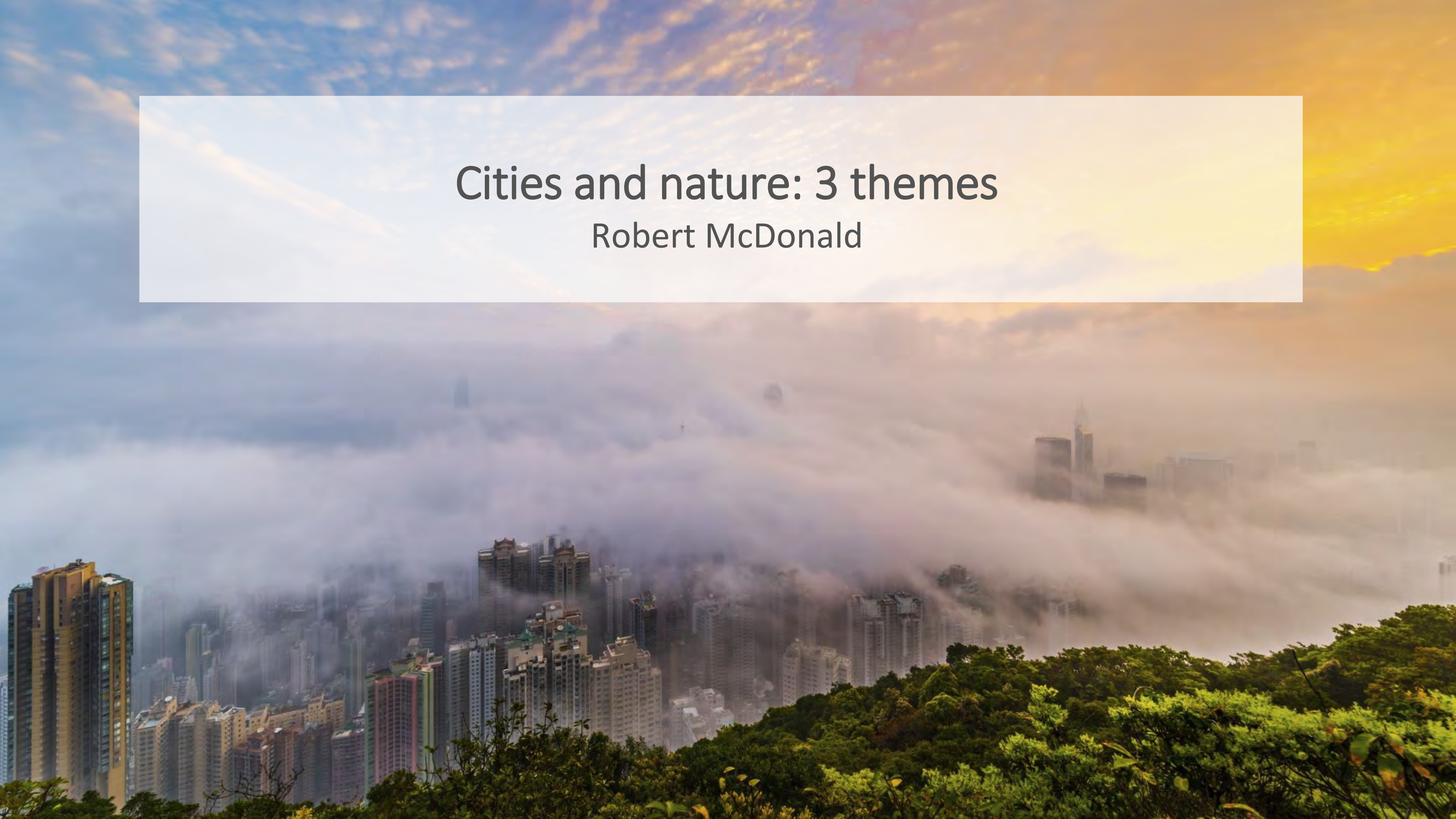


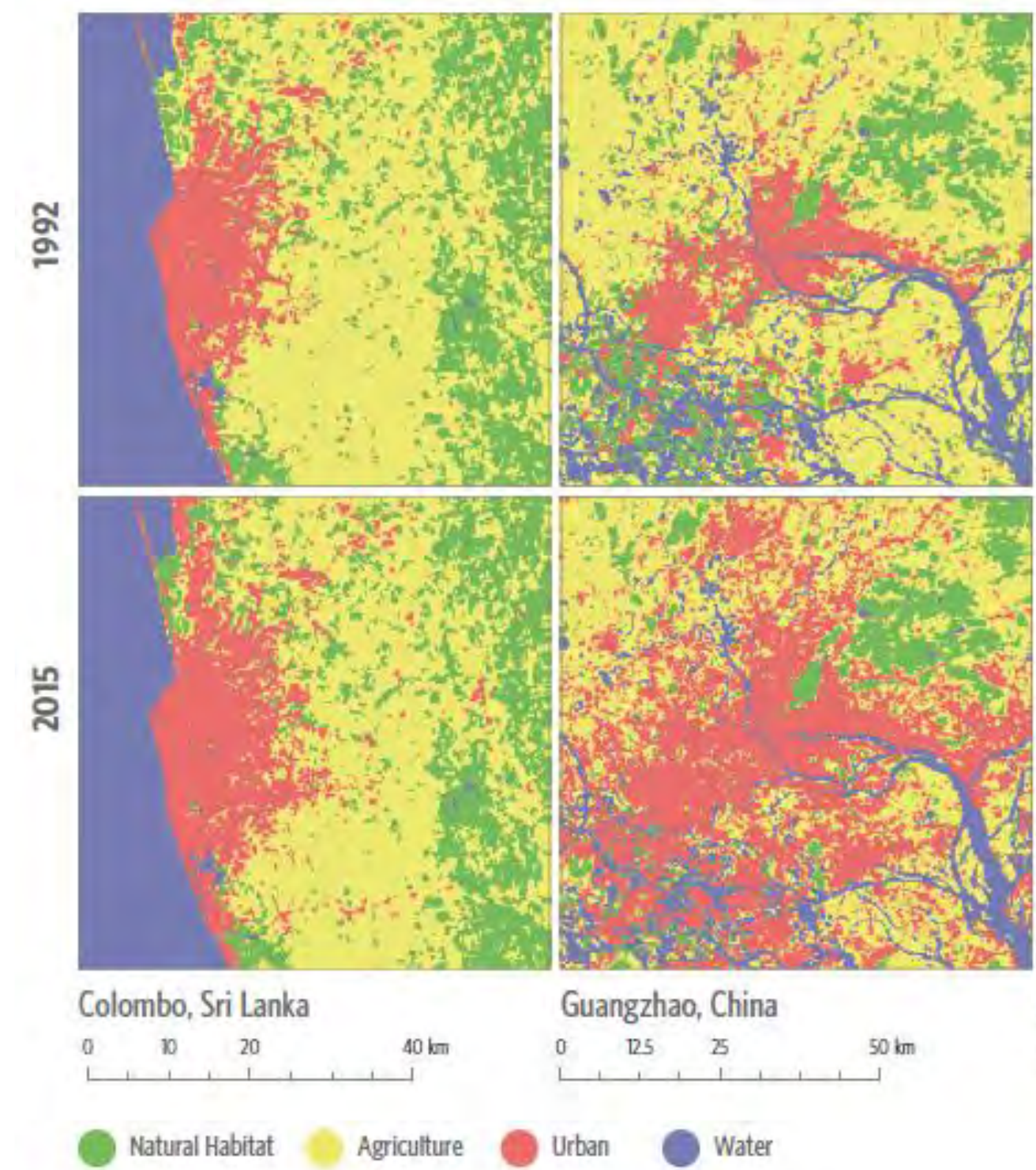


Cities and nature: 3 themes

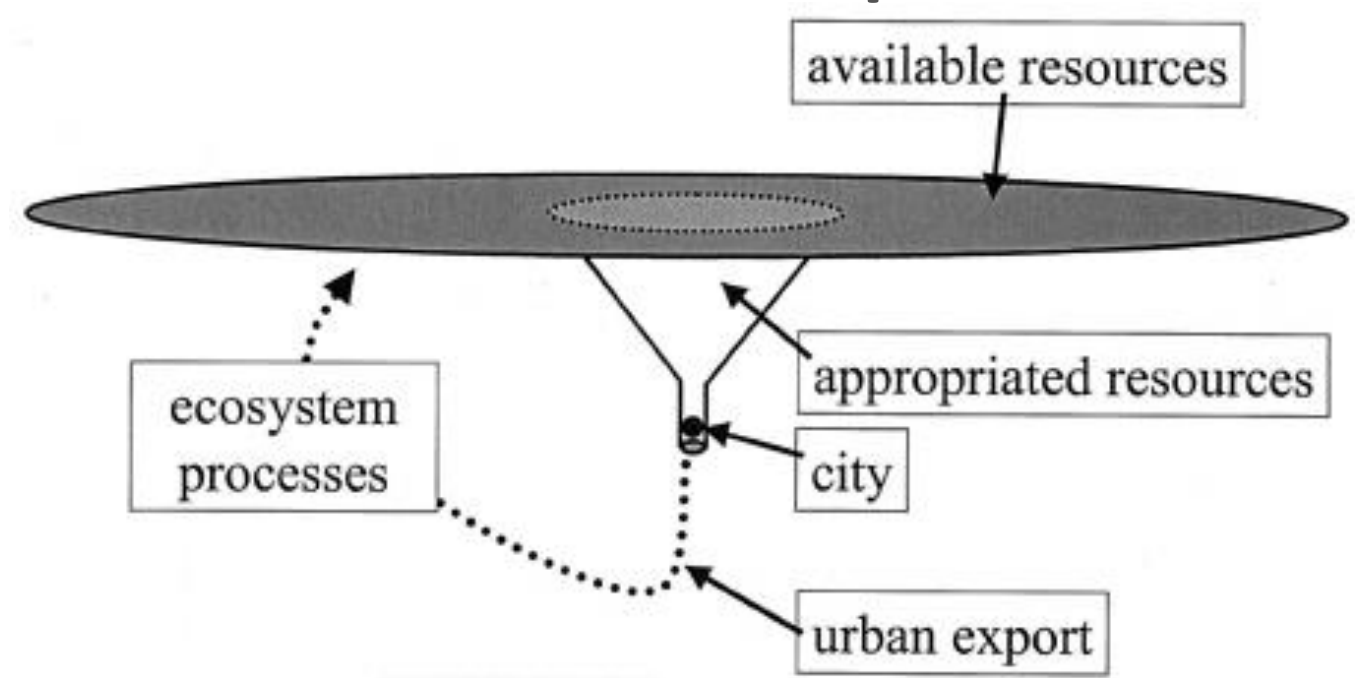
Robert McDonald

Cities and nature

Direct impact

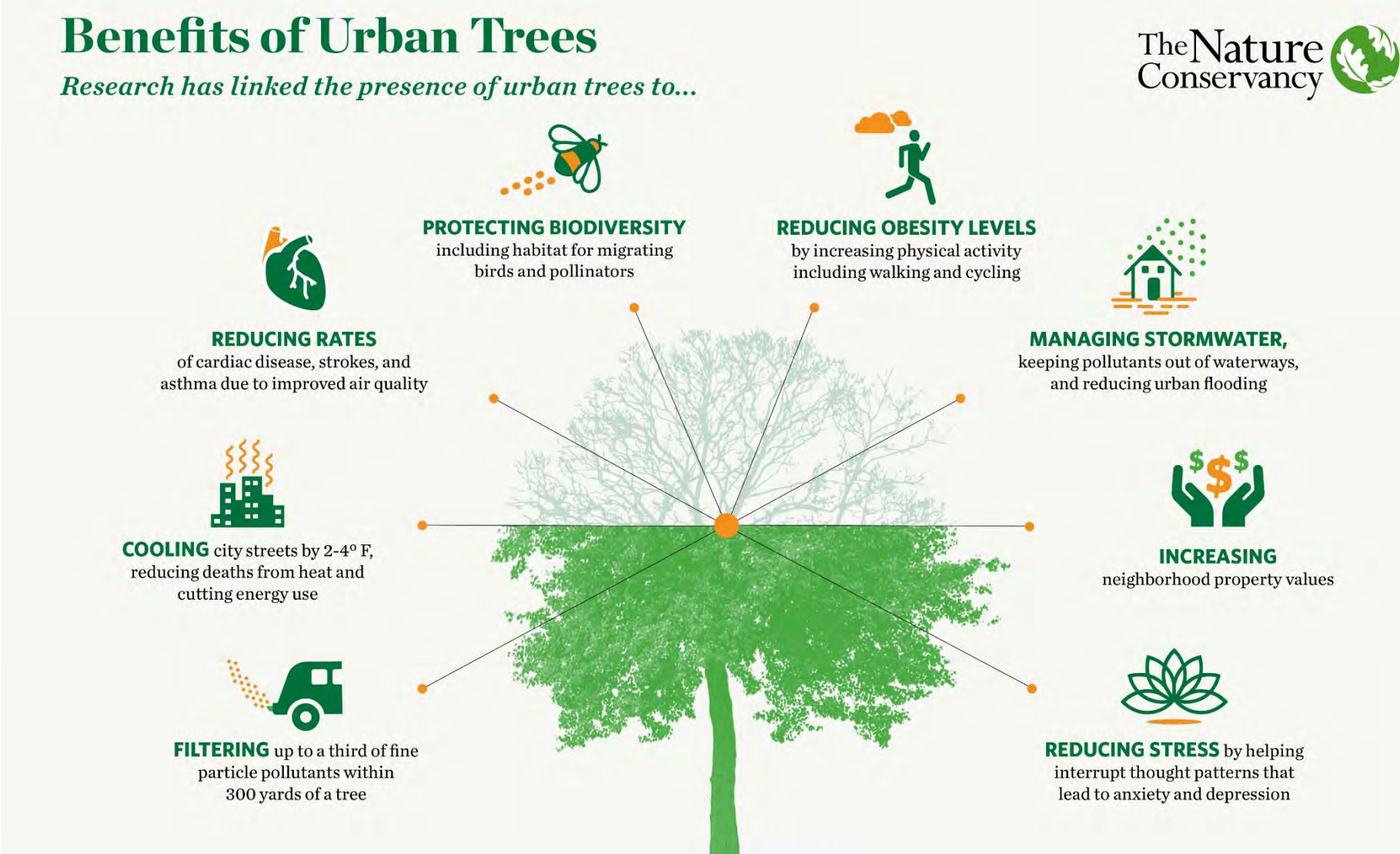


Indirect impact



[Luck et al. 2001](#)

Urban Nature-based Solutions



McDonald et al. 2017, [Funding Trees for Health](#)

McDonald et al. 2018, [Nature in the Urban Century Assessment](#)

Report Findings Dashboard

Urban Growth:



By 2050, there will be
2.4 billion
more people in cities



This rate of urban growth is the
equivalent of building a city
with the population of London
every 7 weeks



Humanity will urbanize an area of
1.2 million km²,
larger than the country of Colombia

Natural Habitat:

1992 - 2000

Urban growth was
responsible for
190,000 km²
of natural habitat lost

29%
of strictly protected
areas¹ were less
than 50 km from
urban areas



2000 - 2030

Urban growth
could threaten
290,000 km²
of natural habitat

40%
of strictly protected
areas¹ are projected
to be within 50 km
of an urban area

¹as defined by IUCN's Protected Area Categories

Carbon Storage:



(as forecast in business-as-usual scenario)

Urban growth would destroy natural
habitat that stores an estimated
4.35 billion
metric tons of CO₂



This is the equivalent of carbon
dioxide emissions from
931 million
cars on the road for one year



Globally avoiding the release of
carbon from habitat loss due to
urban growth has a social value of
182.8 billion USD

assuming the U.S. Environmental Protection Agency's
social cost of carbon (USD 42/t CO₂ eq)

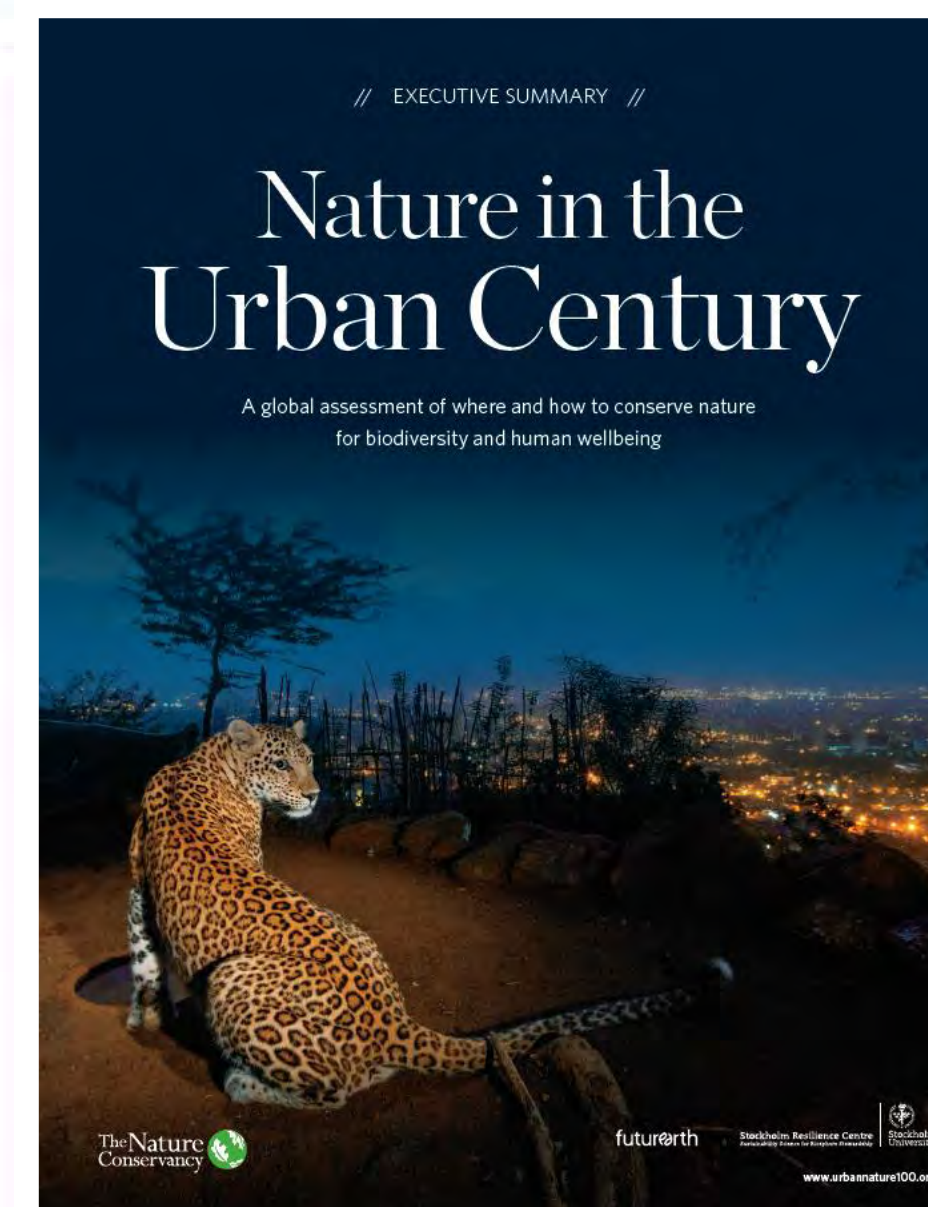
Coastal Resilience:

Coastal habitats reduce the risk
of coastal hazards, such as coastal
flooding and erosion during storms.



By 2030, urban area is forecast
to more than double,
to 23,000 km²
in low-lying coastal zones where
natural habitat plays a critical role
in reducing coastal hazards

This increases the number of urban
dwellers dependent on natural
ecosystems in coastal areas.



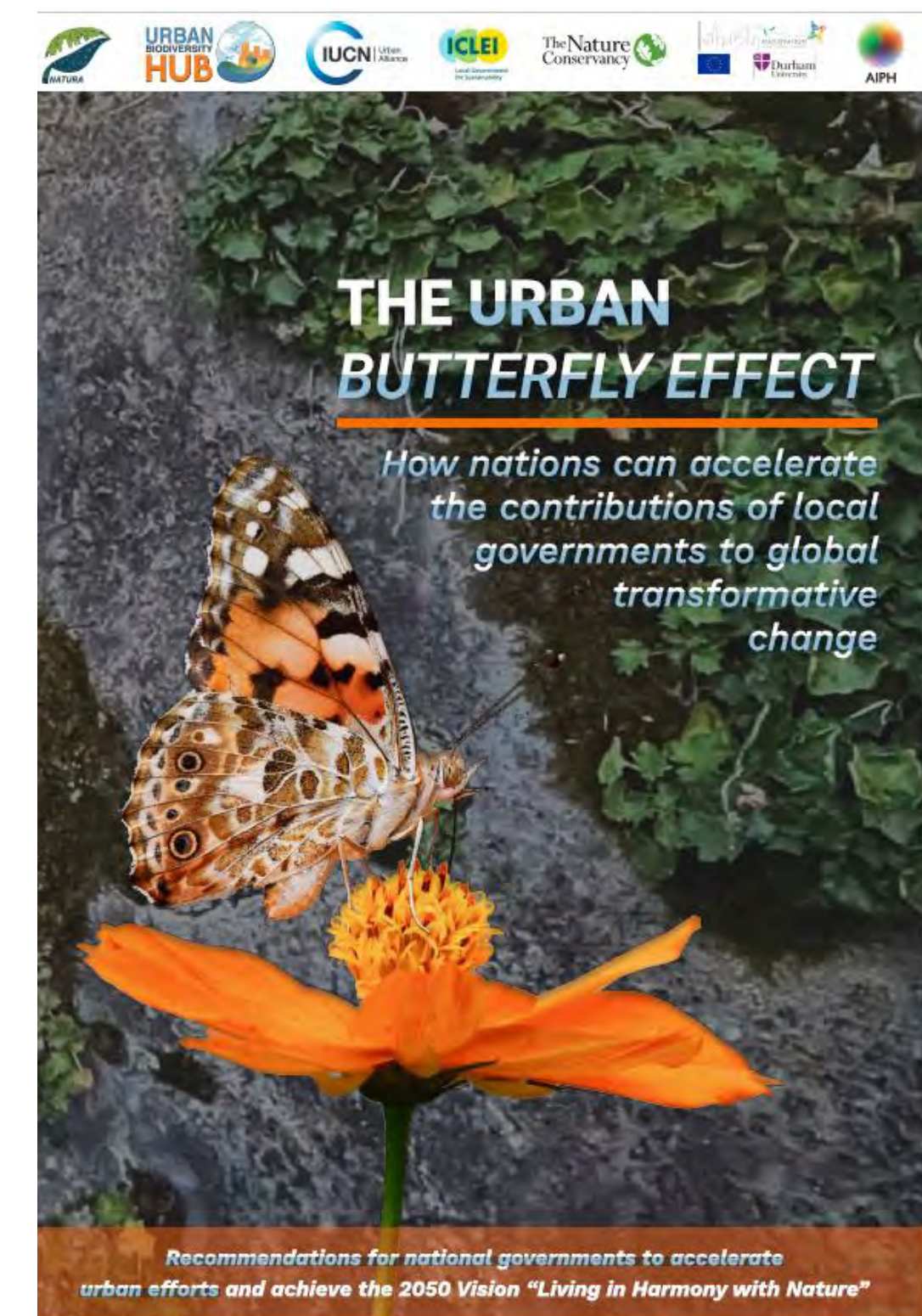
McDonald et al. 2018, [Nature in the Urban Century Assessment](#); McDonald et al. 2019
[Nat. Sust.](#)

Urban land
expansion is a
contributing driver
of habitat loss for
26-39% of species

Simkin et al. 2022 [PNAS](#).

Direct impacts: research questions and policy

- A few key research gaps (McDonald et al. 2019):
 - Freshwater and marine biodiversity
 - Global South cities (especially in tropical and arid systems)
- Policy needs:
 - NBSAPs and urban plans must consider protecting urban adjacent biodiversity as key to 30% by '30 (a key GBF target)
 - Integration between UNFCCC and CBD agendas (synergies between planning for climate and biodiversity)
 - Empowering and capacitating subnational governments
- Relevant to SDGs #14 and 15



Indirect impacts

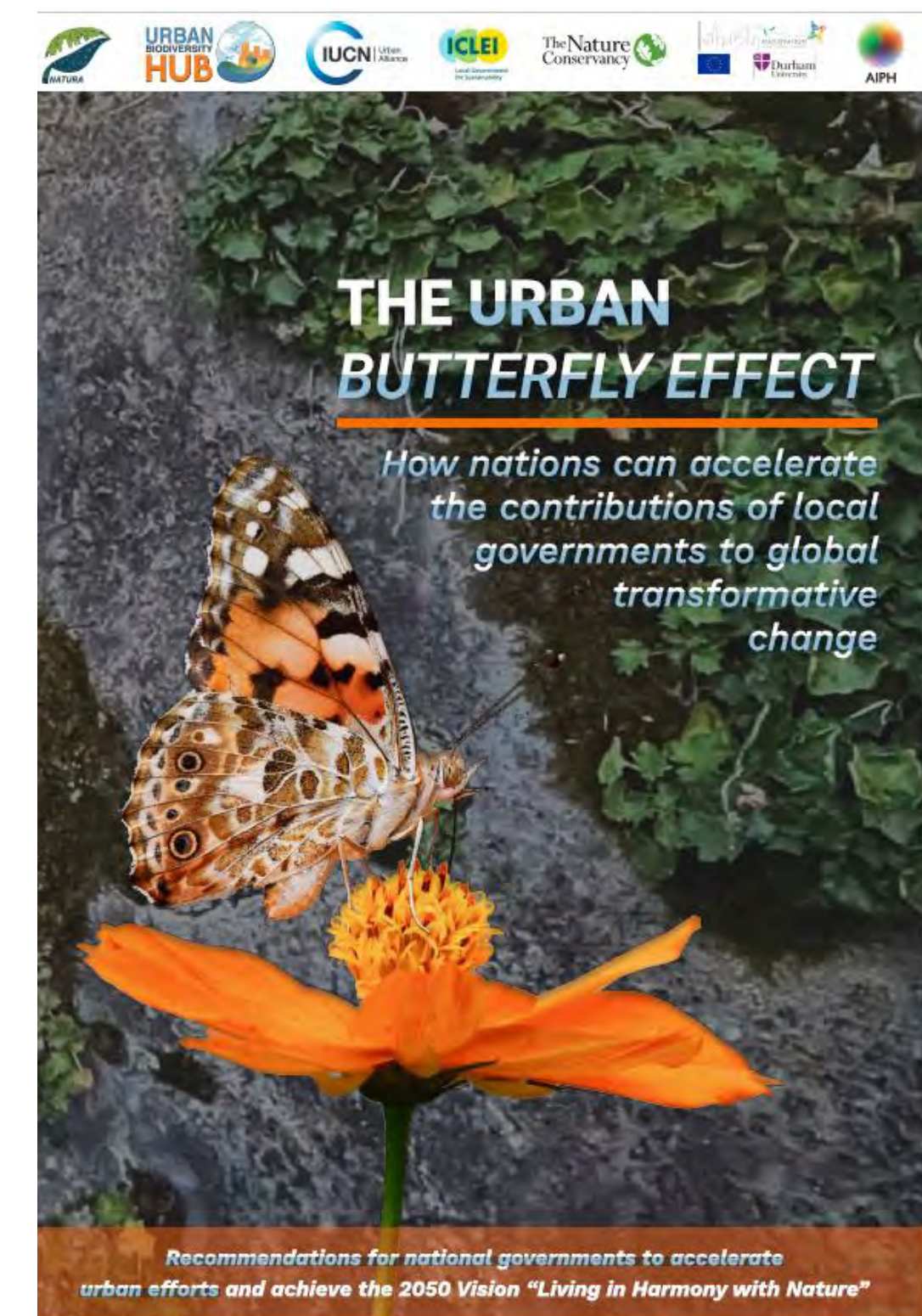
- Indirect urban impacts on biodiversity appear to affect a greater area than direct impacts
- Food consumption appears to be the greatest indirect impact of cities.
 - Agricultural land needed to support those in cities is 36x larger than their urban area.
- However, indirect effects are less studied than direct effects.



McDonald et al. 2019 [Nat. Sust.](#)

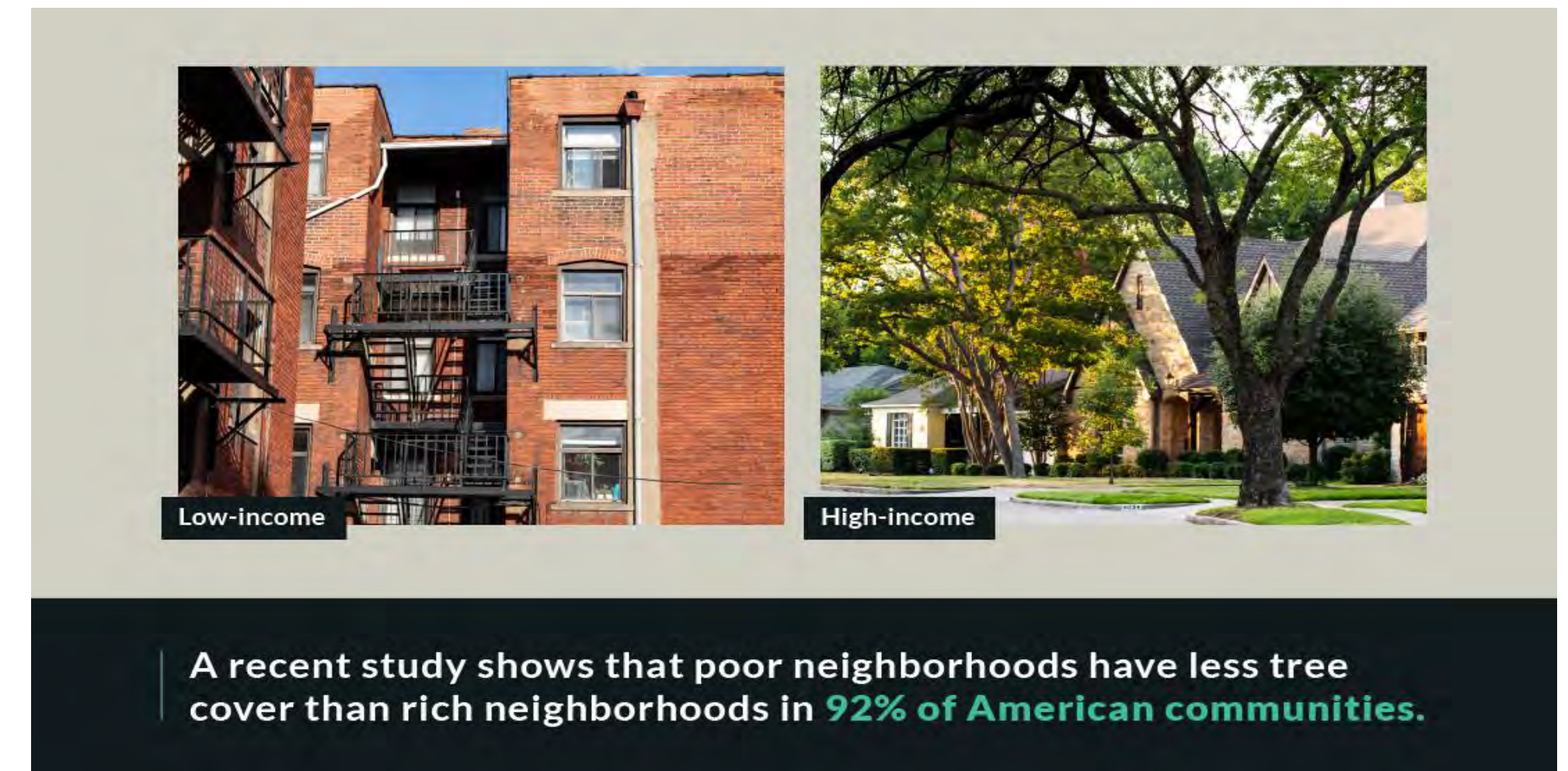
Indirect impacts: research questions and policy

- A few key research gaps (McDonald et al. 2019):
 - Modeling and metrics that connects urban decisions to specific biodiversity impacts (teleconnections and LCA)
- Policy needs:
 - Need for urban (and corporate) commitments to net biodiversity loss that includes indirect effects
 - Emerging frameworks: Science-based Targets for Nature (SBTN), IUCN's Urban Nature Index, Singapore Index.
 - Need for strong urban-relevant commitments in CBD and UNFCCC process:
 - Urban areas indirect effects essential for GBF targets:
 - #7 (Pollution reduced)
 - #16 (Responsible Choices)
- Relevant to SDGs #6, 11, 12, 13, 14, and 15.

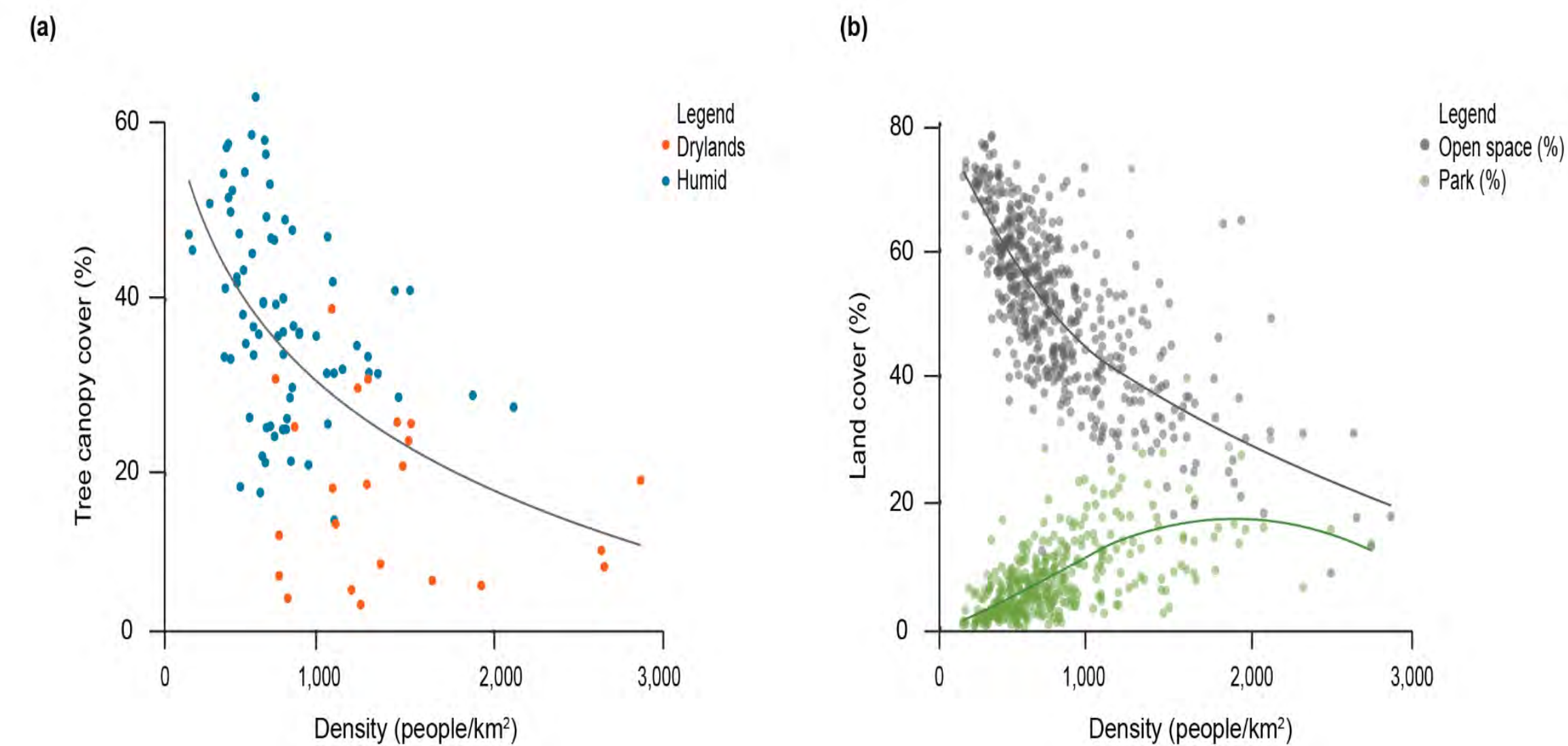


Urban nature-based solutions

- Urban green spaces often lack urban avoider species, but nevertheless can harbor significant biodiversity
- Urban green spaces however can be an NbS for human wellbeing and climate adaptation.
- Two challenges to use of urban NbS:
 - Nature inequality
 - Potential tradeoffs between density and urban nature
 - Can be overcome by good urban design



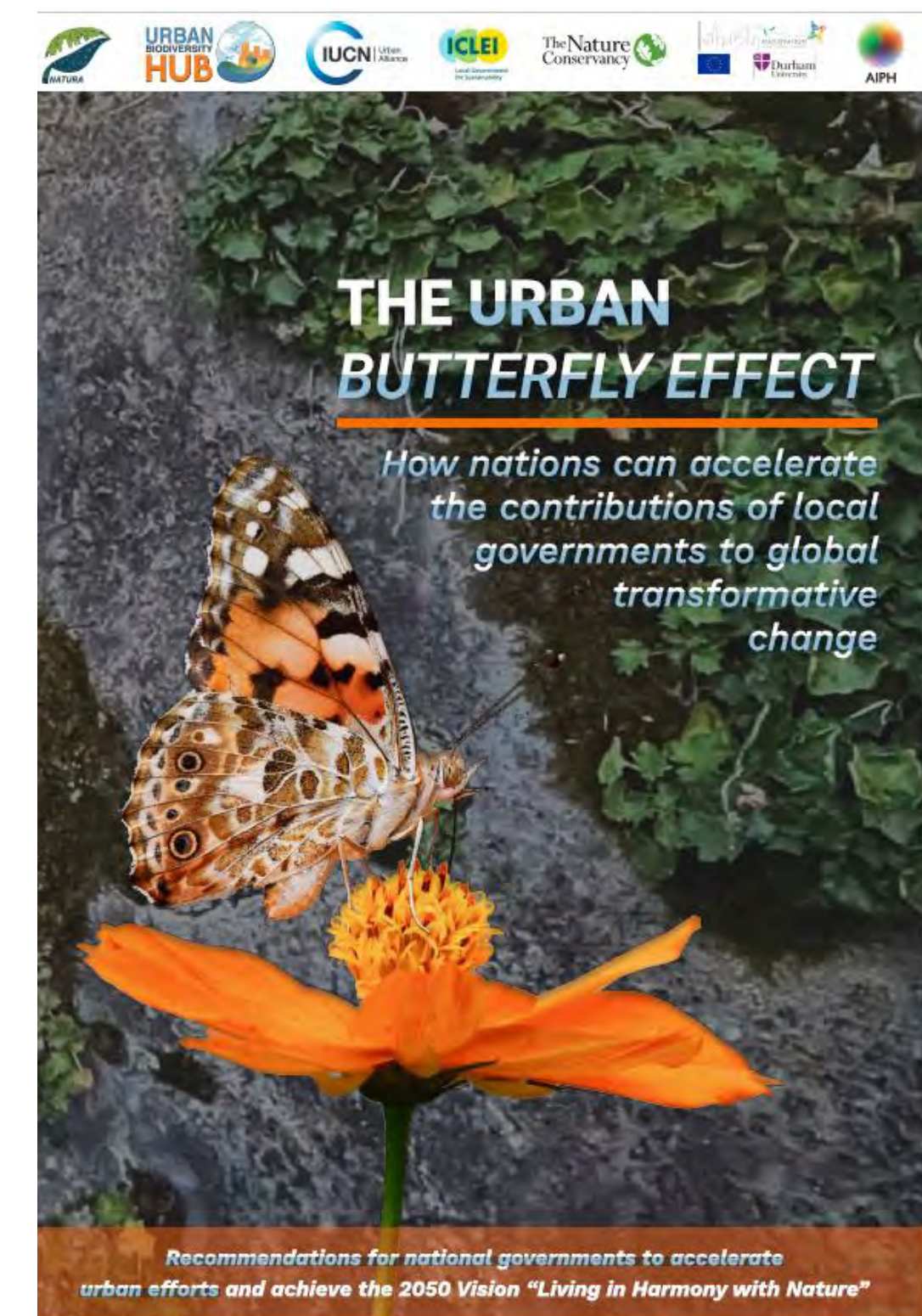
[McDonald et al. 2021](#)



McDonald et al. (in review), People and Nature

Urban NbS: research questions and policy

- A few key research gaps ([McDonald et al. 2015](#)):
 - How can cities be both dense (low-carbon) and green?
 - How much can NbS meet societal needs, relative to other potential solutions?
- Policy needs:
 - Need for financing and incentives that overcome the “wrong pocket problem”
 - Need for best-practice governance systems for planning, creating, and maintaining NbS
- Relevant to SDGs #3, 6, 11, and 13.
- Cities are essential for GBF targets #11, 12, 21.





Thank You