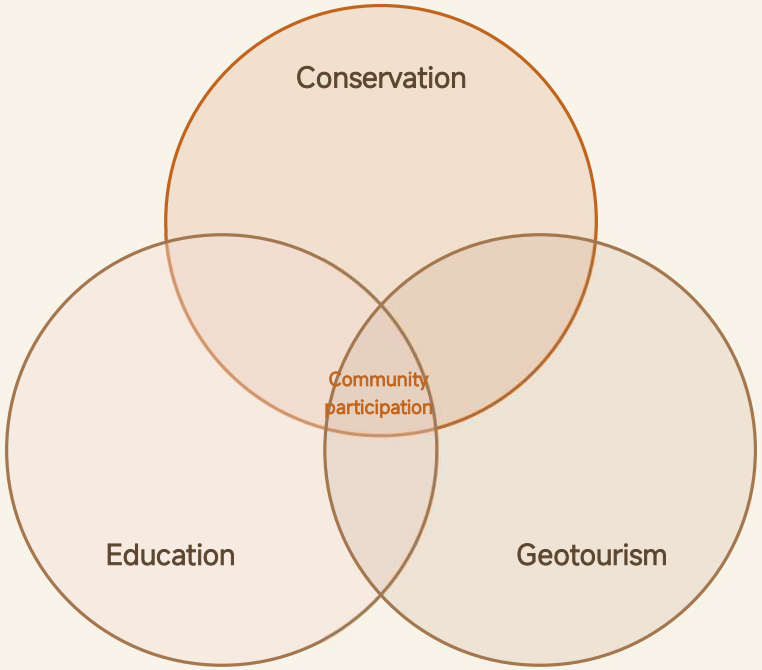
Not to external operators.

This is where the bottom-up principle becomes concrete: the tourism economy is designed to keep value local — economic, but also pride and ownership.

The economy of a geopark is built to circulate value locally.

The geopark triple helix, mediated by community

Conservation, education, and geotourism reinforce each other — community participation is the hub.



Conservation without interpretation

fails to inspire.

Tourism without conservation

destroys the asset.

Education without local ownership

is extractive.

Without community at the hub, the system breaks down: conservation becomes exclusion, tourism becomes extraction, education becomes paternalism.

Three goals reinforce each other — community is the hub.

> This framework sounds elegant on paper. What does it look like when it actually works — and when it struggles?

→ Case Evidence

PART C

Case Evidence: How Geoparks Empower Communities in Practice

Cao Bang, Vietnam: 500 million years meet living culture

Cao Bang UNESCO Global Geopark — designated 2018, near the Chinese border.

2018

YEAR OF DESIGNATION

~500 million years

OF EARTH HISTORY PRESERVED

Geological heritage

karst landscapes, waterfalls, caves, fossils

Cultural traditions

of Tày, Nùng, Mông, and Dao communities

Traditional crafts

knife-making, incense-making, paper-making, tiled-roof production

The 2018 designation created an opportunity to link geological heritage with cultural heritage and local livelihoods.

One designation linked geology, culture, and livelihoods.

Cao Bang: incomes rose three- to five-fold

Economic outcomes since designation — the key is diversification, not just growth.

+25%

ANNUAL VISITOR GROWTH

visitor numbers since designation

3–5×

HOUSEHOLD INCOME INCREASE

from community-based tourism

WHERE IT HAPPENED — AND HOW

Villages

Khuổi Ky, Pác Rằng, Khuổi Khon

Residents now provide

homestays, guiding services, local cuisine

Stable markets created

for agricultural and handicraft products

Diversification creates resilience: when one sector struggles, another can sustain the household.

Striking numbers — but diversification is the real outcome.

03 | CASE EVIDENCE

Spread visitors across villages, not onto flagship sites

Cao Bang's design principle: five experience routes distribute activity across the territory.

01 Journey to the Roots

02 Experiencing Indigenous Culture in a Fairyland

03 Route III

04 Route IV

05 Route V

Five “experience routes” — two named here; three further routes complete the network.

DESIGN PRINCIPLE

Spread tourism activity across villages — do not concentrate it at a few flagship “honey pot” sites.

RESULT

More communities share the benefit. Less pressure on any single site.

A simple but powerful lesson in spatial planning.

03 | CASE EVIDENCE

Guangwushan-Nuoshuihe: 3.3 billion years of record

UNESCO Global Geopark in Sichuan Province, China — from extraction to stewardship.

1,818 km²

TOTAL AREA

3.3 billion years

CONTINUOUS STRATIGRAPHY EXPOSED

World-class karst features

> "A model of sustainable development for global geoparks."

— UNESCO evaluators

Geologically extraordinary — but the story here is about transformation: from resource extraction to heritage stewardship.

Evaluators' verdict: a model for global geoparks.

From cutting the mountain to protecting it

Guangwushan-Nuoshuihe — community transformation in residents' own words.

> “Before, we lived off the mountain by cutting trees; now we live off the mountain by protecting it — even the children know they must guard nature's gifts and our ancestors' treasures.”

— Local resident involved in park services

Not just an economic transition — a cultural and psychological one. The mountain has become a source of pride, not just a resource to be consumed.

OUTCOMES

— Local employment created

— Community-based industries supported

The mountain shifted from resource to pride.

Interpretation links rocks to songs and traditions

Guangwushan-Nuoshuihe — geology and culture presented as intertwined, not separate.

INTERPRETATION MATERIALS INCLUDE

Dedicated sections on intangible cultural heritage, explicitly linking geological features to local folk traditions:

01 **"Bashan Back-carrier" songs (poters' song)**
work songs of mountain porters, tied to the terrain

02 **Fan Shan Jiao Zi performances (flying cymbals)**
folk performance rooted in the mountain landscape

> Geology and culture are presented as intertwined, not separate.
>
> This makes the geology meaningful to local people and fascinating to visitors — and it reinforces cultural identity.

https://www.iqiyi.com/v_cj7wghyy3w.html

Rock formations gain meaning through song, performance, and tradition.

Three geoparks, one finding: diversification

Comparative study — Jeju Island (South Korea), Azores (Portugal), Marble Arch Caves (Northern Ireland).

Jeju Island

South Korea

Azores

Portugal

Marble Arch Caves

Northern Ireland

COMMON FINDING

Geoheritage-based tourism **diversifies local economies**, reducing dependence on agriculture or declining primary industries.

SPILLOVERS

Revenue generation · job creation · hospitality · retail

For rural areas facing decline in traditional industries, tourism becomes a new pillar of the local economy.

Tourism becomes a new pillar where primary industries decline.

Heritage alone is not enough: Jeju 30%, Azores 12%

Contribution of geopark-related tourism to local GDP — the difference is not the rocks.

GEOPARK	CONTRIBUTION TO LOCAL GDP	KEY FACTORS
Jeju Island	**~30%**	Advanced infrastructure, proximity to metropolitan markets, strong stakeholder collaboration
Azores	~12%	Infrastructure gaps, limited accessibility, weaker collaboration

Both territories hold outstanding geological heritage — outcomes diverge on infrastructure and collaboration.

> Infrastructure and collaboration matter as much as geological heritage.

The difference is not the rocks — it is infrastructure, access, collaboration.

Community involvement predicts conservation success

The empirical heart of the lecture — statistical evidence from the comparative study.

$\chi^2 = 18.27$ $p < 0.001$

Significant positive correlation between community involvement and conservation outcomes.

$\beta = 0.43$ $p = 0.003$

Regression coefficient linking community involvement to economic growth.

THE MECHANISM IN TWO CASES

Jeju: high local involvement + direct economic benefit → effective conservation.

Azores: limited local involvement → conflict between conservation and development.

When people benefit directly from conservation, they become its defenders. When excluded, they become its opponents.

Involvement is not just ethical — it is statistically associated with better outcomes.

Merangin, Indonesia: designation is not a magic bullet

Merangin Geopark, Jambi — a cautionary tale of stalled empowerment.

WHAT HAPPENED

Designation secured geopark status granted — but status alone does not guarantee community benefit	Met
Empowerment & branding initiated community empowerment and tourism branding efforts begun	Met
Participation limited inadequate promotional activities; involvement stayed thin	Shortfall
Impact yet to materialise substantial community benefit has not emerged	Shortfall

RECOMMENDATIONS

- Accelerate policy implementation
- Strengthen community-based tourism
- Foster public–private partnerships

Without sustained support, the benefits do not materialise.

The bottom-up approach is not self-executing

The lesson from Merangin — designation is the beginning, not the end.

> Bottom-up governance requires sustained institutional support and capacity-building.

QUESTIONS FOR REFLECTION

01 What went wrong?

02 What would you do differently?

03 What can other geoparks learn from this?

Let's rethink and reflect …..

The hard work — capacity-building, partnership, promotion — comes **after** designation.

Pause and reflect: what is the mechanism of empowerment?

After each case, ask yourself which mechanism did the work.

01

Income

Cao Bang — market access and diversification

02

Skills

guiding, hospitality, craft production

03

Decision-making power

Jeju — a seat at the governance table

04

Cultural pride

Guangwushan-Nuoshuihe — identity and meaning

Different communities, different mechanisms — one size does not fit all.

Name the mechanism before designing the intervention.

PART D

Challenges, Tensions, and the Way Forward

Slides 37–45 · 10 minutes

Tourism can love a place to death

Conservation–tourism tensions: caves, fossil beds, and karst formations have low carrying capacities.

THE PROBLEM

Tourism brings economic benefit — and pressure. Fragile geosites have limits; carrying capacity is low for caves, fossil beds, and karst formations.

The solution is not to stop tourism — it is to design it carefully.

INTERPRETATION GUIDELINES

Avoid complex geoscience terminology

speak in the visitor's language

Design around visitors' capacity

to understand Earth history

Build interpretive planning in from the outset

not retrofitted later

Design flow, interpretation, and access before the pressure arrives.

We cannot engineer our way out of irreversible loss

Unlike biodiversity, geoheritage cannot be restored — the asymmetry demands precaution.

RESTORABLE	PERMANENTLY LOST ONCE DAMAGED
We can replant forests.	We cannot regrow a stalactite.
We can restore wetlands.	We cannot recreate a fossil bed.

IMPLICATION

A **precautionary approach** to visitor infrastructure is essential: when in doubt, restrict access; when in doubt, protect first.

A damaged speleothem is permanently lost — protect first.

Growth is not automatically equitable — who benefits?

Equity and distributional questions inside successful geoparks.

3–5×

INCOME RISE IN CAO BANG

in successful cases — but not everyone benefits equally

BENEFITS CAN CONCENTRATE AMONG THOSE WITH

— **Proximity** to tourism routes

— **Capital** to invest in homestays

WHY CAPACITY-BUILDING MATTERS

Programmes that promote local goods and services and build guiding skills achieve fairer distribution.

Targeted capacity-building spreads the benefit more fairly.

Geodiversity literacy remains a persistent bottleneck

Low literacy → geoparks perceived as “natural tourism destinations”, not scientific-educational systems.

79 /100

AVERAGE POST-TEST SCORE

after field-based participatory education with students, teachers, and community members in geosite observation

WHAT THE SCORES SHOW

— Participatory field education **works** — observation in the field raises understanding measurably.

— The **lowest scores** remain on understanding geoheritage itself.

Even in designated geoparks, the geological significance is often lost — interpretation remains a persistent challenge.

Interpretation is where the model still under-delivers.

Geoparks are about the future, not just the past

UNESCO explicitly links geopark management to climate change mitigation and disaster risk reduction.

Volcanic hazards

eruption records inform preparedness

Landslide risks

slope geology, maps, danger zones

Past climate shifts

recorded in strata — evidence for what comes next

UNESCO LINKS GEOPARK MANAGEMENT TO

- — Climate change mitigation
- — Disaster risk reduction

> Geological knowledge is directly relevant to community resilience.

Strata hold records of past hazards — knowledge for resilience.

Five principles for the way forward

Practical, actionable, evidence-based — if you remember nothing else, remember these five.

01	**Interpret, don't lecture**	everyday language; connect rocks to landscape, flora, and human history
02	**Design for community ownership**	from the outset, not as an afterthought
03	**Diversify benefit streams**	guiding, homestays, crafts, food, education — not just gate fees
04	**Invest in geodiversity literacy**	for residents, schoolchildren, and guides
05	**Plan for fragility**	visitor flow management, restricted access where necessary, legal protection

Five principles synthesise the evidence — the lecture in one page.

04 | SYNTHESIS

The central claim

Geotourism is not a niche tourism product.

It is a territorial development strategy that uses geological heritage as a catalyst for conservation, education, and community well-being.

Where it works — Cao Bang, Guangwushan-Nuoshuihe, Jeju — it works because communities are not **beneficiaries** but **owners** of the process.

Can geotourism scale without diluting?

Every successful case creates pressure for more visitors, more infrastructure, more commercialisation.

Can geoparks hold the line on conservation while continuing to deliver economic hope?

This is the question we leave open — the evidence so far is mixed but hopeful.

04 | CLOSING PROVOCATION

> “If your town discovered a world-class fossil site tomorrow, what would you want the **geotourism plan** to look like — and who should be at the table when it is written?”

Think about your own community: who would you involve, what would you prioritise, what would you protect?

Not hypothetical — the decision facing communities around the world right now.

Discussion: 30 minutes, three moves

Structured debate — divide the room into stakeholder groups, then negotiate across them.

01 5 min

Clarifying questions

open floor for anything unresolved from the lecture

02 15 min

Structured debate

three stakeholder groups — residents & business owners, conservation scientists, tourism operators — each names **three priorities** and **one red line**

03 10 min

Open discussion

cross-group negotiation, then plenary

Facilitate the cross-group negotiation — let positions collide before consensus.

Three groups, three priorities each, one red line.

Four prompts — take the discussion where it wants to go

Draw on your own disciplinary background: geology, tourism studies, community development, policy, education.

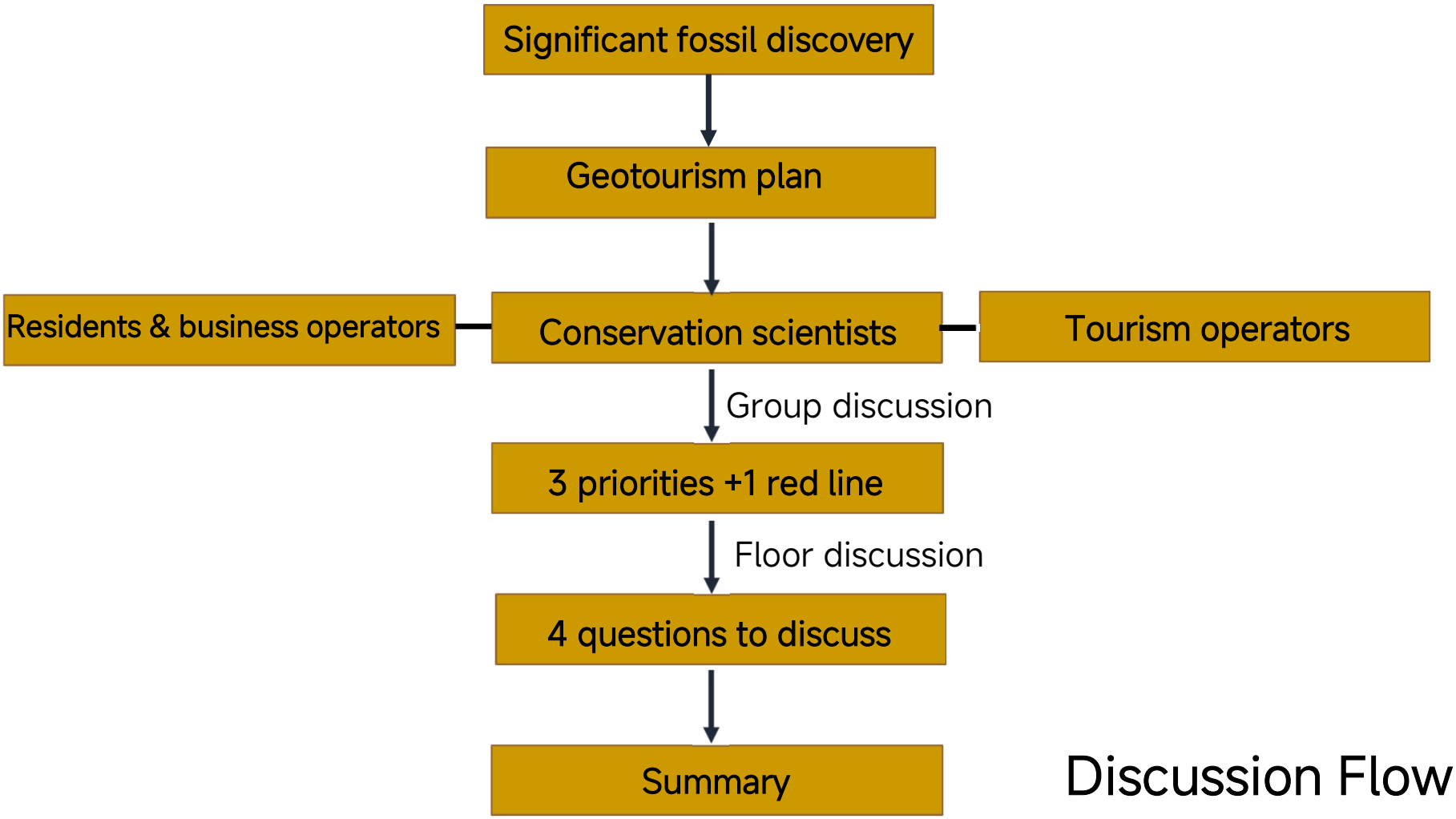
01 Community involvement correlates with better conservation outcomes. Why? What is the causal mechanism?

02 Is UNESCO designation at risk of becoming a branding exercise rather than a governance framework? What safeguards exist?

03 How should geoparks balance international tourism with local educational needs?

04 Can digital tools — virtual geotrails, augmented reality — reduce pressure on fragile sites while broadening access?

Use the prompts flexibly.



Discussion Flow

05 | CLOSING

Terima kasih
Thank You

“The ground beneath your feet is a library. What story will your community tell?”

Further information
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