→ *13 March 2026*

CRED
Center for Climate
Resilient Development

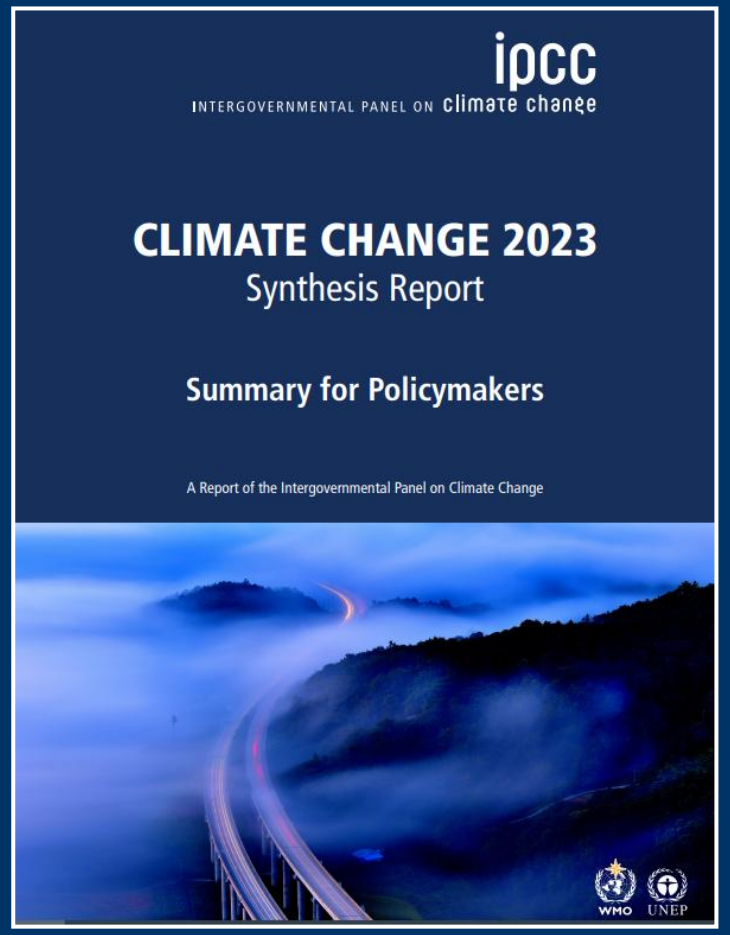
Can climate resilient development be transformative? The politics of shifting technology, practice and governance

Siri Eriksen, Professor, Norwegian University of Life Sciences (NMBU)

CRED - Center for Climate Resilient Development
https://www.nmbu.no/en/research/center-climateresilient-development-cred

Author, Intergovernmental Panel on Climate Change (IPCC), Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), Atlantic Meridional Overturning Circulation in Focus Assessment

Siri.eriksen@nmbu.no



IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001

Without **urgent, effective, and equitable** mitigation and adaptation actions, climate change increasingly threatens ecosystems, biodiversity, and the livelihoods, health and well-being of current and future generations. (high confidence)

Rapid and far-reaching **transitions across all sectors and systems** are necessary to achieve deep and sustained emissions reductions and secure a liveable and sustainable future for all. These system transitions involve a significant **upscaling of a wide portfolio of mitigation and adaptation options**. Feasible, effective, and low-cost options for mitigation and adaptation are already available, with differences across systems and regions. (high confidence)

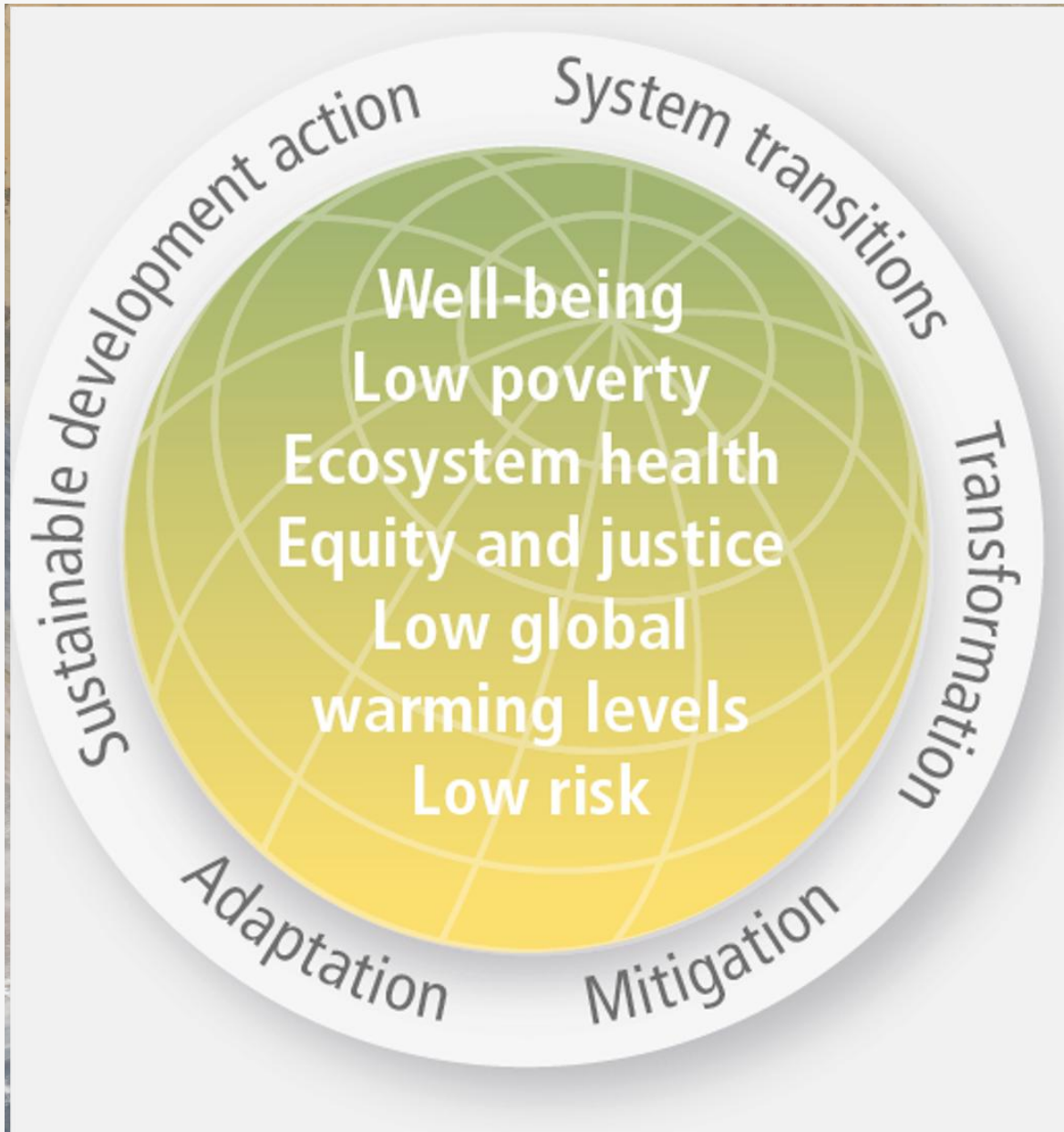
Climate resilient development

Climate resilient development is the process of implementing adaptation and mitigation to support sustainable development for all

Adaptation cannot be assessed in isolation from mitigation and sustainable development

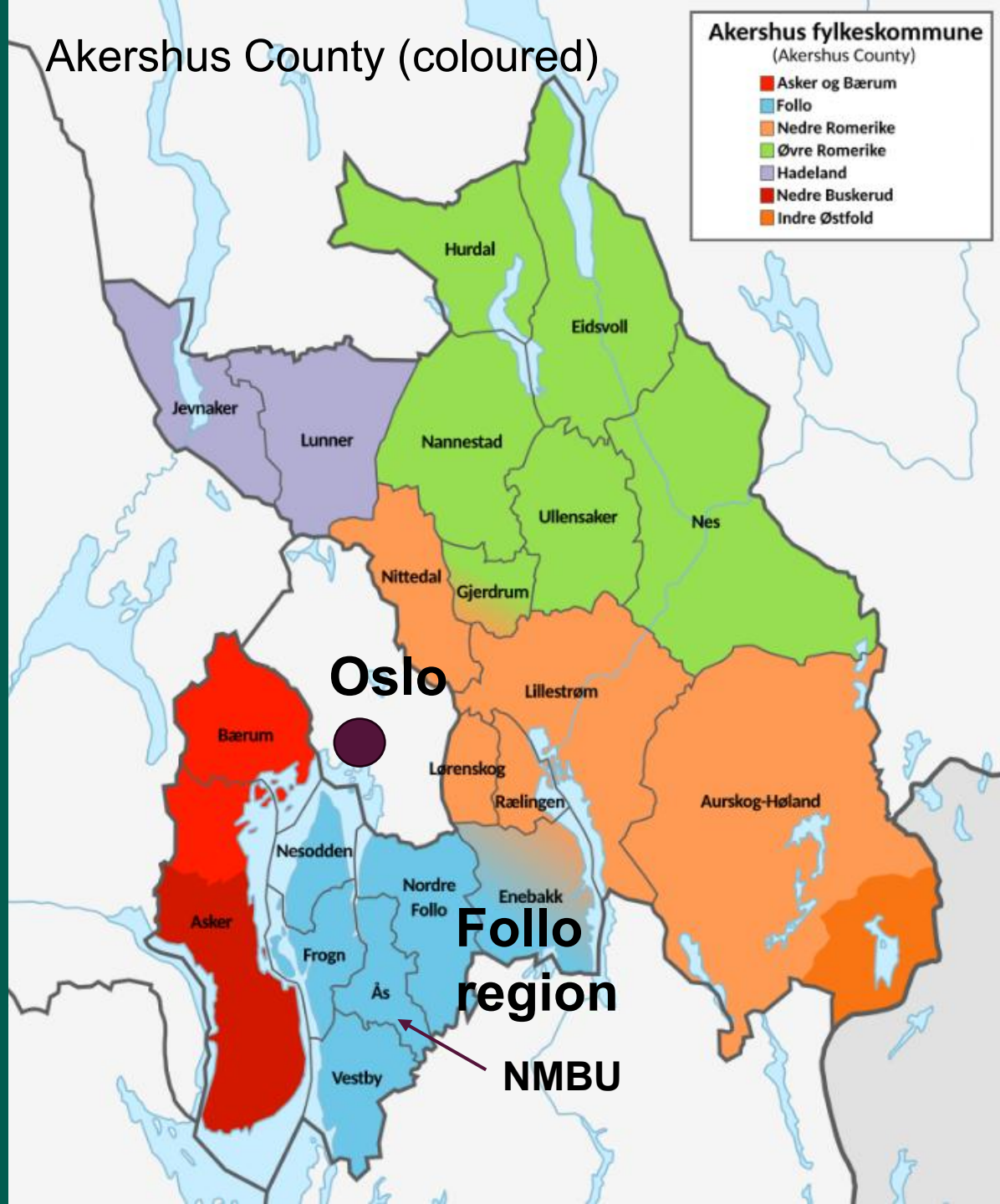
Climate resilient development requires holistic, integrated and equitable actions

Urgency: Shifting to a societal development that limits global warming and climate risk, and that advances sustainable development



Co-creating local climate resilient development practice in the Oslofjord region

- CRED - Center for Climate Resilient Development
- A collaborative initiative between the Follo region and NMBU
- Establishes a platform for researchers and local stakeholders to co-create knowledge, fostering practical solutions to advance local climate resilient development
- Follo region:
  - 6 municipalities surrounding NMBU
  - 150 000 inhabitants
  - Peri-urban area, as well as agriculture, forestry and the Oslo fjord
  - Major transport routes to Sweden



Norges miljø- og biovitenskapelige universitet

[Center for ClimateResilient Development – CRED | NMBU]

Hjem / Forskning

Senter for klimarobust endring – KRED

Senter for klimarobust endring (KRED) er et samarbeid mellom NMBU, Folloregionen, politikere, næringsliv og sivilsamfunn i Oslofjordområdet, med mål om å skape lokale løsninger på klimautfordringer.

Skatteforsk
Centre for Tax Research

, the Follo
ating local

Developed through:

NMBU Sustainability arena: TOWARDS sustainable cities and communites (2021-2025)

NMBU SKAPE 2024-2025 «New tools for co-creating transformative action for climate resilient development»

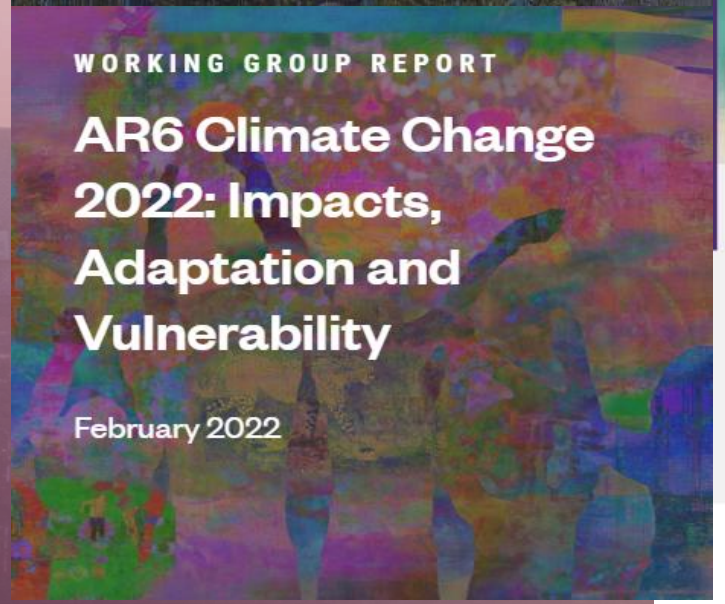
Fair and Resilient Societies - The Nordic Model into the future?" (Funded by Nordforsk 2025-2027)

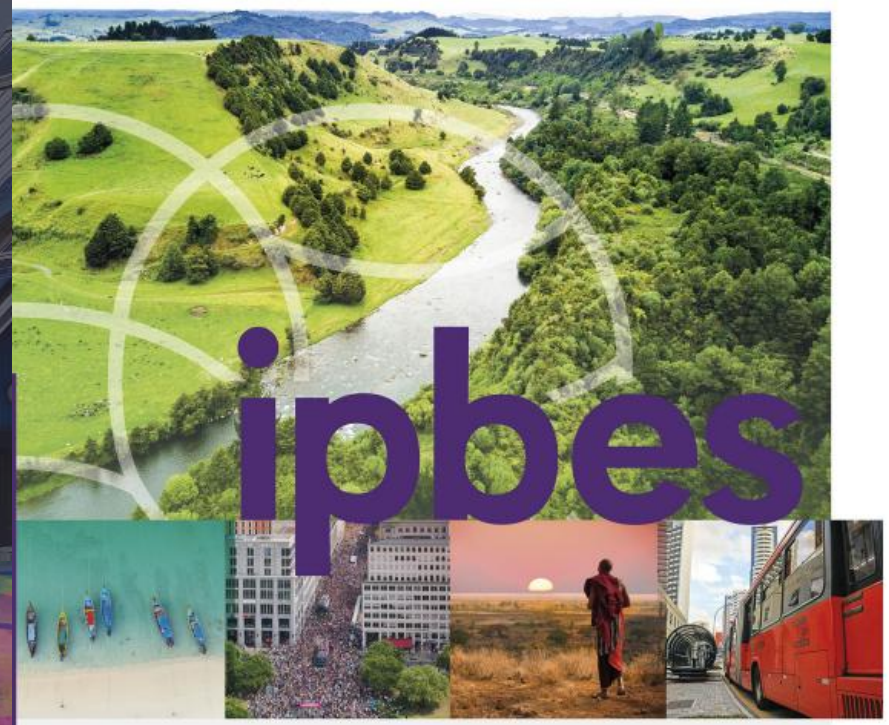
Funding from Folloregionen IPR (2025-2026)

Research Council of Norway project: Navigating growth and sustainability: Co-creating local climate resilient development practice (2026-2030)

Climate and development in Follo

- What does practice that supports CRD (Climate Resilient Development) look like?
- For example in land use planning for housing development in the Oslofjord region?
- What are ways to navigate conflicts and mobilise synergies between different land use interests to foster CRD practices at the local level?



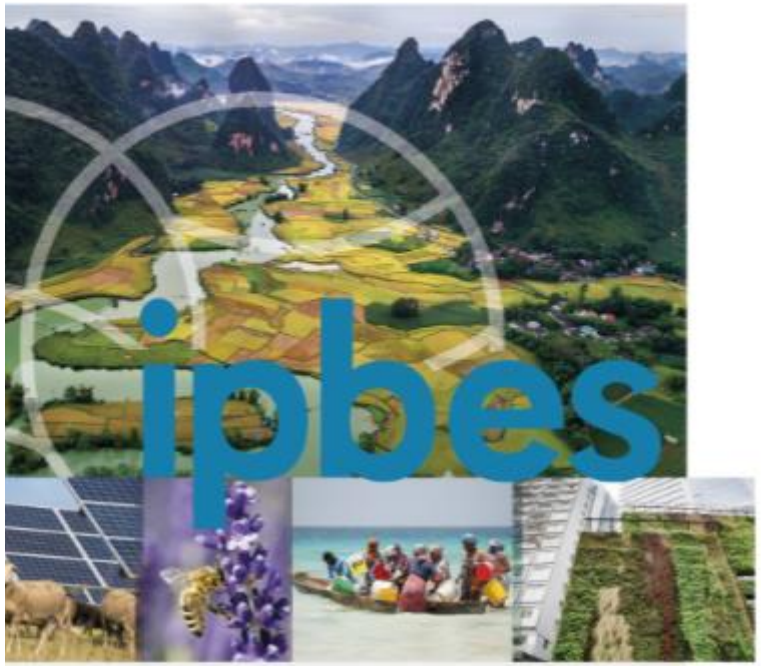


The thematic assessment report of

THE UNDERLYING CAUSES OF BIODIVERSITY LOSS AND THE DETERMINANTS OF TRANSFORMATIVE CHANGE AND OPTIONS FOR ACHIEVING THE 2050 VISION FOR BIODIVERSITY

SUMMARY FOR POLICYMAKERS

ipbes



The thematic assessment report on

INTERLINKAGES AMONG BIODIVERSITY, WATER, FOOD AND HEALTH

SUMMARY FOR POLICYMAKERS

ipbes

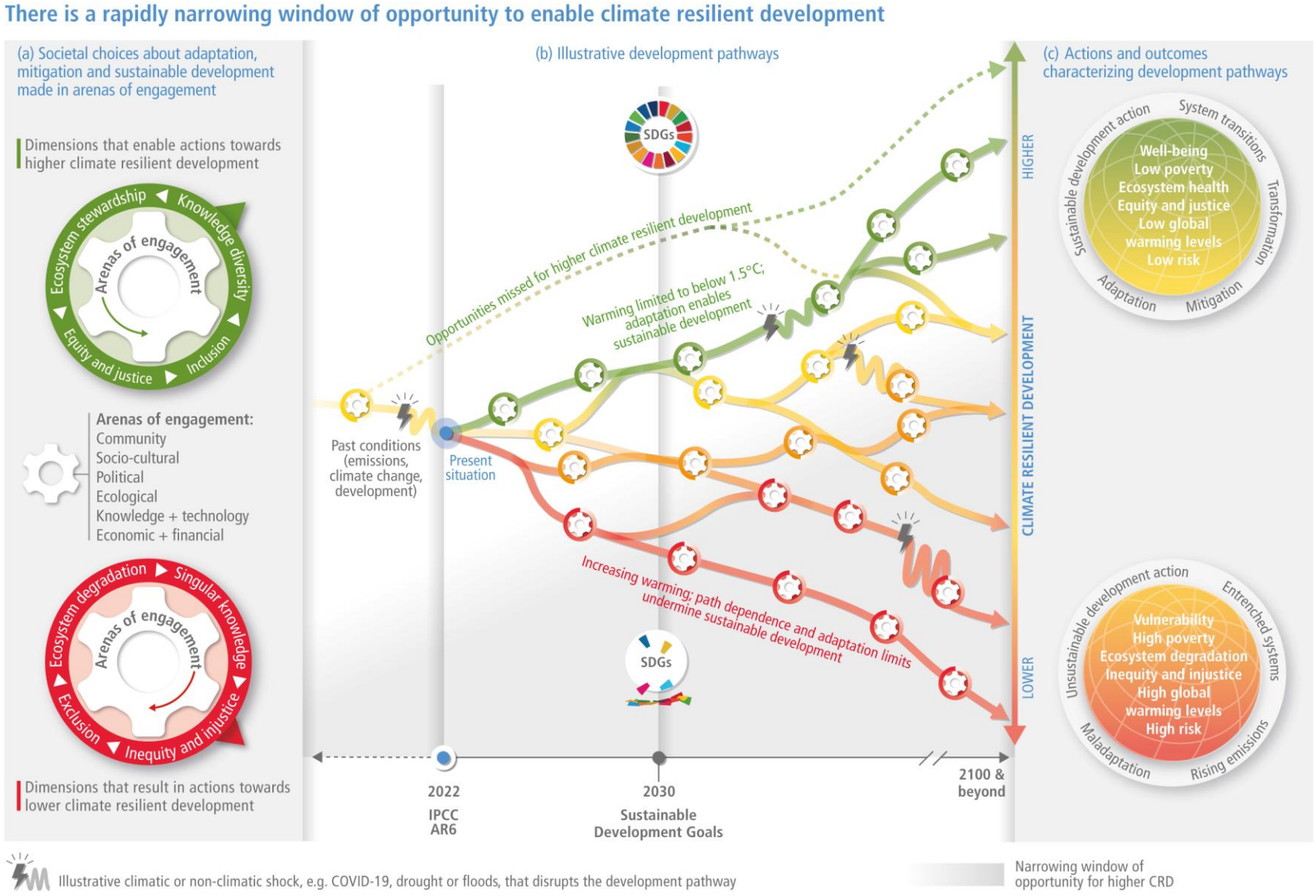
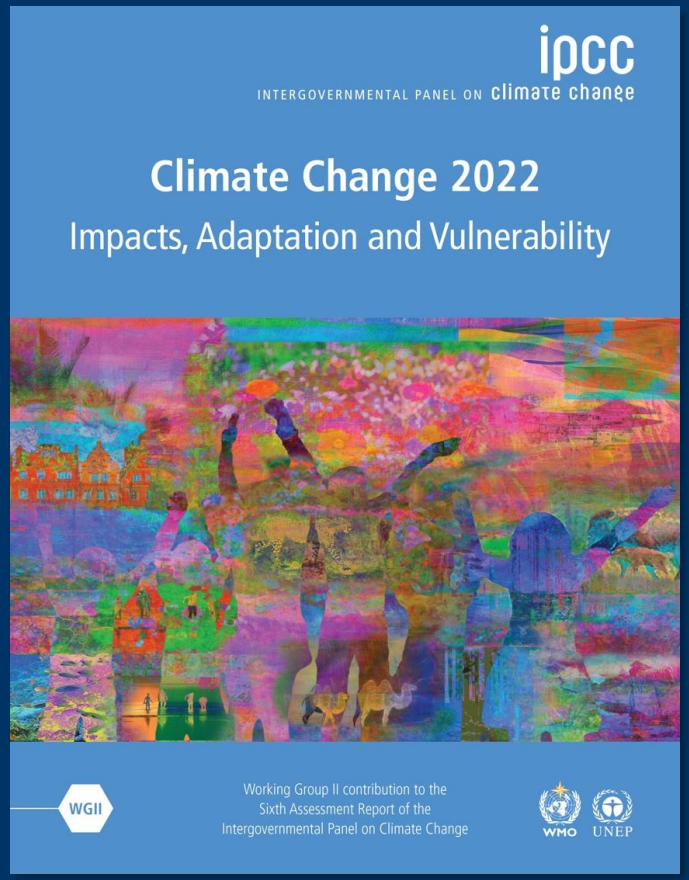


Fig 18.1 Schipper et al., 2022

"Transformative actions aimed at 'deliberately and fundamentally changing systems to achieve more just and equitable outcomes', (Shi and Moser, 2021: 2) shift pathways towards climate resilient development (CRD) (high confidence)." (Schippper et al. 2022, p. 2668)

Key question:

- How can societal transformation to shift development be supported?



"The scientific evidence is unequivocal: climate change is a threat to human well-being and the health of the planet.

Any further delay in concerted global action will miss the brief, rapidly closing window to secure a liveable future.

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

“

The choices and actions implemented in this decade will have impacts now and for thousands of years. (SYR SPM C.1)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18. november 2025 kl. 20:07

KLIMATOPPMØTET I BELÉM COP30

Norge støtter fossil-plan på klimatoppmøtet

Norge støtter arbeidet for et såkalt veikart for omstilling bort fra fossil energi på klimatoppmøtet i Belém i Brasil.

Det bekrefter Klima- og miljødepartementet overfor NRK.

– Norge er opptatt av at det landene blir enige om følges opp. Verden sa i 2023 at man vil omstille seg vekk fra fossile brensler, sier klima- og miljøminister Andreas Bjelland Eriksen.

Målet for initiativet er en konkret plan for hvordan verden skal omstille seg bort fra fossil energi, slik verdens ledere ble enig om på klimatoppmøtet i Dubai for to år siden.

– Norge arbeider allerede aktivt for dette, gjennom CO2-prising, deltakelse i EUs kvotesystem og en tydelig politikk for energiomstilling. At flere land sluttet seg til denne tilnærmingen, ville i utgangspunktet være bra, sier Eriksen.

– Vi trenger en global dugnad for å frigjøre oss fra fossile brensler, sa Tysklands miljøminister Carsten Schneider på en pressekonferanse der også Norge deltok tirsdag.

https://enb.iisd.org/belem-un-climate-change-conference-cop30-daily-report-18nov2025

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Daily report for 18 November 2025

UN Climate Change Conference - Belém, November 2025

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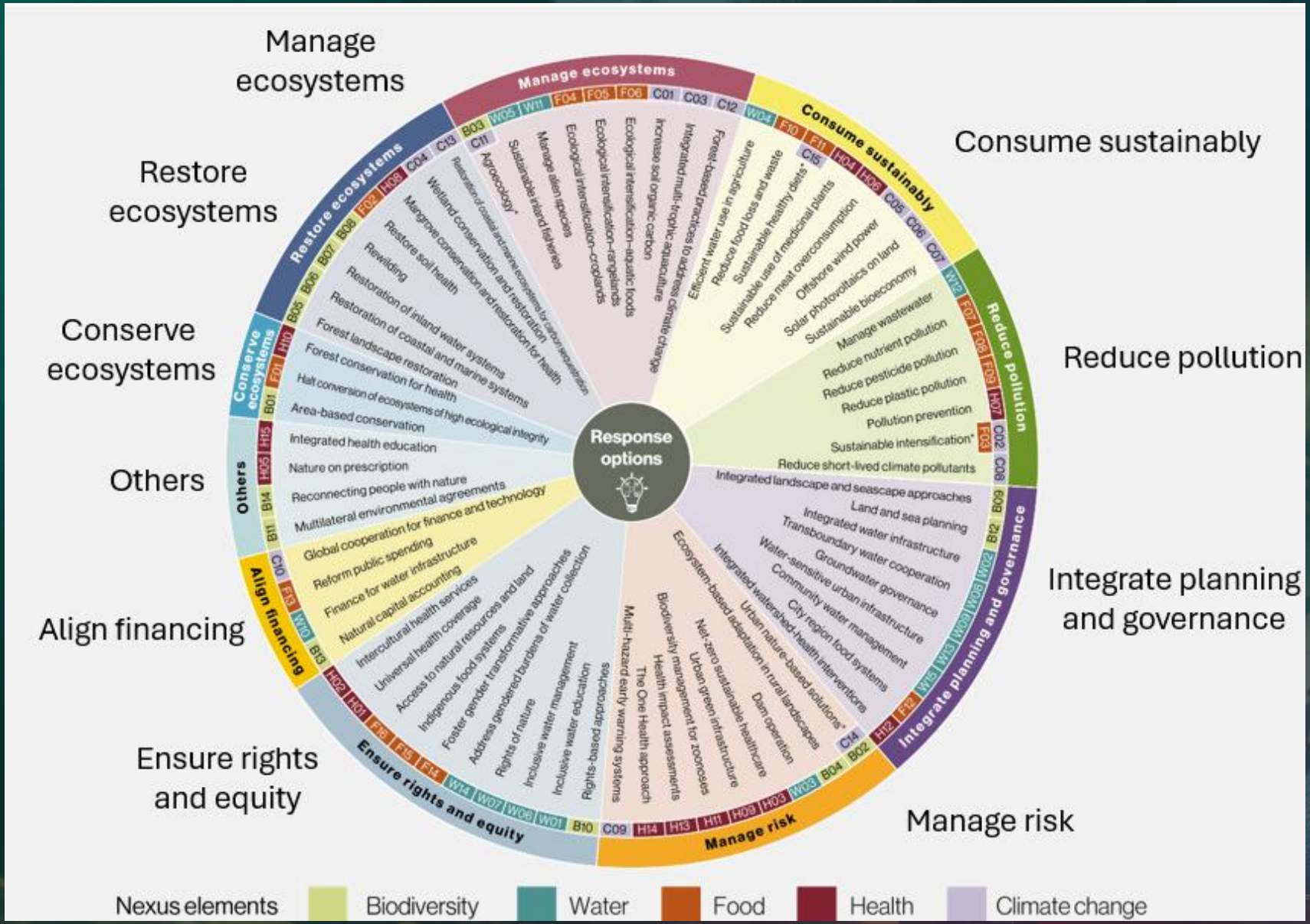
A host of new draft texts was released overnight, including a draft "Global Mutirão" decision on "uniting humanity in a global mobilization against climate change." The Presidency pushed Parties to swiftly wrap up negotiations, but consultations convened throughout the day showed little sign of progress. Many more sessions were scheduled to take place in the evening, all the way until midnight.

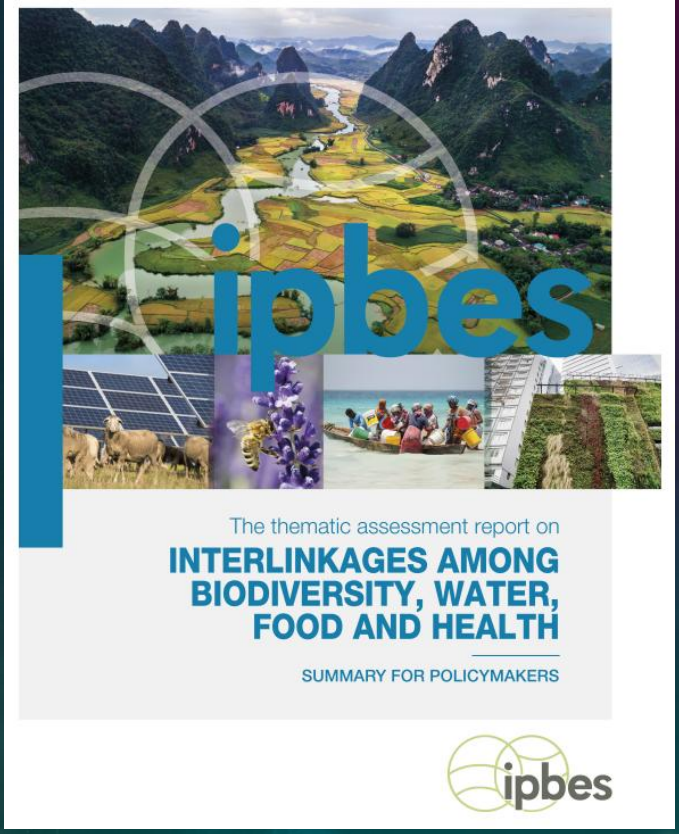
COP30
Brazil

How do we **shift development pathways** currently based on growing consumption and extraction of natural resources?

How do we identify and develop **key knowledge-action arenas** in which municipal planners, elected leaders, civil society, the private sector and researchers engage?

- Many practices can support interlinkages across biodiversity, climate change, water, food and health



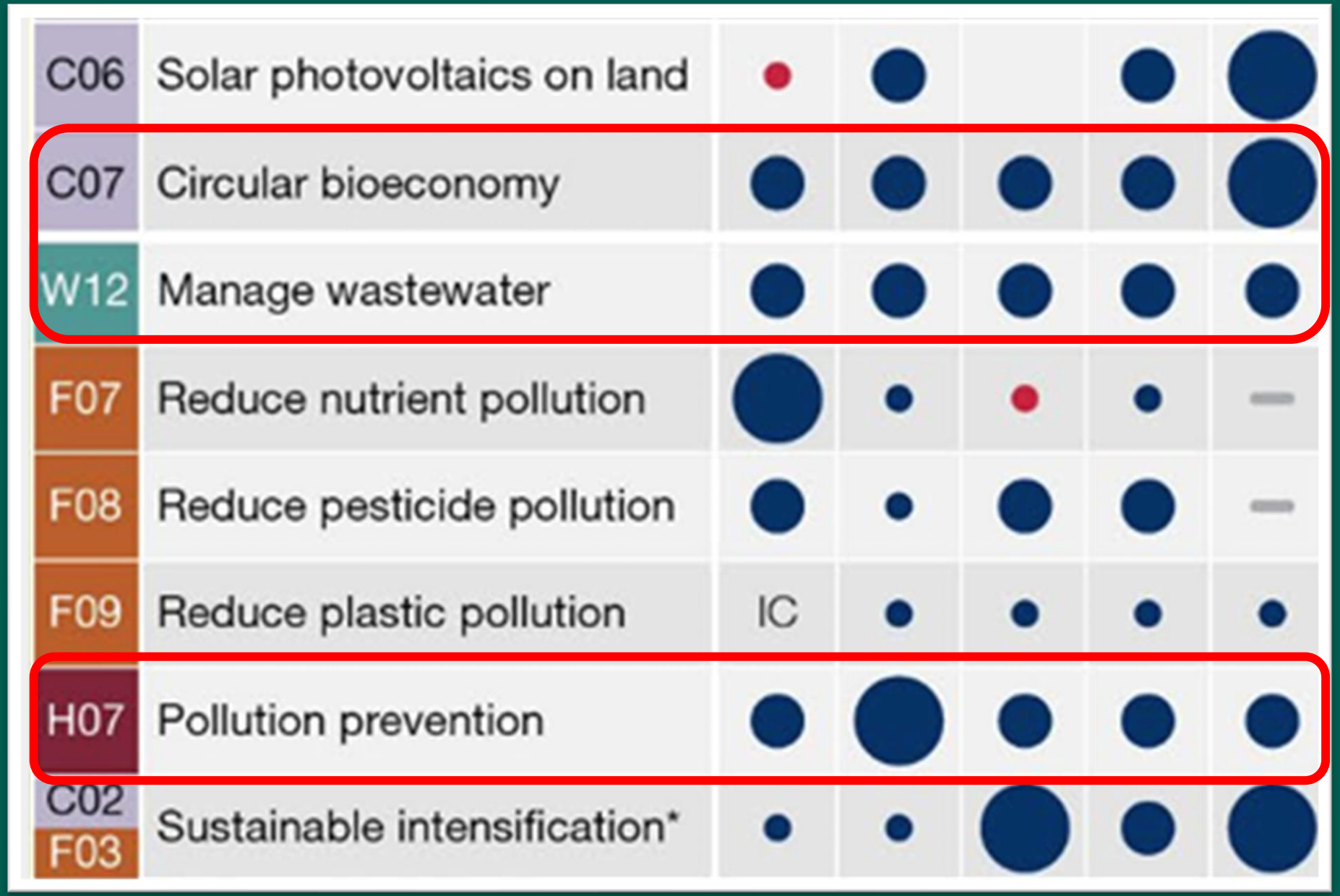


Source: IPBES Nexus Assessment, (2024) Figure SPM.7

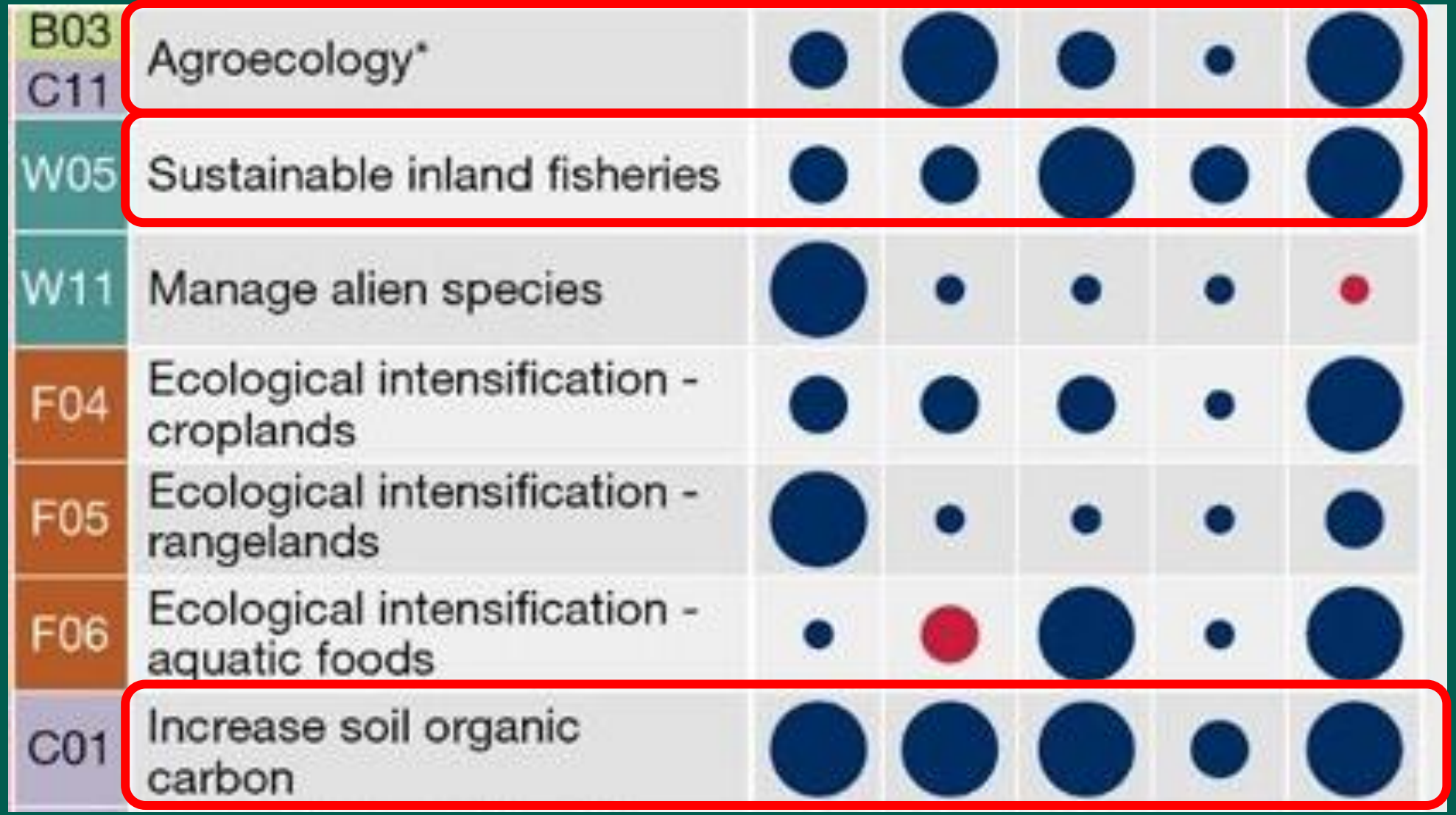
Integrate planning and governance

Multi-stakeholder, multisectoral, collaborative processes to adaptively co-manage landscapes and seascapes over the long term with an emphasis on connectivity between socioecological systems with synergistic outcomes for environmental, social and economic objectives.

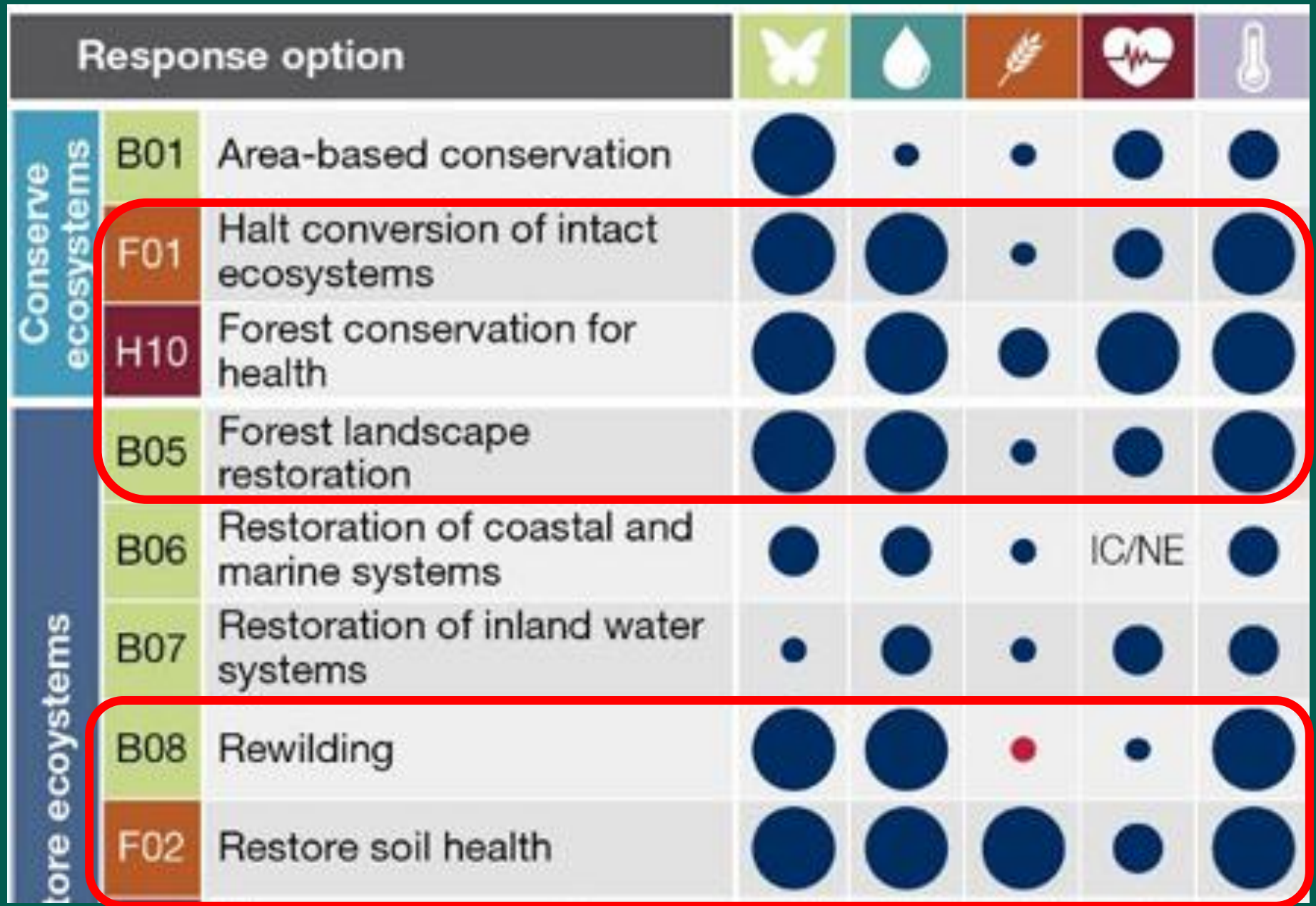
Reduce pollution



Manage ecosystems



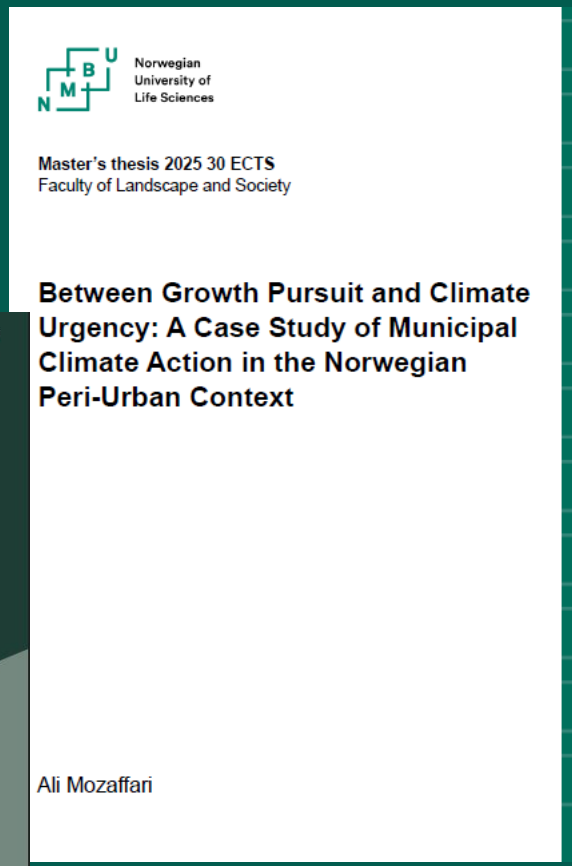
Restore and conserve ecosystems



Discussing climate resilient development and the IPBES Nexus report, February 2025

Practical entry points of co-creation

- → Dialogue meetings
- → Identification of student projects
- → Development of an atlas of CRD practice in Follo
- → Research
  - the ongoing municipal planning process
  - the piloting of new tools
  - survey of risks, attitudes, and land use values
  - case studies: barriers and opportunities for CRD in three housing development sites
- → **Scale up** such transformative governance and responses to the wider Oslofjord region as well as **nationally** and **internationally**
- → Build a Nordic network and community of practice


Norwegian University of Life Sciences

Master's thesis 2025 30 ECTS
Faculty of Landscape and Society

Between Growth Pursuit and Climate Urgency: A Case Study of Municipal Climate Action in the Norwegian Peri-Urban Context

Ali Mozaffari

Key themes identified through:

- Dialogue and trust
- Engagement of multiple actors and interests need to be engaged
- Transdisciplinary approach

Who/where	Theme
Ås Frogn Nesodden	Adaptation, storm water management and nature based solutions (case Ås and Frogn)
Nordre Follo	How can CRD contribute to social sustainability and equity in urban development planning
Many (e.g. Nordre Follo, Vestby)	How do we combine housing development, renewable energy, and growth?
Several (Nesodden, Ås)	How can we implement circular water and sewer systems in housing developments to reduce costs and pollution in the Oslo fjord
Nordre Follo (all)	Sustainable acquisitions as a tool for strengthening climate and sustainability

Discussion of nature based solutions in adaptation

Other topics:

- social sustainability in new housing development,
- shifts to renewable energy,
- civil society engagement

• Student research

- → Balancing Development and Conservation: Climate-Resilient Pathways for Follo's Peri-Urban Forests and Habitats
- → Climate resilient development in local land use practice: The effects of housing development in Ås on transport emissions and household transport costs
- → Climate Resilient Development in local land use practice – the implementation of nature-based solutions in new housing areas in Nordre Follo
- → Disability inclusion in climate planning

- → Interdisciplinary masterclass
- → MSc Thesis:

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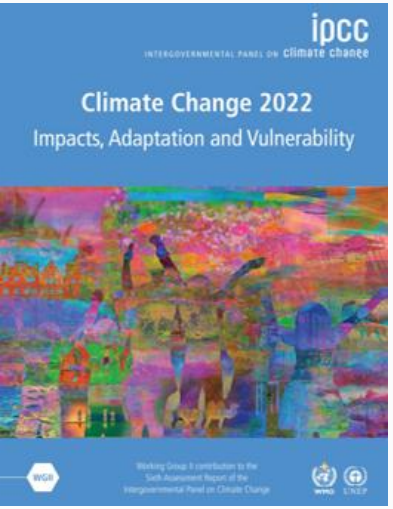


There is a rapidly narrowing window of opportunity to enable climate resilient development

(a) Societal choices about adaptation, mitigation and sustainable development made in arenas of engagement

Dimensions that enable actions towards higher climate resilient development

Ecosystem stewardship · Knowledge diversity · Inclusion · Equity and justice · Arenas of engagement

Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial

Ecosystem degradation · Singular knowledge · Exclusion · Inequity and injustice · Arenas of engagement

Dimensions that result in actions towards lower climate resilient development

(b) Illustrative development pathways

SDGs

Opportunities missed for higher climate resilient development

Warming limited to below 1.5°C; adaptation enables sustainable development

Past conditions (emissions, climate change, development)

Present situation

Increasing warming; path dependence and adaptation limits undermine sustainable development

SDGs

2022 IPCC AR6

2030 Sustainable Development Goals

2100 & beyond

(c) Actions and outcomes characterizing development pathways

HIGHER

CLIMATE RESILIENT DEVELOPMENT

LOWER

Sustainable development action · System transitions · Transformation · Adaptation · Mitigation

Well-being
Low poverty
Ecosystem health
Equity and justice
Low global warming levels
Low risk

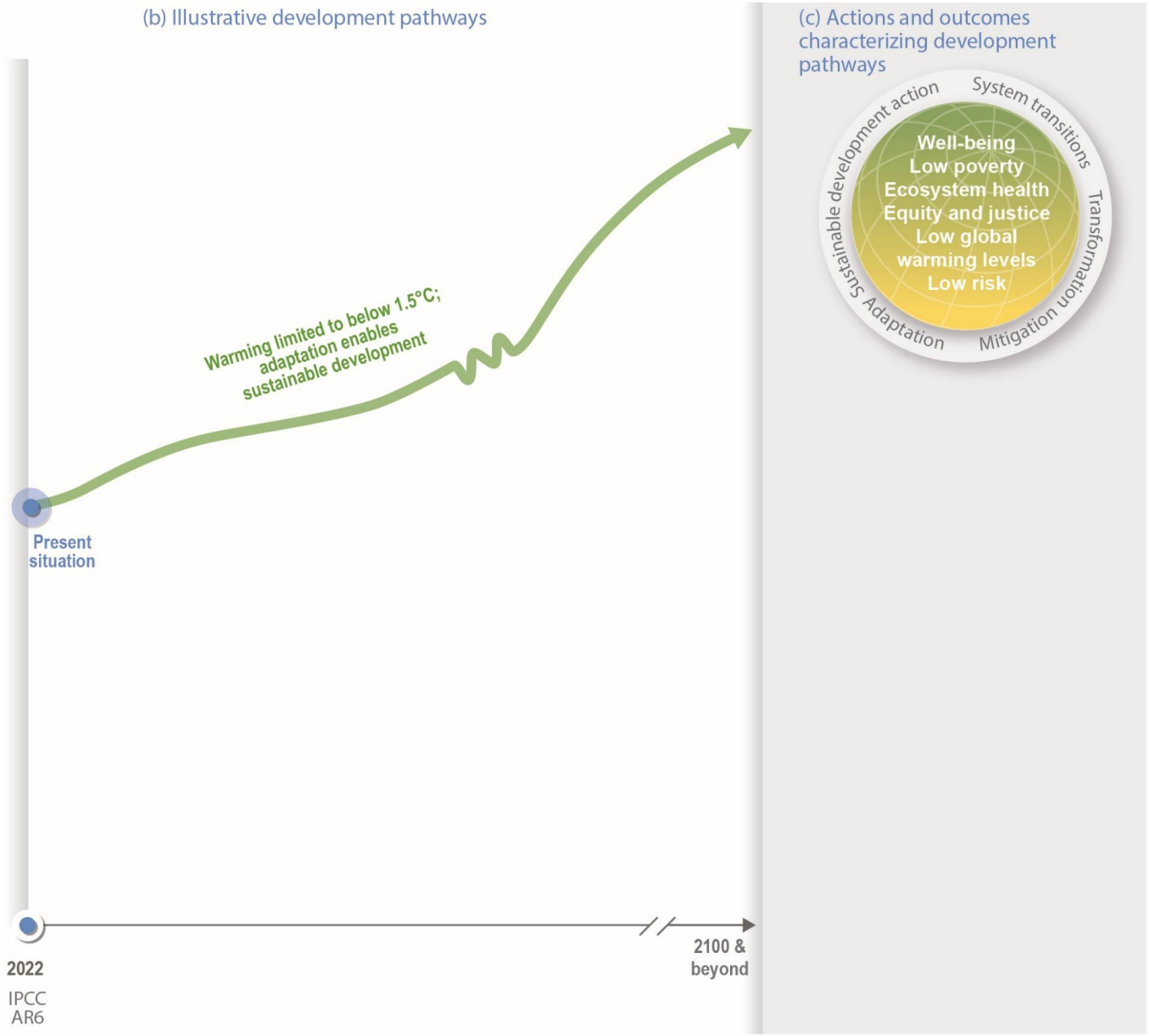
Unsustainable development action · Entrenched systems · Maladaptation · Rising emissions

Vulnerability
High poverty
Ecosystem degradation
Inequity and injustice
High global warming levels
High risk

Illustrative climatic or non-climatic shock, e.g. COVID-19, drought or floods, that disrupts the development pathway

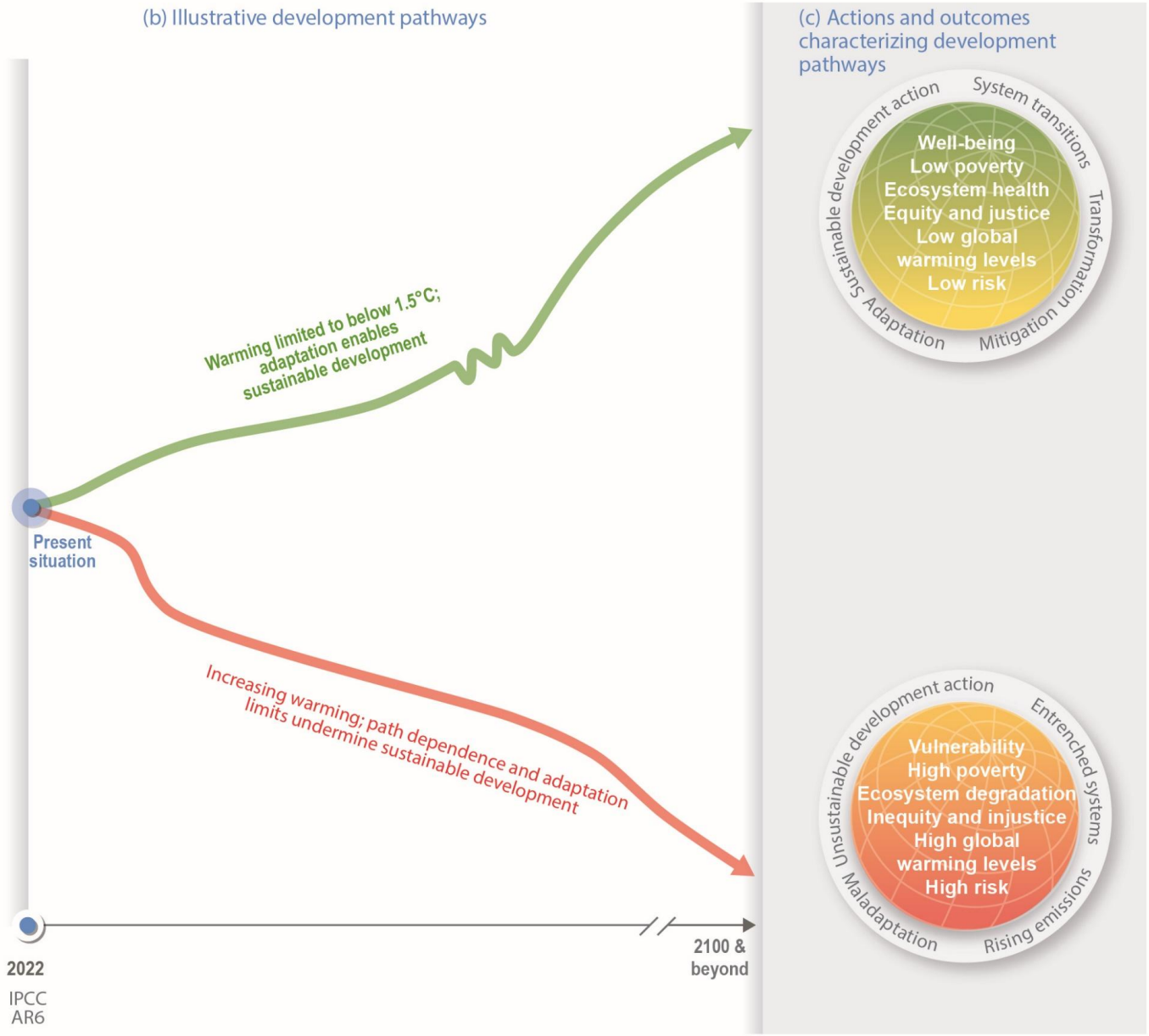
Narrowing window of opportunity for higher CRD

IPCC_AR6_WGII_SummaryForPolicymakers.pdf Figure SPM.6



Climate resilient development:

- Adaptation supporting sustainable development
- Increasingly irreversible changes as we approach and exceed 1.5 degrees warming
- Limits to adaptation increase with warming



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- Adaptation gaps are increasing
- Inequities exacerbate vulnerability
- We are on course to 3.2 degrees warming by 2100
- Path dependence

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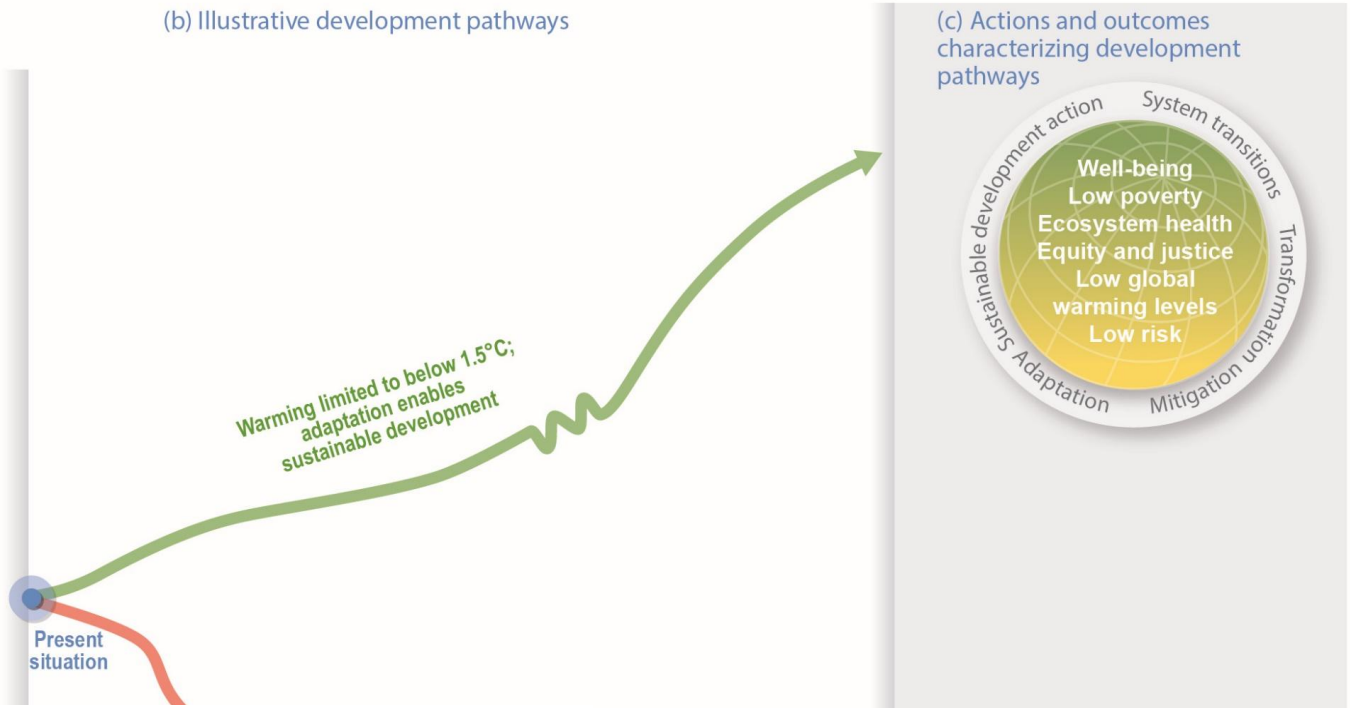
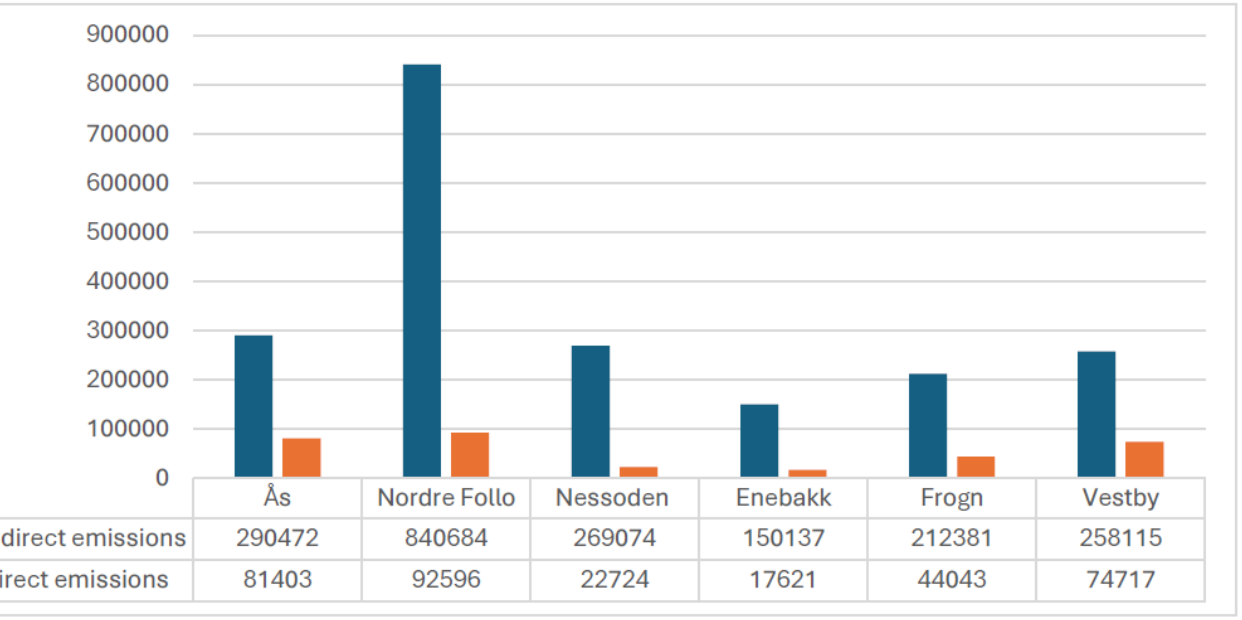


Figure 11 Direct versus Indirect Emissions



	Ås	Nordre Follo	Nessoden	Enebakk	Frogn	Vestby
direct emissions	290472	840684	269074	150137	212381	258115
irect emissions	81403	92596	22724	17621	44043	74717

The Author's Compilation Data from the Norwegian Environment Agency (Miljødirektoratet, n.d., a)

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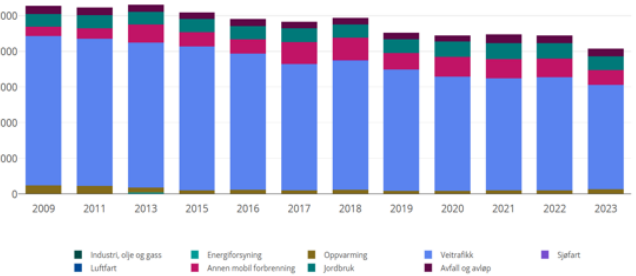
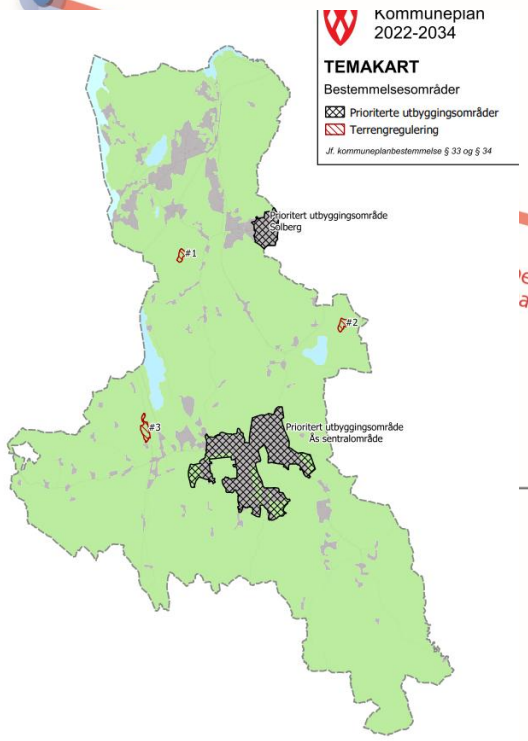
orisa Fucsia, Student in Research

le: Climate Resilient Development in Local Land Use Practice. The ffects of Housing Development in Ås on Accessibility and Transport Emissions.



ur 1. Fordeling av årlige klimagassutslipp etter sektor i Ås kommune.
de: Miljødirektoratet, 2024.

Road traffic the biggest source of direct emissions in Ås (ca 70%)
Housing development affects daily transport
Also a critical social equity issue in accessing services
Planning decisions today have long term consequences for emissions



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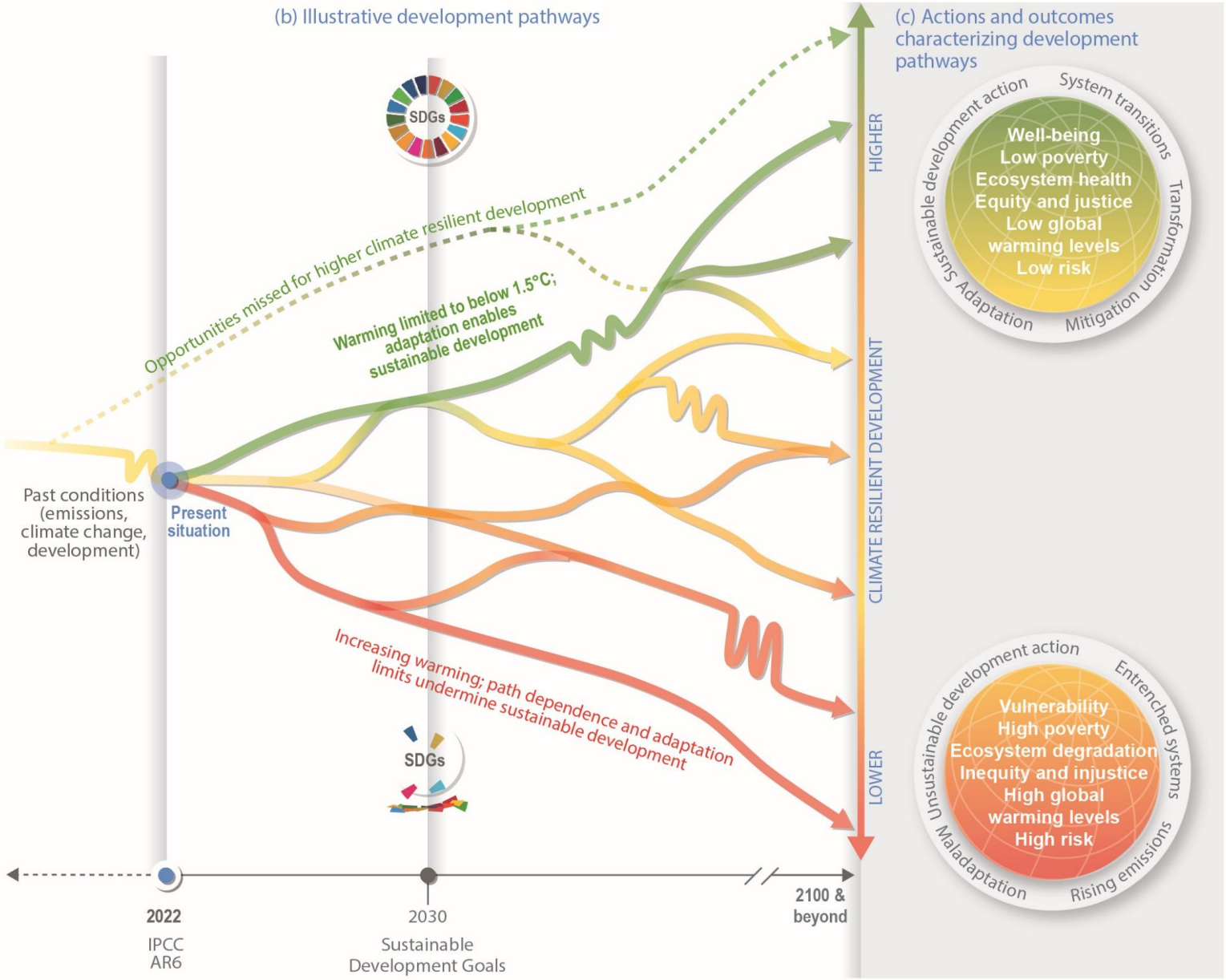

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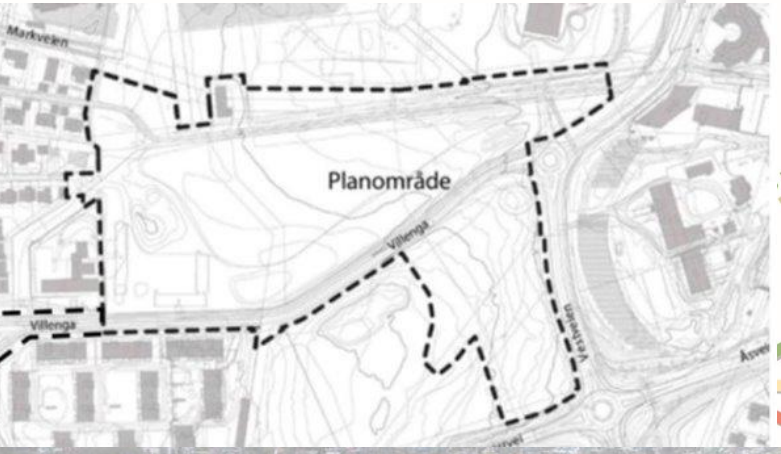
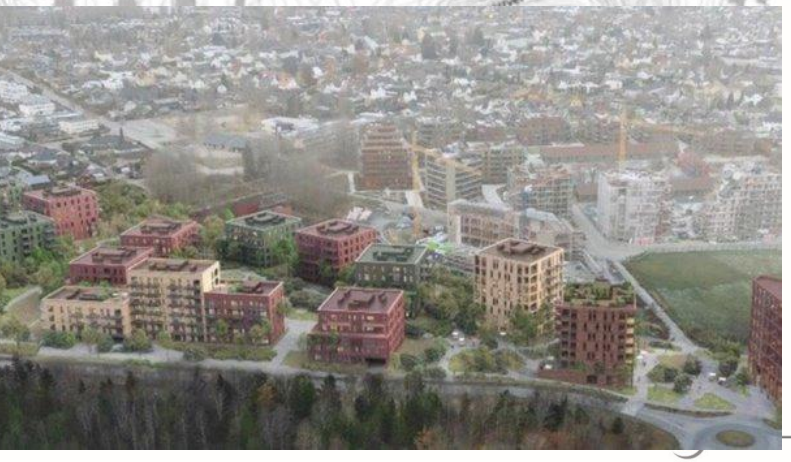
The prospects to shift to pathways towards sustainable futures depend on action this decade

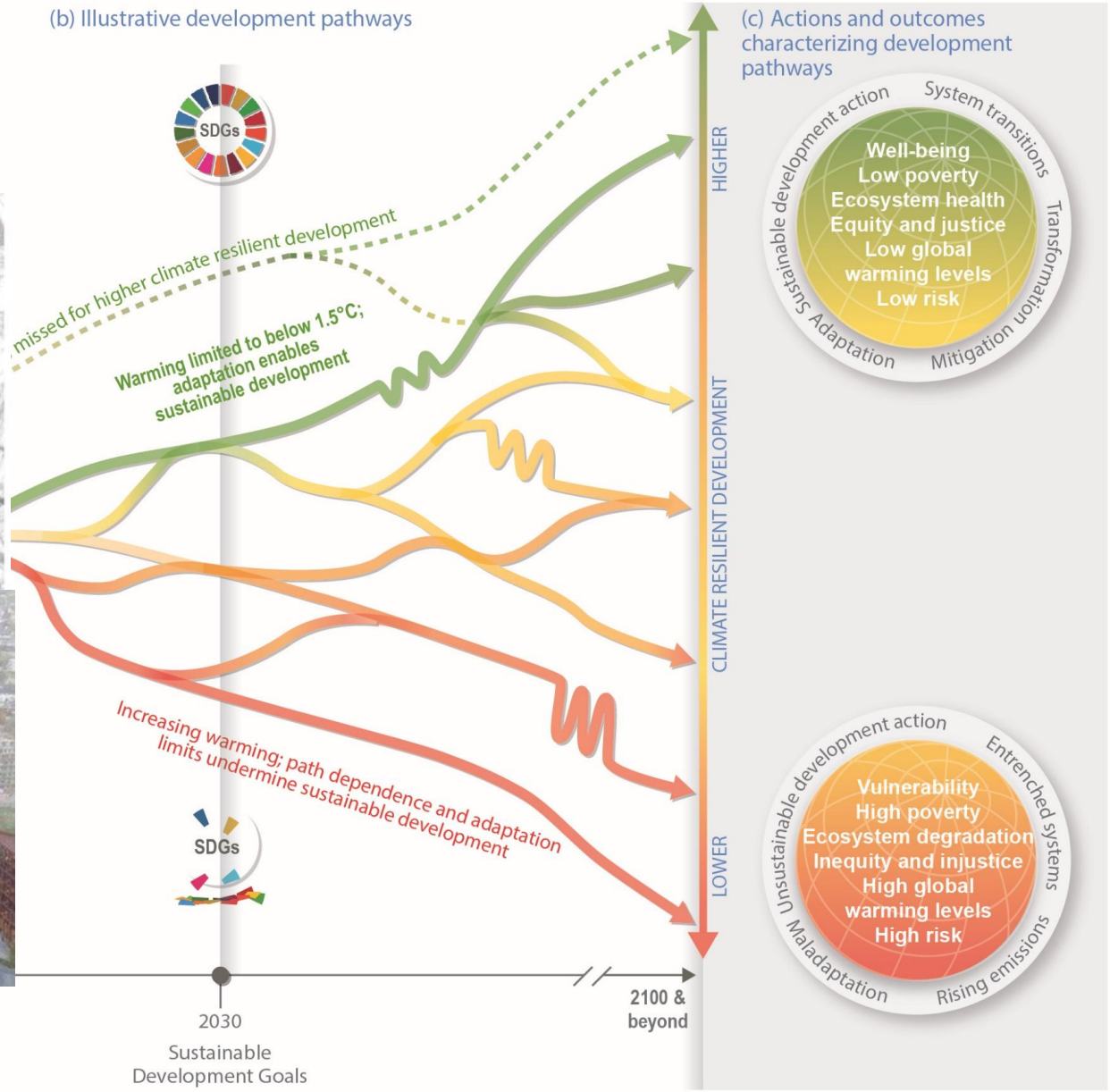
Development pathways result from continuous societal choices

Nature based solutions in Nordre Follo – Ina Sofie Lund, CRED Student in Research





High initial costs – long term and multi-sectoral benefits
Holistic understanding of NbS
Contextual solutions
Regulations and requirements



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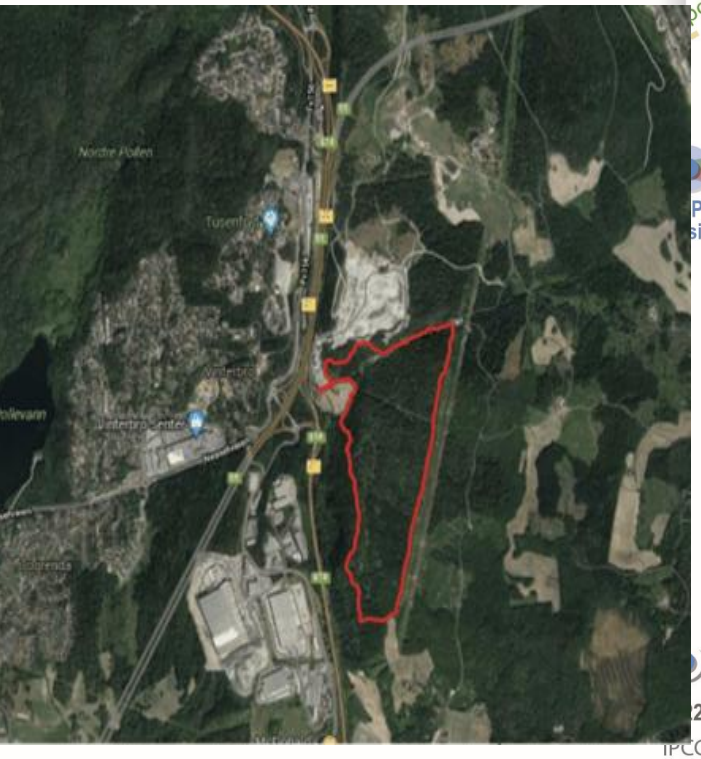
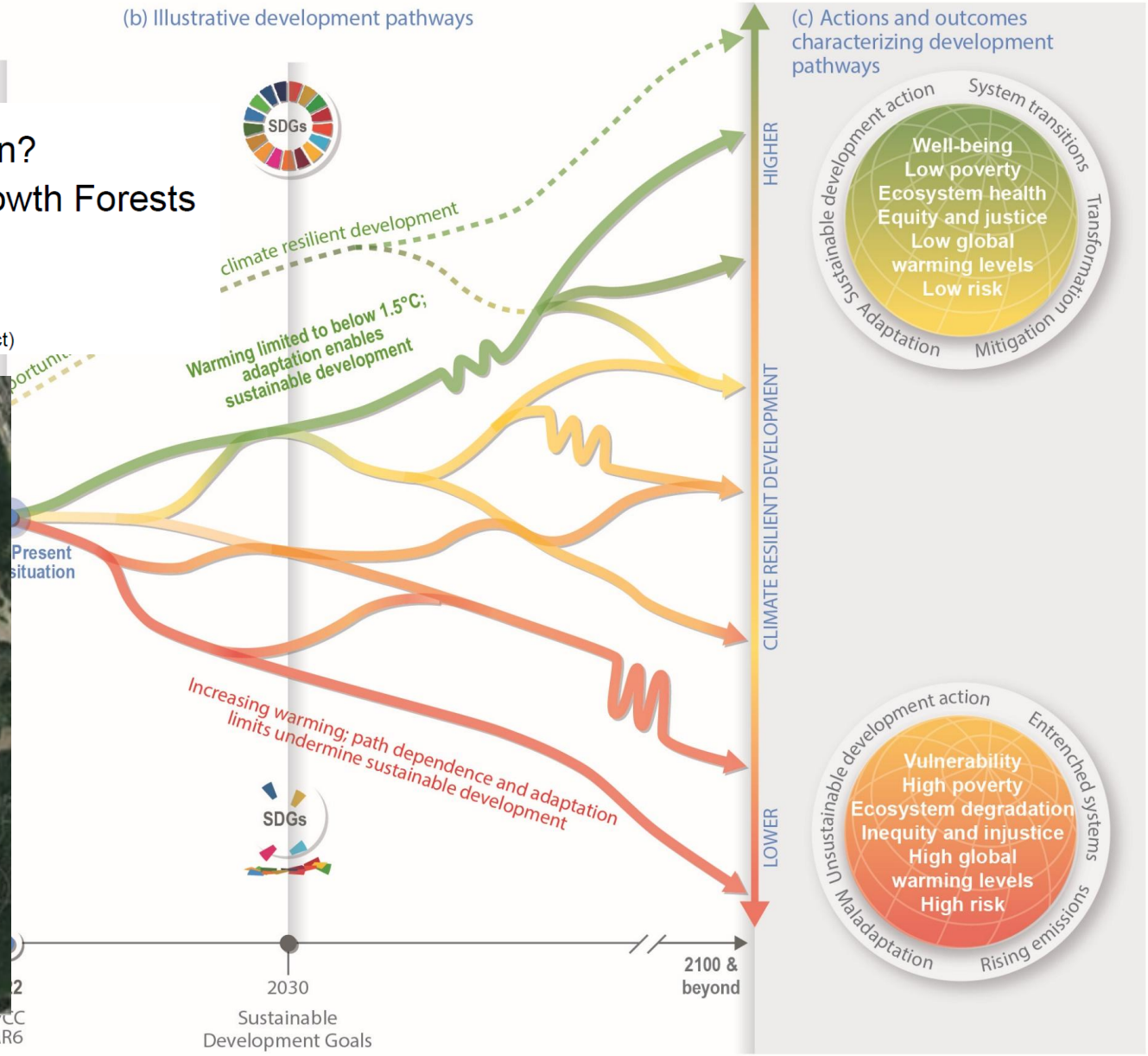
Development or Conservation?
e Cost of Converting Follo's Old-Growth Forests into Industrial Parks

Student: Nandini Narayanan
Course: Special Syllabus (CRED Research Project)





Carbon Accounting: IPCC LULUCF (Land Use, Land-Use Change, Forestry) guidelines with data from NIBIO. Calculated one-time emissions from biomass/ soil carbon loss and forfeited future sequestration

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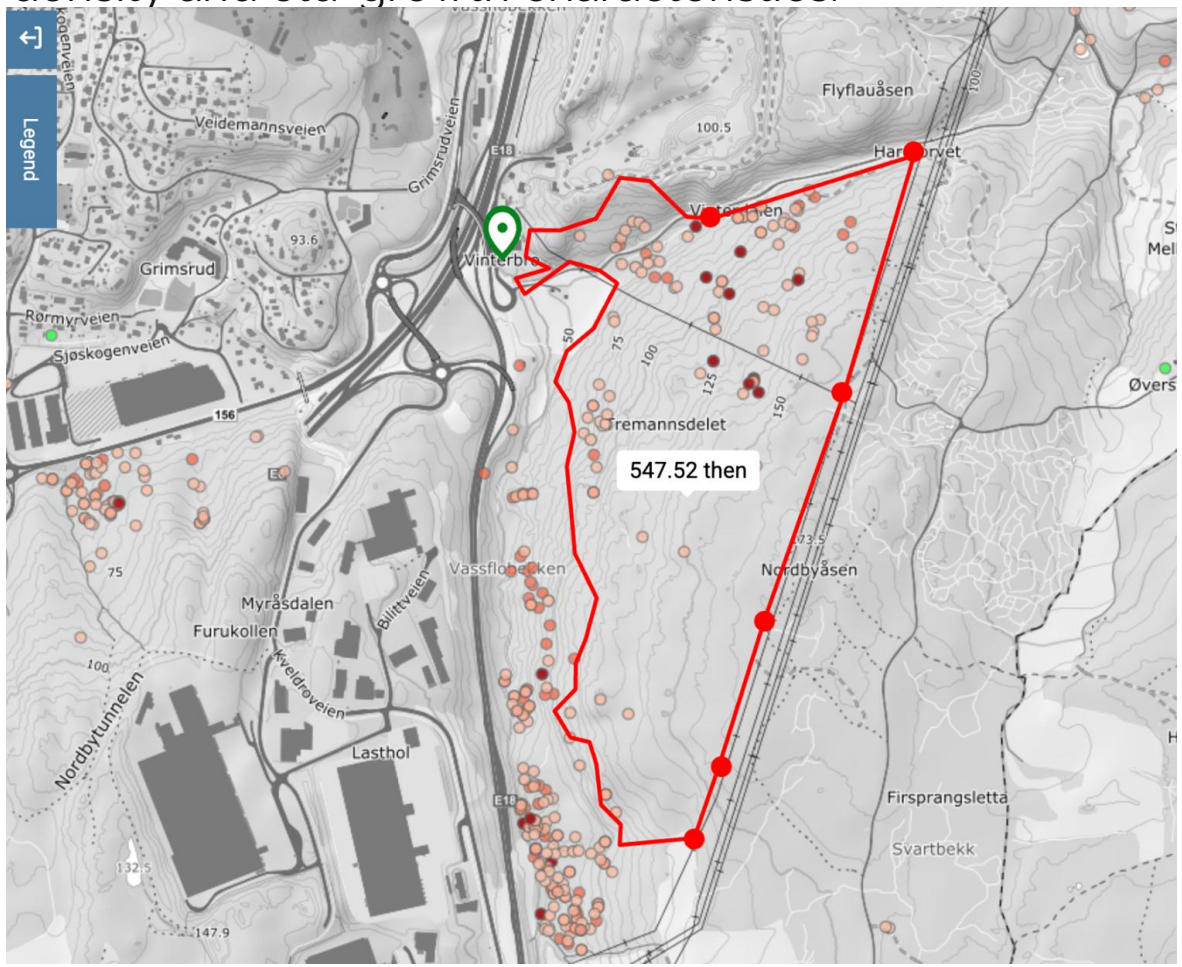
Biodiversity Impact as well as hidden climate cost

Vinterbro has high ecological value, with high carbon density and old-growth characteristics.



Selection of 'Species in Forest' in Kilden NIBIO map layer

Affected Red-Listed Species: Moss & Fungi

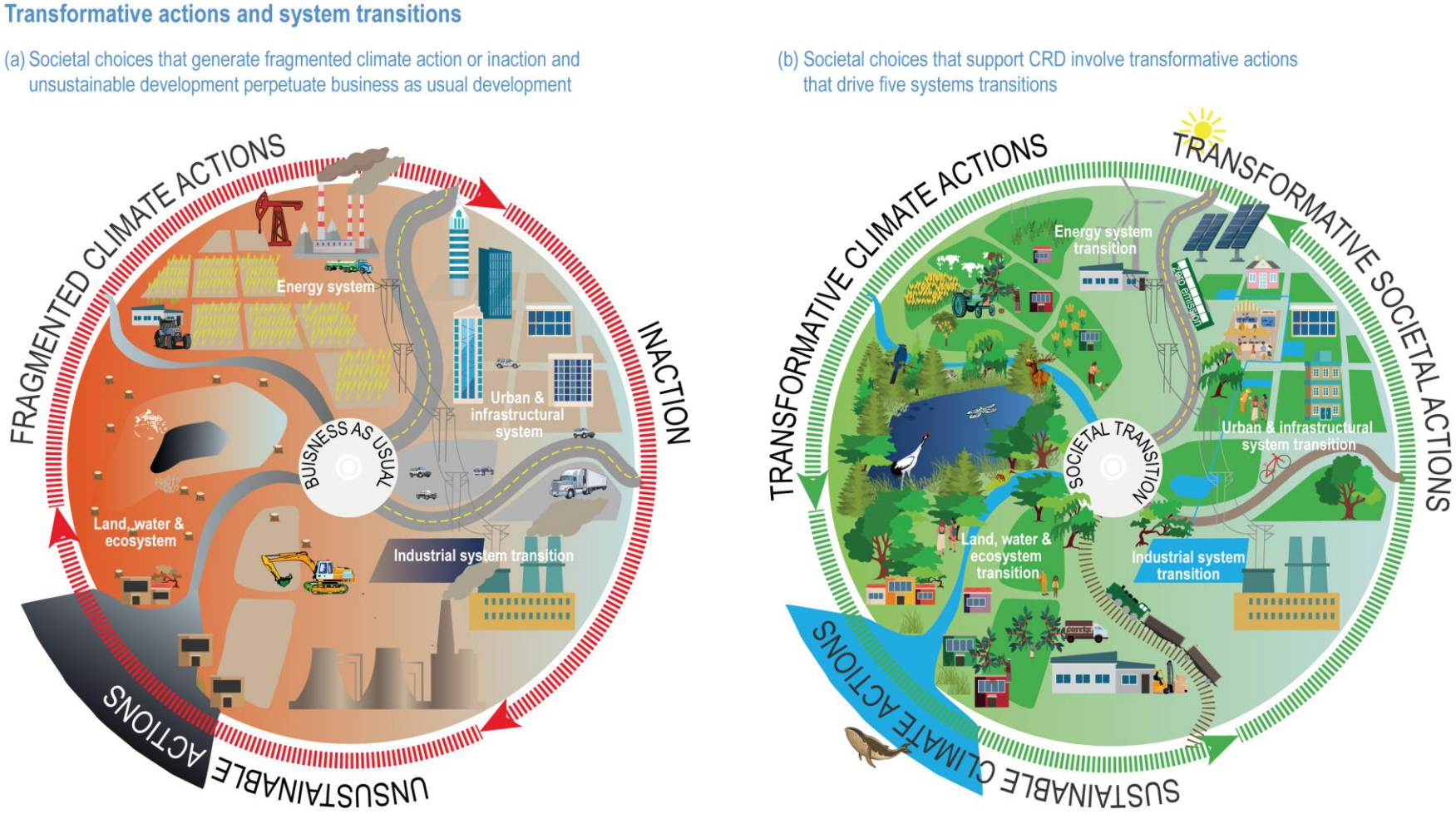
	Species (Vitenskaplig navn)	**Kilden NIBIO Classification**	**Norwegian Red List of Species 2021 Category**
1.	*Buxbaumia viridis* (Green Shield-moss)	Protected species in forests	NT - Nær truet (near threatened)
2.	*Crustoderma dryinum* (Crust fungus)	Endangered species in forests	VU - Sårbar (vunerable)
3.	*Rhodonia placenta* (Brown rot fungus)		VU - Sårbar (vunerable)
4.	*Amylocorticium subincarnatum* (Corticioid fungus)		VU - Sårbar (vunerable)
5.	*Skeletocutis jelicii* (Polypore / Bracket fungus)		EN - Sterkt truet (endangered)
6.	*Pycnoporellus fulgens* (Polypore fungus)		NT - Nær truet (near threatened)
7.	*Antrodiella citrinella* (Polypore fungus)	Near threatened species of responsibility in forests	NT - Nær truet (near threatened)
8.	*Tilia cordata* (Deciduous tree)	Near threatened species in forests	NT - Nær truet (near threatened)
9.	*Phlebia centrifuga* (Corticioid fungus)		NT - Nær truet (near threatened)
10.	*Phellinus nigrolimitatus* (Polypore fungus)		NT - Nær truet (near threatened)
13.	*Fomitopsis rosea* (Polypore fungus)		NT - Nær truet (near threatened)

Table B1: *Norwegian Red Listed Species Present in Vinterbro site*

Transformation – urgency and scale of change required

- Significant changes in form, structure, and/or meaning-making (O'Brien, 2018)
  - transformations of systems, structures, relations and behaviors
- Often non-linear changes that upset the status quo – as opposed to incremental change
- "Transformative action is increasingly urgent across all sectors, systems and scales to avert dangerous climate change and meet the SDGs" (IPCC AR6 WGII Ch18: Schipper et al. 2022, p. 2668).

Intersecting system transitions



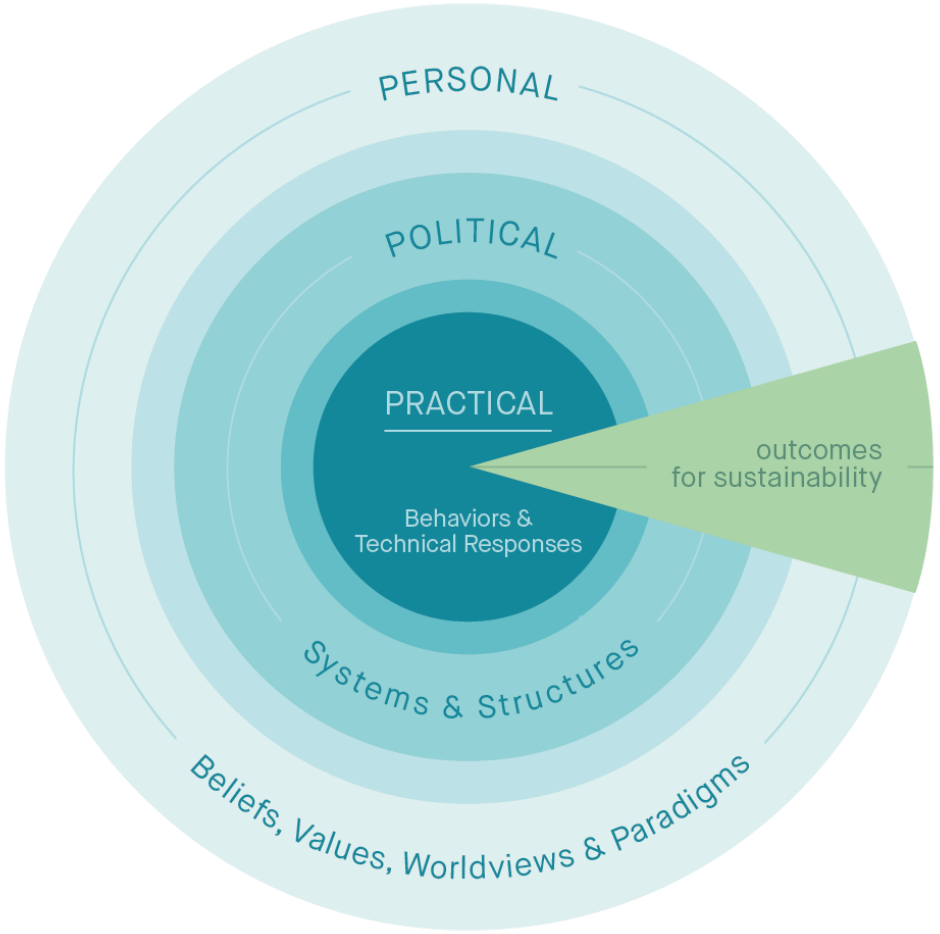
Schipper, E.L.F.,et al., 2022: Climate Resilient Development Pathways. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2655–2807, doi:10.1017/9781009325844.027.

Figure 18.3 | Transformative actions and system transitions characterize Climate Resilient Development Pathways

(a) Societal choices that generate fragmented climate action or inaction and unsustainable development perpetuate business as usual and entrenched systems.

(b) Societal choices that support CRD involve transformative adaptation, mitigation and sustainable development actions that drive five systems transitions (energy, land and other ecosystems, urban and infrastructure, industrial and societal). There is close interdependence between these systems. The system transition framework allows for a comprehensive assessment of the synergies and trade-offs between mitigation, adaptation and sustainable development. For example, land and water use in one system impacts the other systems and their surrounding ecosystems, thus reflecting how agricultural practices can have an impact on energy usage in urban centers. Finally, societal system transitions within each of the other systems enable the transitions to occur (18.3, Box 18.1).

The three spheres of transformation



- «…the types of transformation needed to address climate change and sustainability challenges will involve more than new gadgets and experiences. They are likely to also involve «interior» changes in worldiews, values or paradigms that manifest as new ways of relating to others, treating nature, and organizing society» (Leichenko and O'Brien, 2019, *Climate and Society: Transforming the Future*, p. 179)
- Transformation as a continuous process that involves interrelated changes across three dimensions (ibid, p 180)

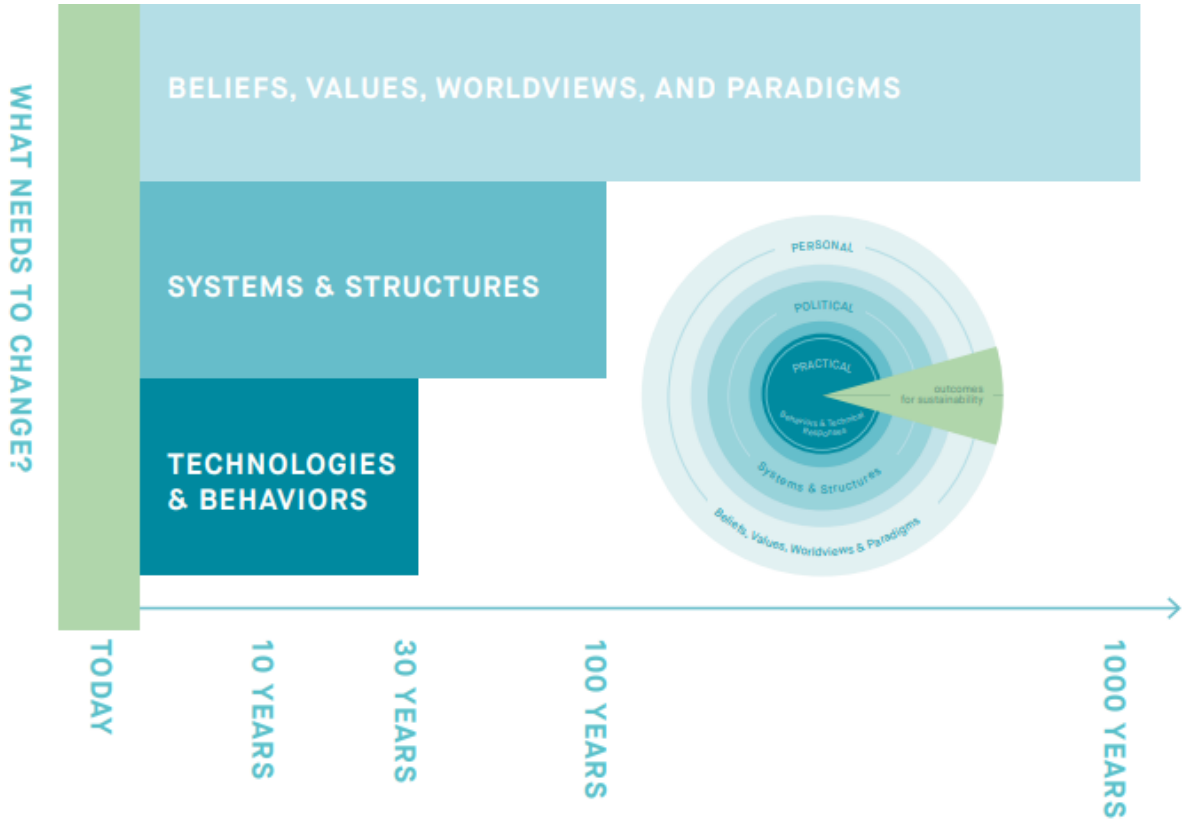
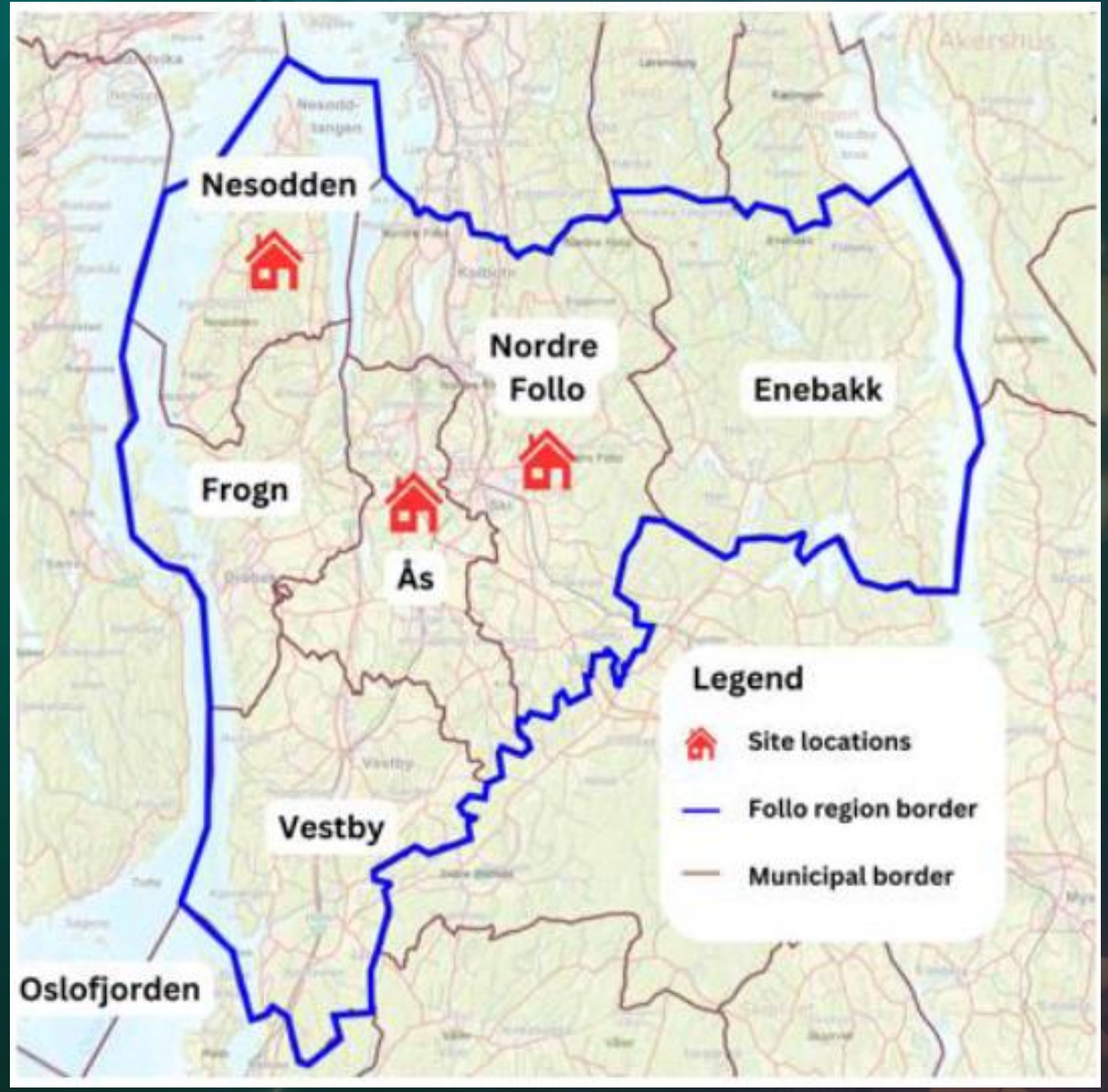
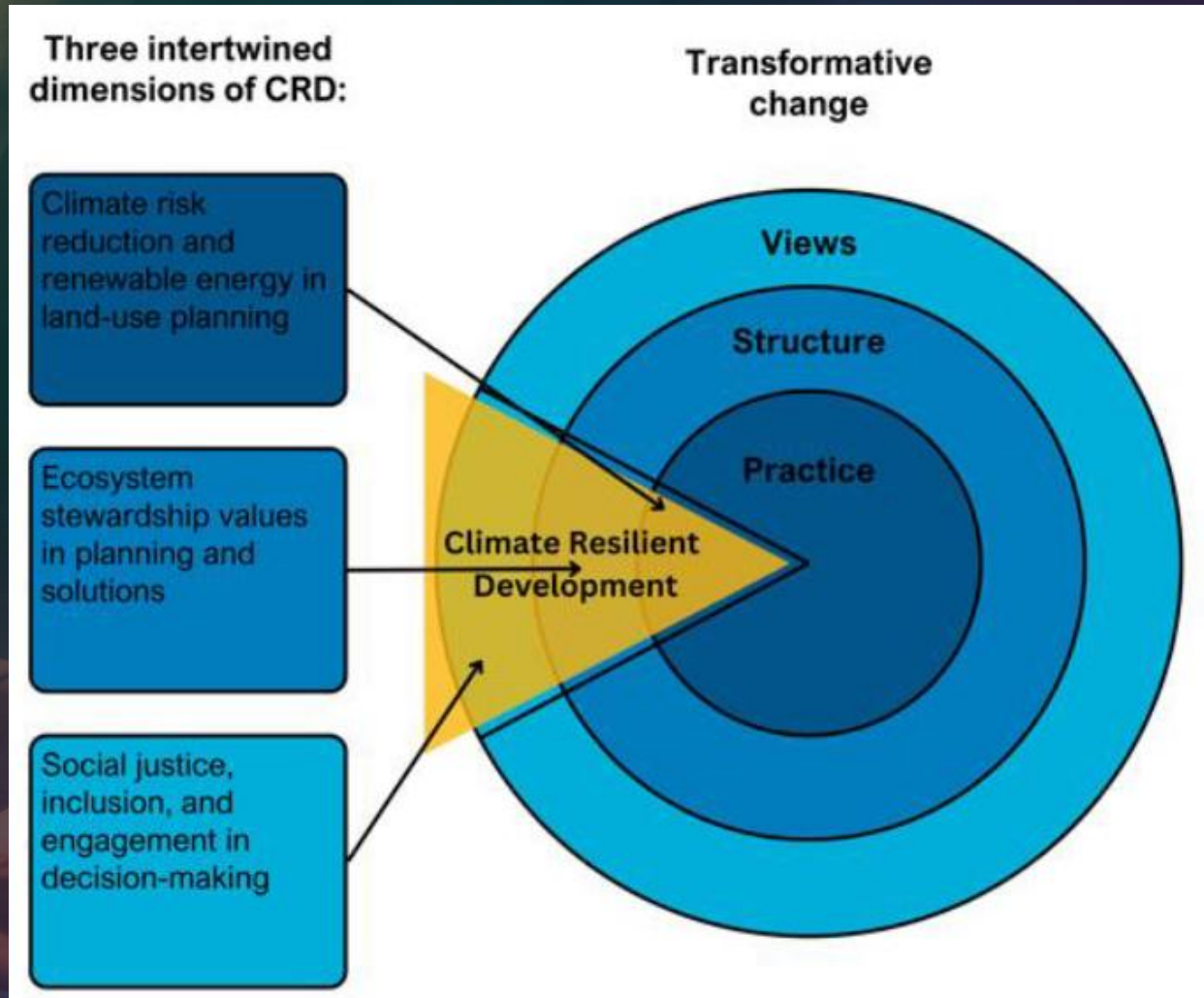


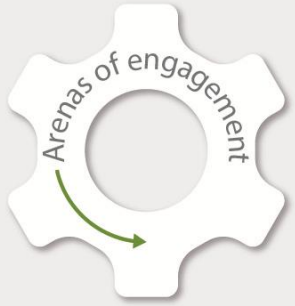
Figure 2: Transformation in time (Based on Sharma 2017).



Policy dialogues
Research
Action research
Student engagement
Dissemination



Societal choices are the result of multiple decisions made by multiple actors in diverse arenas of engagement

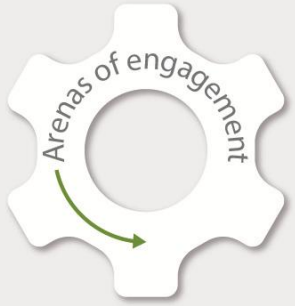


- Multiple government, private sector and civil society actors interact in different arenas of engagement, including **economic + financial**

Photo: shutterstock.com

Photo: Alex Fassio/CC BY-NC-ND 2.0/flickr

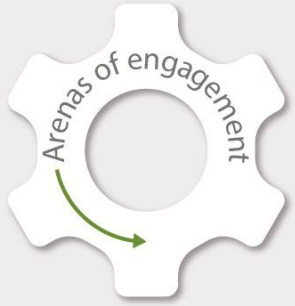
Societal choices are the result of multiple decisions made by multiple actors in diverse arenas of engagement



- Multiple government, private sector and civil society actors interact in different arenas of engagement, including economic + financial, **knowledge + technology**

Photos: shutterstock.com

Societal choices are the result of multiple decisions made by multiple actors in diverse arenas of engagement



- Multiple government, private sector and civil society actors interact in different arenas of engagement, including economic + financial, knowledge + technology, **ecological**

Arenas of engagement:

Ecological
Knowledge + technology
Economic + financial

Photo: Bruce Glavovic

Photo: shutterstock.com

Arenas of engagement:

- Political
- Ecological
- Knowledge + technology
- Economic + financial

Societal choices are the result of multiple decisions made by multiple actors in diverse arenas of engagement

- Multiple government, private sector and civil society actors interact in different arenas of engagement, including economic + financial, knowledge + technology, ecological, **political**

Photo. Marco Oriolesi/unsplash.com

Photo: shutterstock.com

Societal choices are the result of multiple decisions made by multiple actors in diverse arenas of engagement

- Multiple government, private sector and civil society actors interact in different arenas of engagement, including economic + financial , knowledge + technology, ecological, political, **socio-cultural**

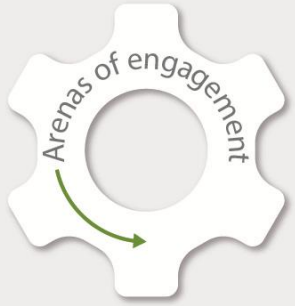
Arenas of engagement:

Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial

Photo: Marianne Mosberg

Photo: shutterstock.com

Societal choices are the result of multiple decisions made by multiple actors in diverse arenas of engagement



- Multiple government, private sector and civil society actors interact in different arenas of engagement, including economic + financial, knowledge + technology, ecological, political, socio cultural and **community** arenas.

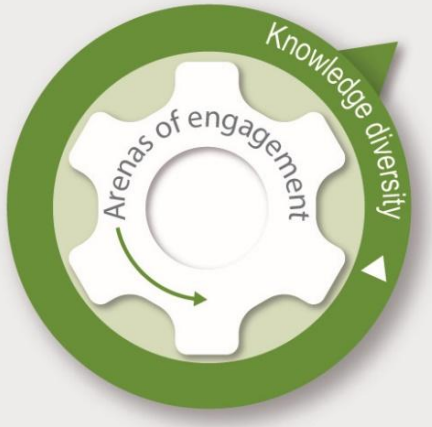
Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial

Photo: wonderlate/unsplash.com

Photo: Joris Visser/unsplash.com

Photo. Asia Culturecenter/unsplash.com

Dimensions that enable actions towards higher climate resilient development

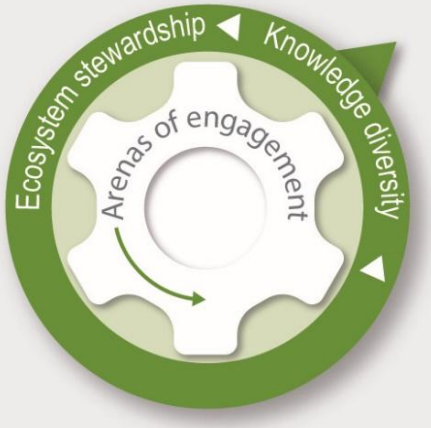


Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial

Key dimensions enable climate resilient development

- Dimensions that enable societal choices towards higher climate resilient development include **knowledge diversity**

Dimensions that enable actions towards higher climate resilient development



Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial

Key dimensions enable climate resilient development

- Dimensions that enable societal choices towards higher climate resilient development include knowledge diversity, **ecosystem stewardship**

Dimensions that enable actions towards higher climate resilient development

Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial

Key dimensions enable climate resilient development

- Dimensions that enable societal choices towards higher climate resilient development include knowledge diversity, ecosystem stewardship, **equity and justice**

Dimensions that enable actions towards higher climate resilient development

Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial

Key dimensions enable climate resilient development

- Dimensions that enable societal choices towards higher climate resilient development include knowledge diversity, ecosystem stewardship, equity and justice and **inclusion.**

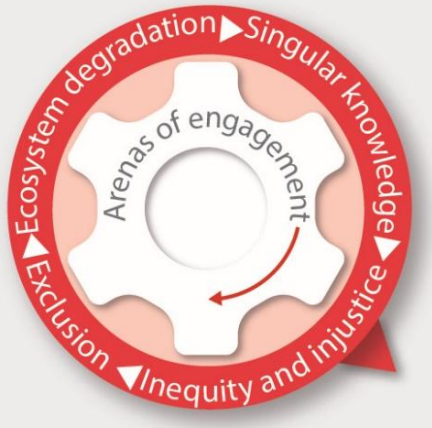
Key dimensions enable climate resilient development

- Dimensions that enable societal choices towards *higher* climate resilient development include knowledge diversity, ecosystem stewardship, equity and justice and inclusion.

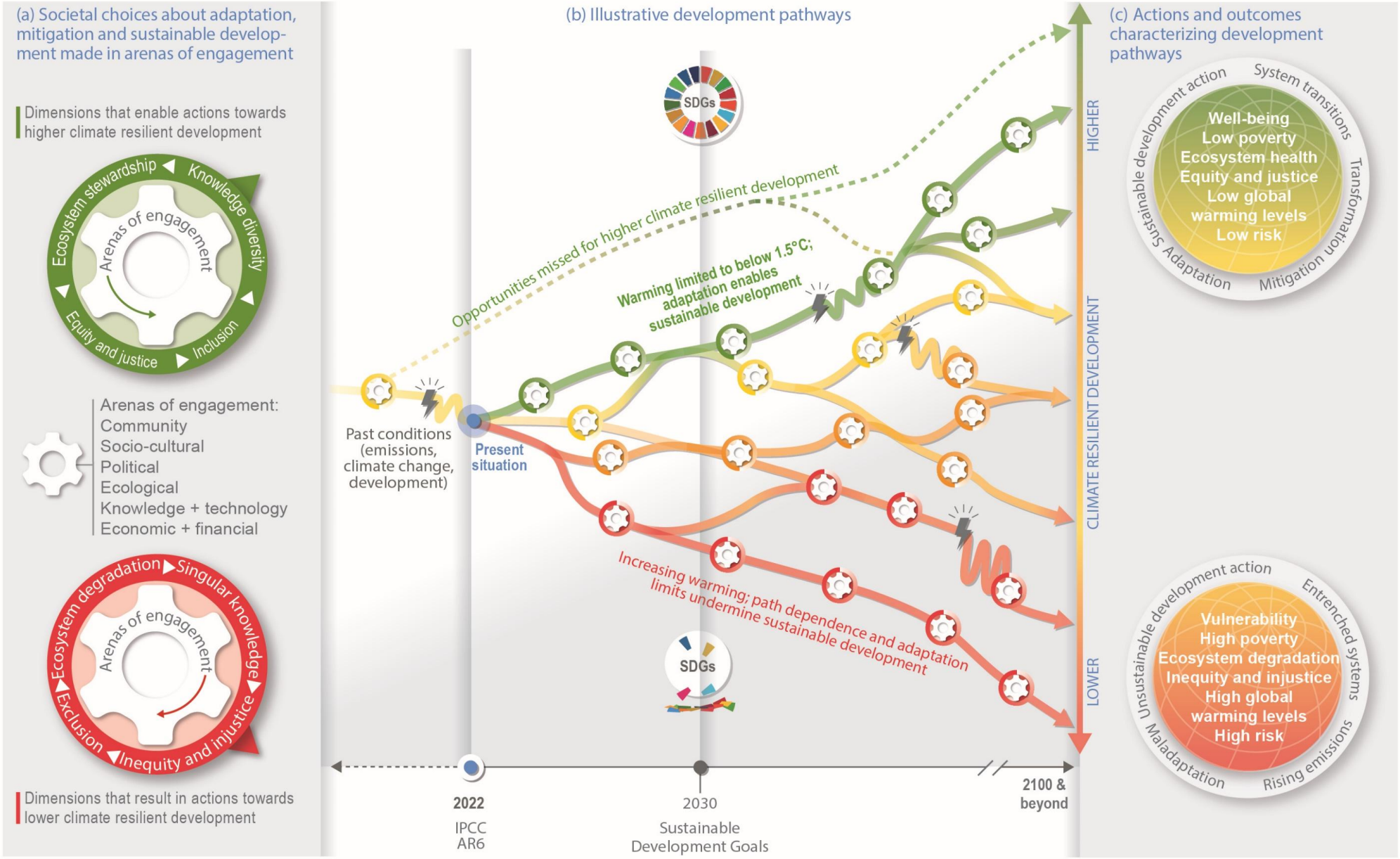
- Dimensions that result in societal choices towards *lower* climate resilient development have been identified as **singular knowledge, ecosystem degradation, exclusion, and inequity and injustice**

Dimensions that enable actions towards higher climate resilient development

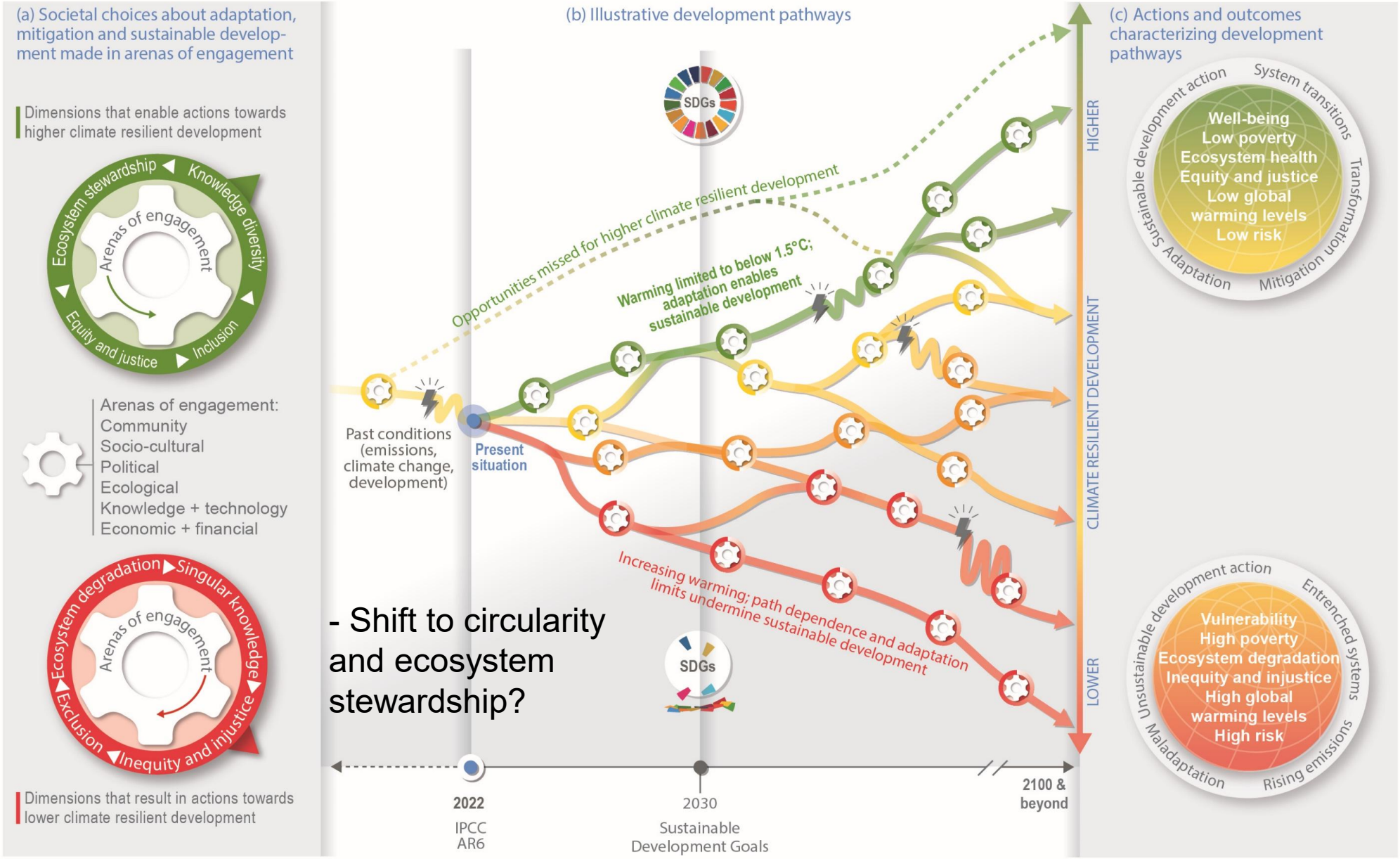
Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial



Dimensions that result in actions towards lower climate resilient development


(a) Societal choices about adaptation, mitigation and sustainable development made in arenas of engagement
Dimensions that enable actions towards higher climate resilient development
Ecosystem stewardship
Knowledge diversity
Arenas of engagement
Equity and justice
Inclusion
Arenas of engagement:
Community
Socio-cultural
Political
Ecological
Knowledge + technology
Economic + financial
Ecosystem degradation
Singular knowledge
Arenas of engagement
Exclusion
Inequity and injustice
Dimensions that result in actions towards lower climate resilient development
(b) Illustrative development pathways
SDGs
Opportunities missed for higher climate resilient development
Warming limited to below 1.5°C; adaptation enables sustainable development
Past conditions (emissions, climate change, development)
Present situation
Increasing warming; path dependence and adaptation limits undermine sustainable development
SDGs
2022
IPCC AR6
2030
Sustainable Development Goals
2100 & beyond
HIGHER
CLIMATE RESILIENT DEVELOPMENT
LOWER
(c) Actions and outcomes characterizing development pathways
Unsustainable development action
System transitions
Transformation
Mitigation
Adaptation
Sustainable development action
Well-being
Low poverty
Ecosystem health
Equity and justice
Low global warming levels
Low risk
Unsustainable development action
Entrenched systems
Rising emissions
Maladaptation
Unsustainable development action
Vulnerability
High poverty
Ecosystem degradation
Inequity and injustice
High global warming levels
High risk
Illustrative climatic or non-climatic shock, e.g. COVID-19, drought or floods, that disrupts the development pathway
Narrowing window of opportunity for higher CRD

E.g. disability inclusive green space planning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Dimensions that result in actions towards lower climate resilient development
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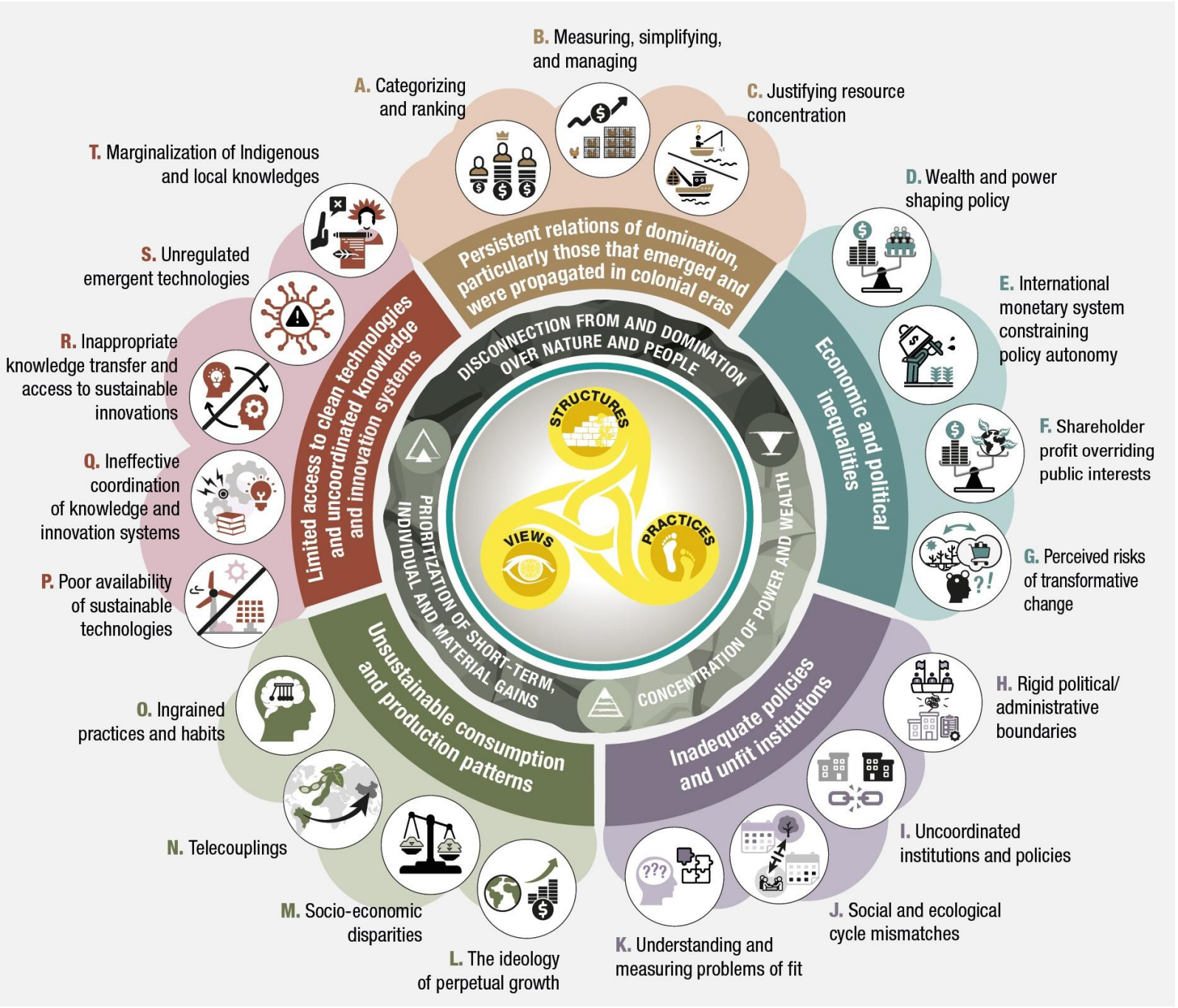
Opportunities missed for higher climate resilient development
Warming limited to below 1.5°C; adaptation enables sustainable development
Past conditions (emissions, climate change, development)
Present situation
Increasing warming; path dependence and adaptation limits undermine sustainable development
SDGs
- Shift to circularity and ecosystem stewardship?
2022
IPCC AR6
2030
Sustainable Development Goals
2100 & beyond
HIGHER
CLIMATE RESILIENT DEVELOPMENT
LOWER
(c) Actions and outcomes characterizing development pathways
Unsustainable development action
System transitions
Transformation
Mitigation
Sustainable Adaptation
Well-being
Low poverty
Ecosystem health
Equity and justice
Low global warming levels
Low risk
Unsustainable development action
Entrenched systems
Rising emissions
Maladaptation
Vulnerability
High poverty
Ecosystem degradation
Inequity and injustice
High global warming levels
High risk
Illustrative climatic or non-climatic shock, e.g. COVID-19, drought or floods, that disrupts the development pathway
Narrowing window of opportunity for higher CRD

Transformation as opening up deliberative spaces with diverse forms of knowing

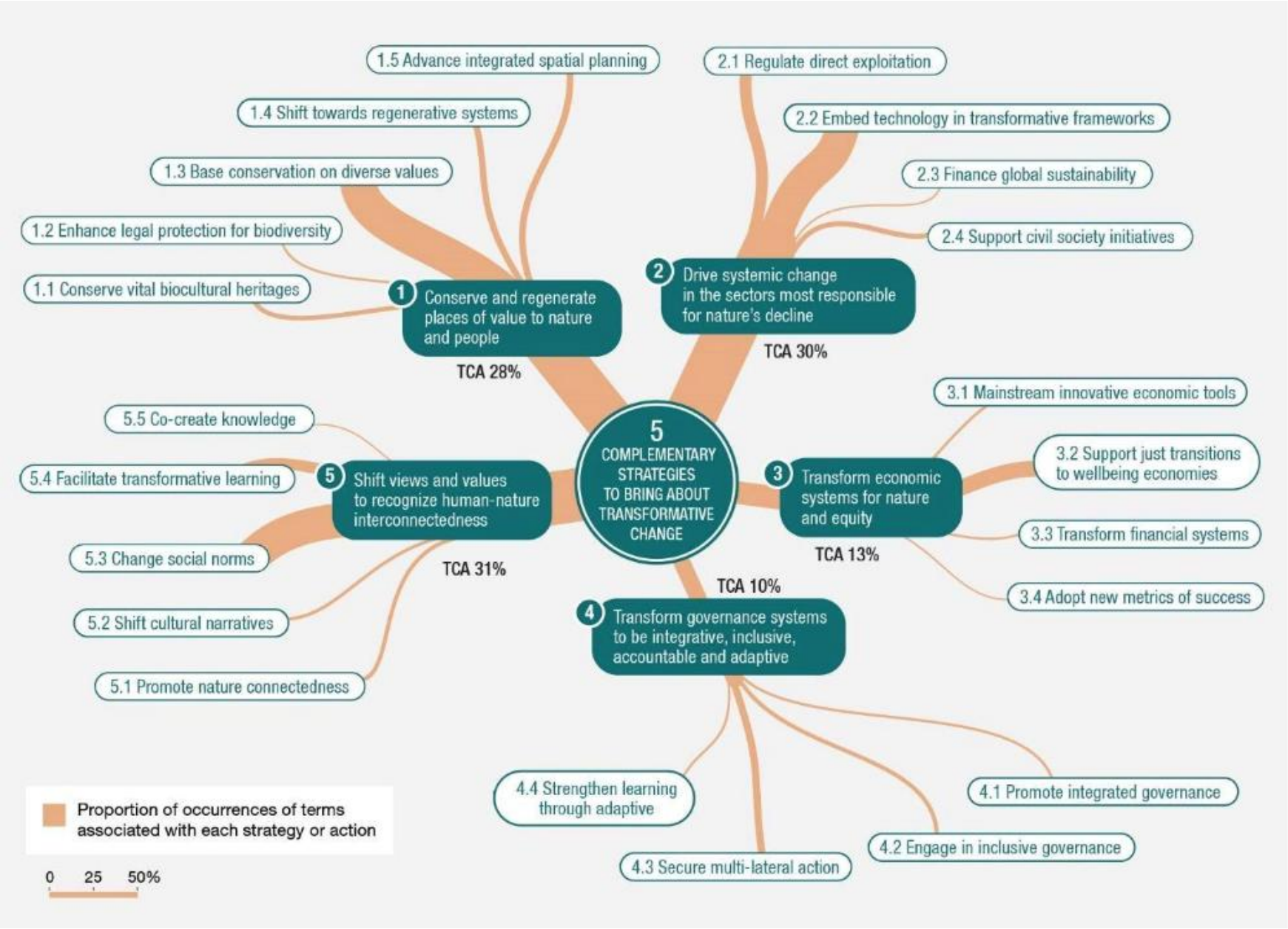
- Questioning development and relationships of domination
- Question our understanding our position in the world, and how we can understand the world
  - E.g.dualistic understandings questioned
  - Our understanding of ‘individualism’ vs interdependence, connectedness and solidarity
  - Engaging with affective, experience based forms of knowing
    - Eriksen, S. 2022. Is my vulnerability so different from yours? A call for compassionate climate change research. Progress in Human Geography. https://doi.org/10.1177/03091325221083221
    - Nightingale, A.J., Gonda, N., Eriksen, S.H. 2022. Affective adaptation= effective transformation? Shifting the politics of climate change adaptation and transformation from the status quo. Wiley Interdisciplinary Reviews: Climate Change 13 (1), e740. https://doi.org/10.1002/wcc.740
    - Eriksen, S., R. Grondahl and A.-M. Sabones, 2021. On CRDP and CRPD: Why the rights of persons with disabilities are critical for understanding climate resilient development pathways. The Lancet Planetary Health, 5 (12), e929-e939. https://doi.org/10.1016/S2542-5196(21)00233-3
- Most important dualism to be overcome – us and them?
- Requires taking us outside current structures and politics?



IPBES Transformative Change Assessment identified

- Five broad challenges to transformative change emerging from the underlying causes of biodiversity loss and nature's decline
- 20 barriers, which are specific manifestations of these challenges

Source: IPBES Transformation Change Assessment (2024) SPM.3



IPBES Transformative Change Assessment identified

- Five complementary strategies for bringing about transformative change that address these challenges/barriers
- 22 specific leverage points within those strategies

Source: IPBES Transformation Change Assessment (2024) SPM.6

Dynamic Atlas of climate resilient development

- Linkages with other efforts and experiences around the world
- Understand the processes through which these local realities are interlinked
- How do urgent system transitions take place through local practice and global interlinked processes
- How can equitable system transitions and societal transformation be advanced?

Thank you!

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