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Level 1 CCRU 21 Jan 2021

Adaptation of Coastal Communities: the good, the bad, and the ugly

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1. Climate Change big picture
2. Why adaptation is necessary (types of adaptation)
3. Current NZ guidance/situation
4. Coastal Communities Case Studies
    a. engagement processes
    b. adaption processes
5. Take-aways, Questions

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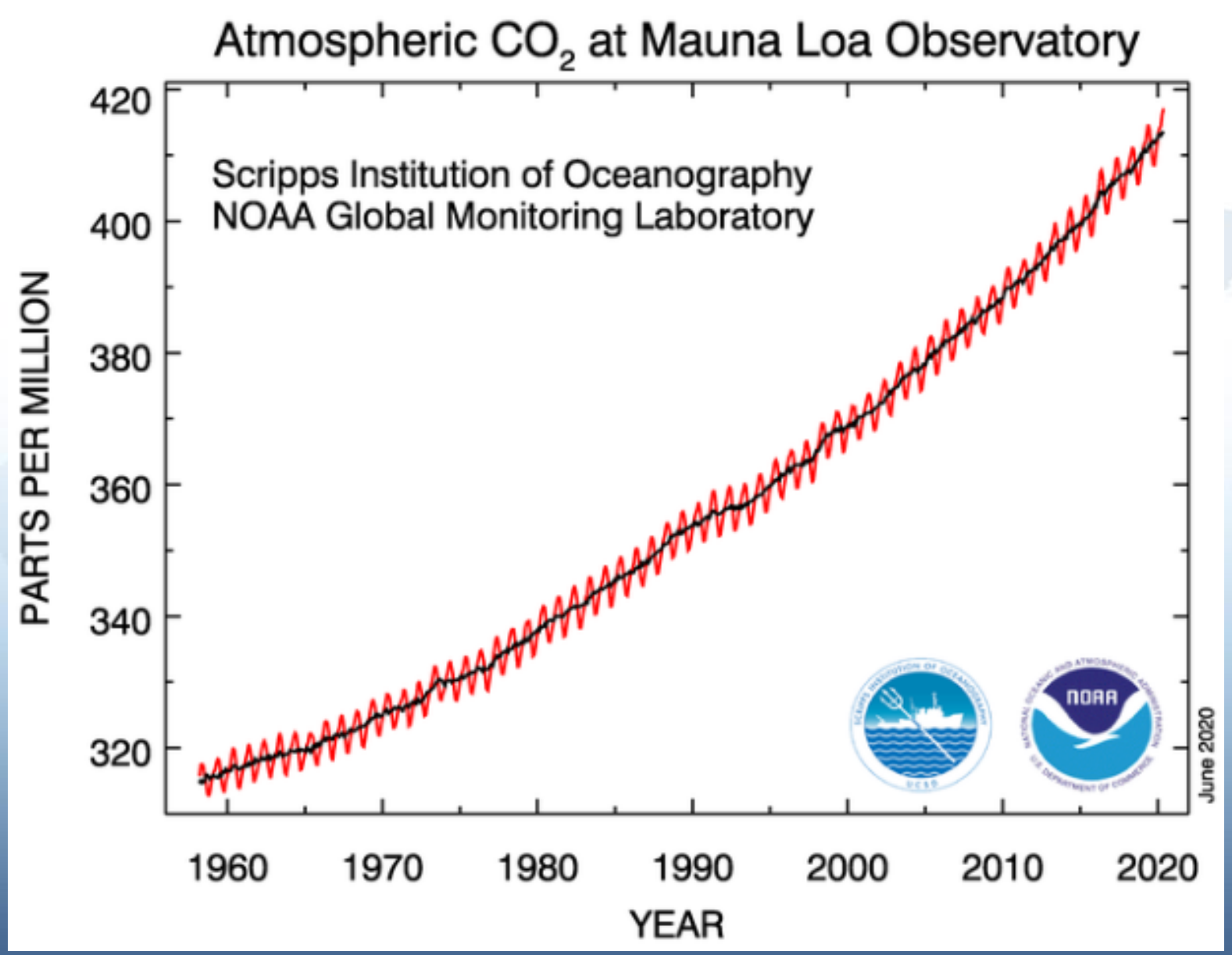

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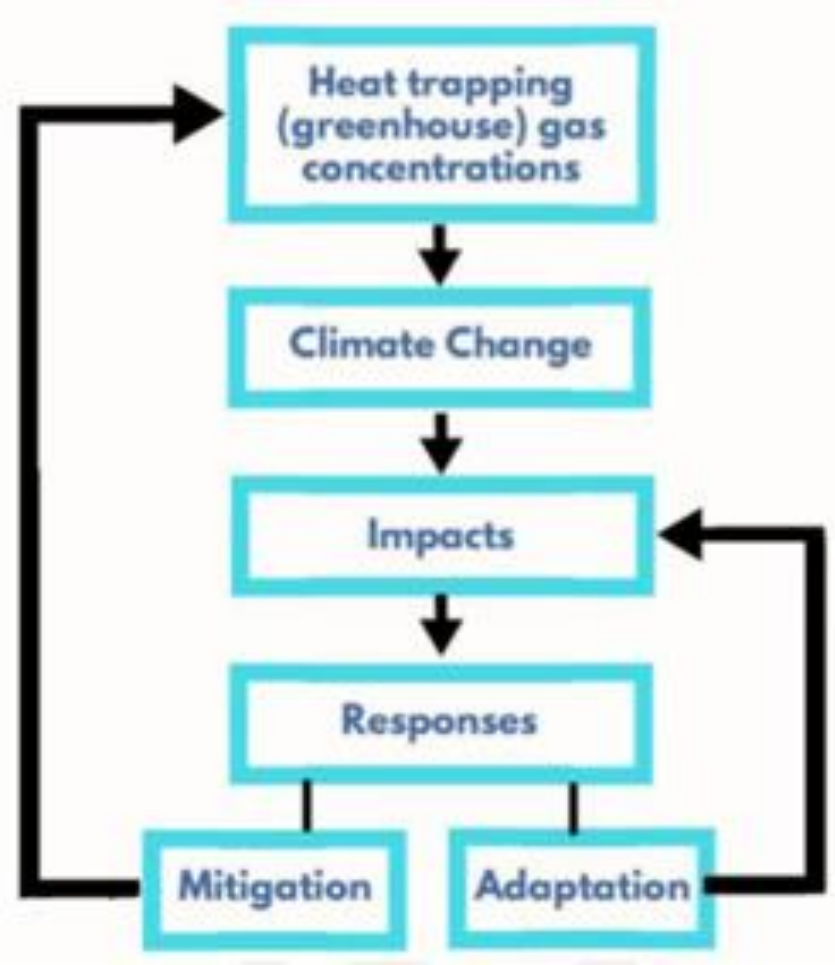
A simple picture: externalities and a complicated local and global problem

"xx

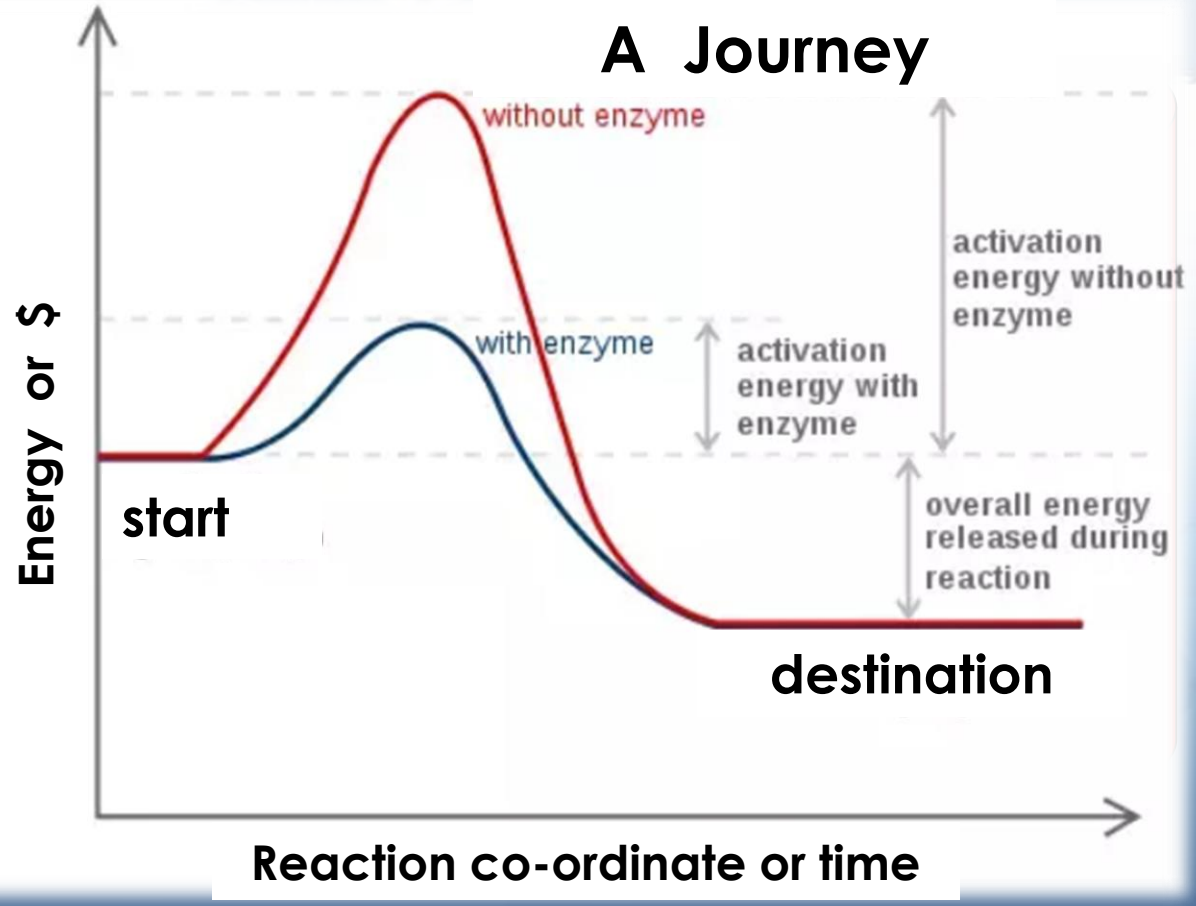
Adapting to Climate Change



best case '*Braking Distance*' about 50 years so Adaptation will be necessary anyway

Source: based on Locatelli & Pramova (2016) Forests and synergies between adaptation and mitigation, weADAPT. Courtesy Annette Bolton

2 Barriers and Bottlenecks on the Adaptation Journey



- Adaptation is a journey from the old to new economies.
- Real economic, social and environmental benefits
- Communities, Businesses and Governments
- BAU (red road) will not 'cut it'
- Technical jigsaw pieces (blue road)

https://www.quora.com/How-can-you-describe-the-difference-between-activation-energy-and-enzymes

2 Barriers and Bottlenecks on the Adaptation Journey

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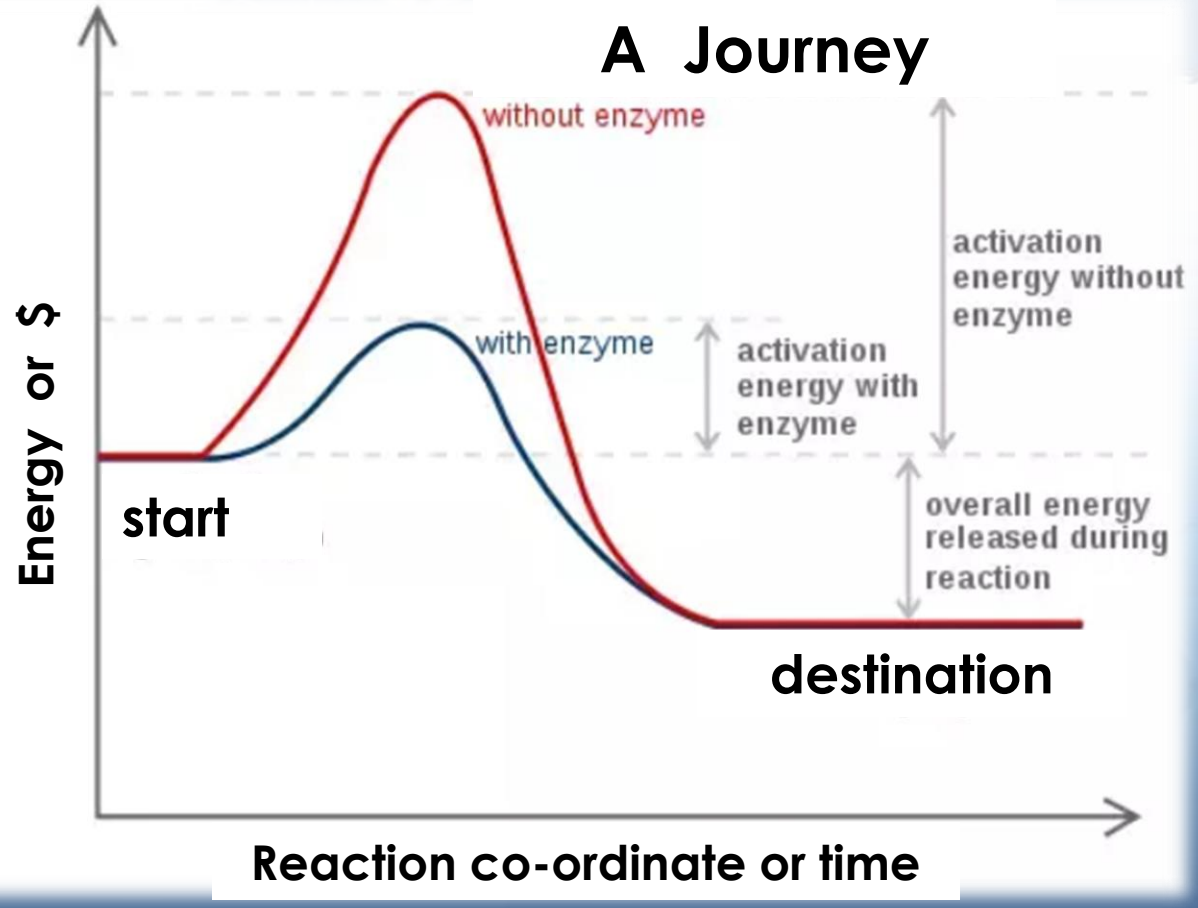

https://www.quora.com/How-can-you-describe-the-difference-between-activation-energy-and-enzymes

Technical Jigsaw Pieces

- sector and situation specific
- for any one situation there alikely to be a number of options
- Allow use of the blue road, one farm, one community at a time.
  - For North-Canterbury dryland dairy operations
  - For Christchurch coastal communities

2 Barriers and Bottlenecks on the Adaptation Journey Attitudes

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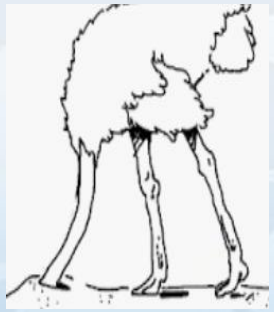
Climate change attitudes and fear of liability

Denial (fear)



optimal sweet-spot
equity
justice
economics
compliance

Climate Shaming (fear)

What drives fear?

- polarization (*e.g.* framing this in legal terms)
- lack of reassurance about endpoints and funding
- uncertainty (legal, uninformed media coverage, nature of LG interface)

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2 Barriers and Bottlenecks on the Adaptation Journey Communities

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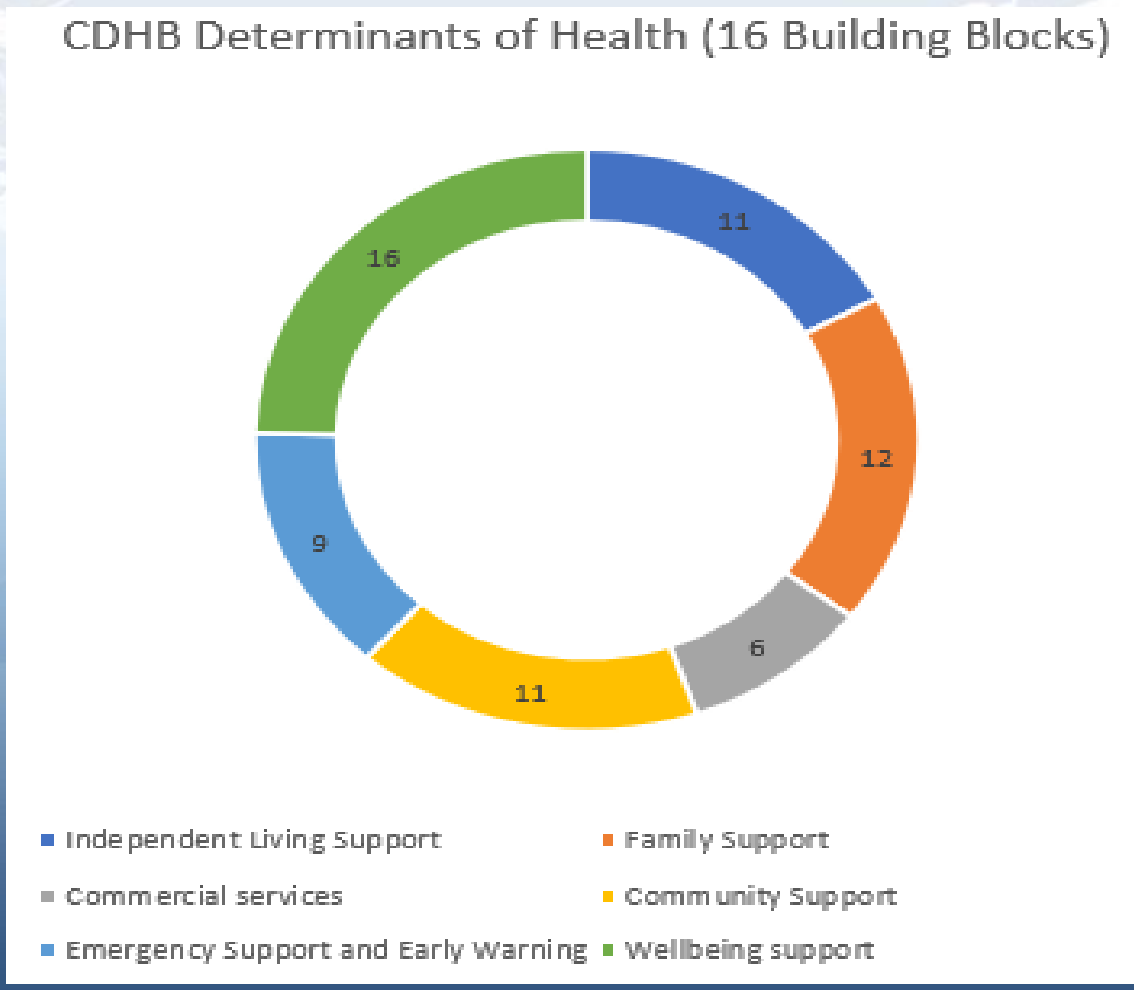
Communities own their own stories and make their own futures (creativity)….



#	CDHB Determinants of Health (16 Building Blocks)
1	Equity
2	Transport
3	Housing Stock
4	Public Services
5	Active Lifestyles
6	Employment & Income
7	Culture & Heritage
8	Social & Community Capital
9	Neighbourhood Amenity
10	Education
11	Health Services
12	Food Security
13	Community Safety
14	Natural Capital
15	Resource Sustainability
16	Community Resilience

BOEE work in progress

2 Barriers and Bottlenecks on the Adaptation Journey Local Government

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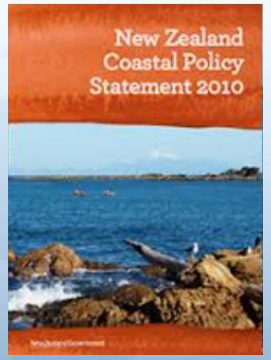
- Conversation driven by legal requirements
- Default mode of *consult* (BAU) not appropriate to life changing agreements
- *consult* seems less expensive and more familiar (than *collaborate*) to Local Government, but in fact in long term much more expensive (to communities and country)
- Costs and benefits fall in different places.
- RMA being replaced by 3 acts, further uncertainty
- Immediate process potentially undercut by legislation
- Funding?



Adaptation to Climate Change and Managed Retreat Bill (2021)

Bell et.al (2017) Coastal Hazards and Climate Change. Ministry for the Environment. ISBN 978-1-98-852535-8

3 Current NZ guidance (Engagement)

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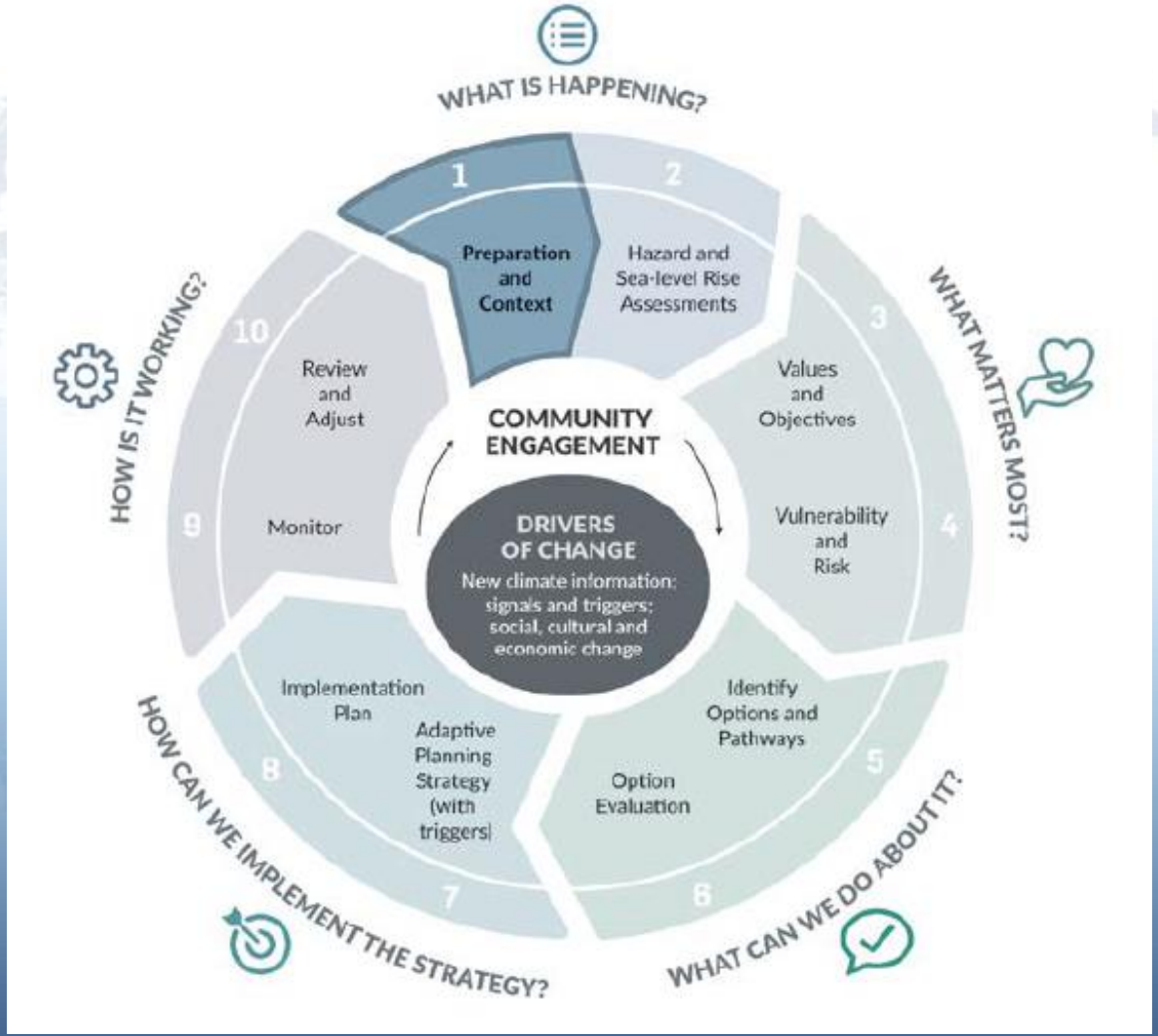

Interpretation under BAU paradigm (*consult*) will not be effective for adaptation need *collaboration* for key components, *e.g.* strategy and trigger points

Economics and Funding...the big quiets:

- Economics displacement from functioning supportive communities
- Economics & social costs
- Funding ?

X

3 Current NZ guidance (Best Practice)

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Trigger Points must be:

1. Be locally agreed (collaboratively) not imposed
2. Used consistently
3. Based on realism of the scenarios.

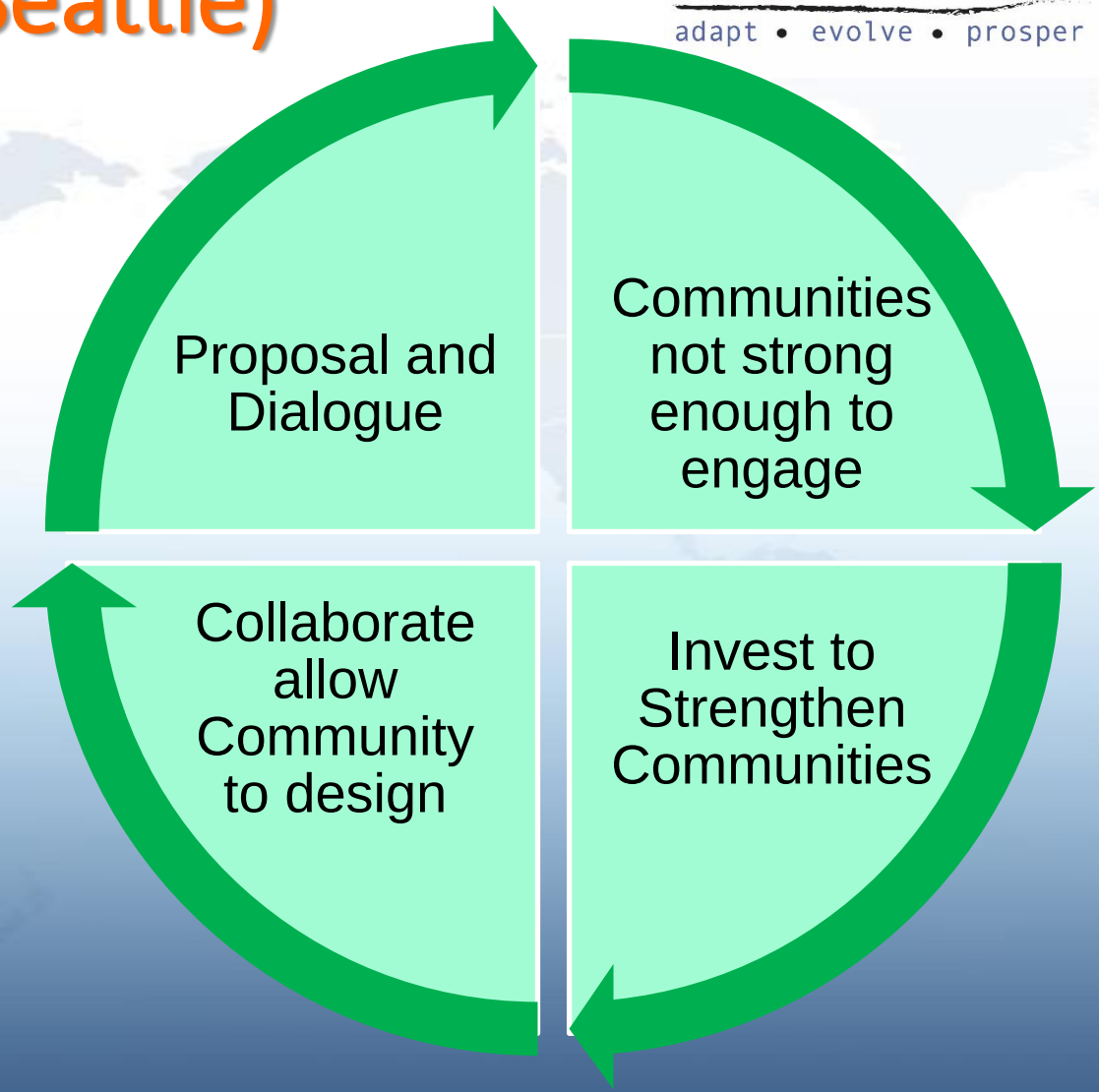
   Compounding risk with unrealistic events is not a good way to identify scenarios for planning: $m \times n \times o = p$

   - *m* is a $3a^{-1}$ event, *n* is a 1 in 100a event *and o* is 1 in 30a event *m is a super King tide, n is 1 in 100 (then) flood, o is 2x increased tropical storm p* ~ 1 in a thousand.

Hillier, K. Matthews, T. Wilby R. Murphy, C. (2020) Multi-hazard dependencies can increase or decrease risk. Nature Climate Change **10**, pp595–598

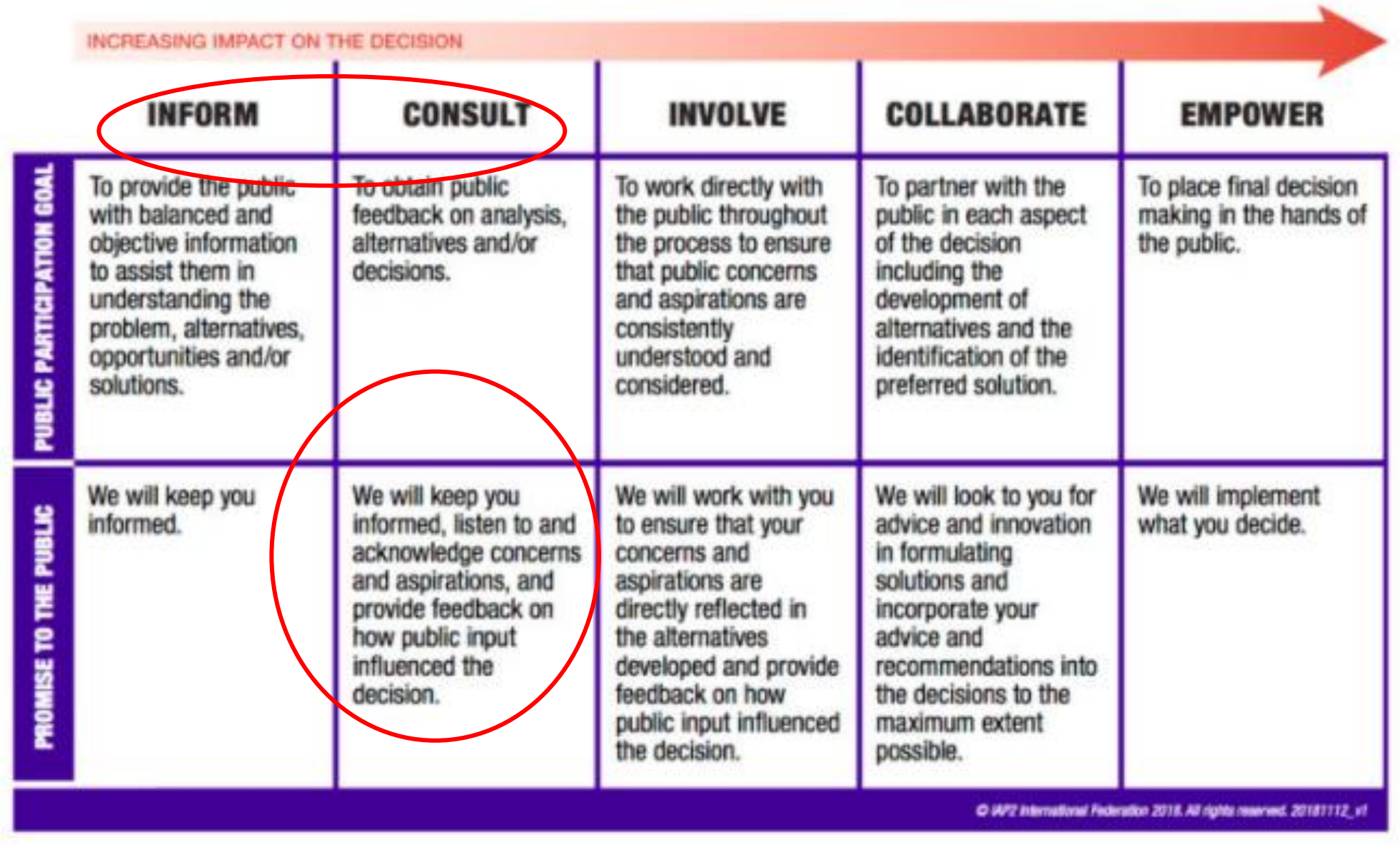
Pihl, E., Martin, M.A., Blome, T., Hebden, S., Jarzebski, M.P., Lambino, R.A., Köhler, C., Canadell, J.G., Ebi, K.L., Edenhofer, O., Gaffney, O., Rockström, J., Roy, J., Srivastava, L., Payne, D.R., Adler, C., Watts, S.F., Jacobsson, L., Sonntag, S., 10 New Insights in Climate Science 2019, Future Earth & The Earth League, Stockholm, 2019

4 Coastal adaptation to sea-level rise: case studies (Engagement, Seattle)



https://www.seattle.gov/neighborhoods/outreach-and-engagement

Collaboration not Consultation

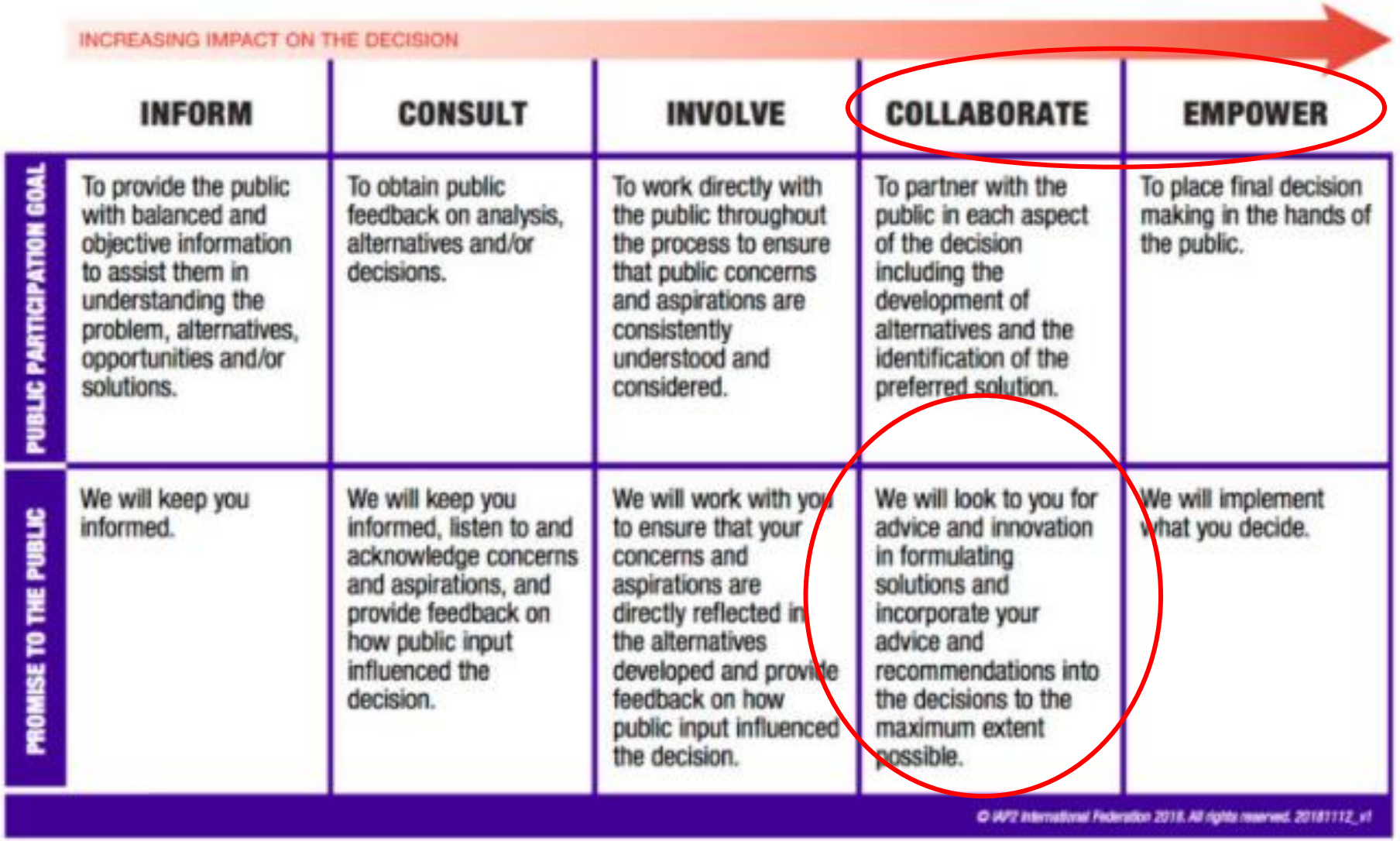


INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

https://organizingengagement.org/models/spectrum-of-public-participation/

Collaboration not Consultation

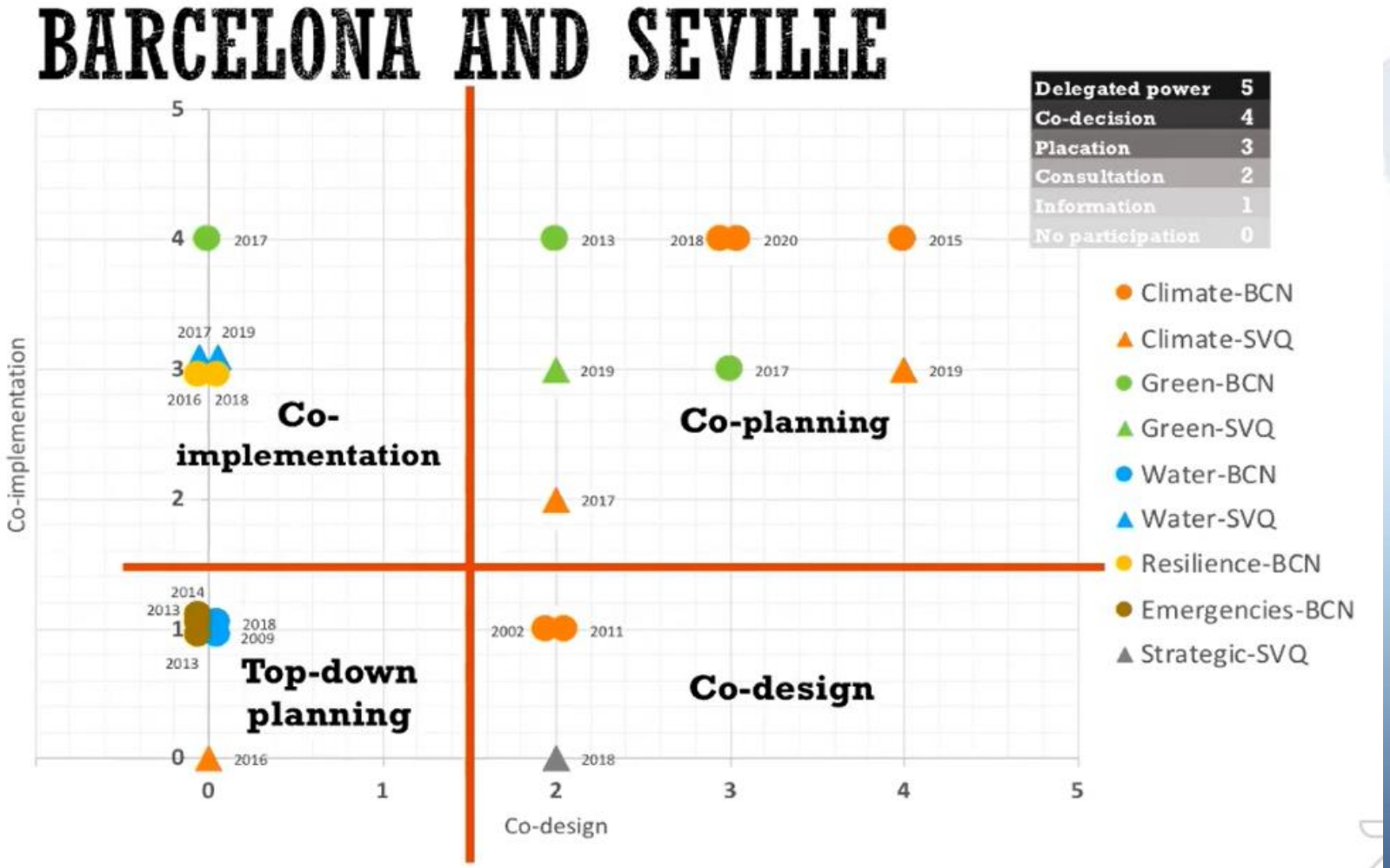


Take Home

- Process must be facilitated by LG
- Outcomes must be owned by communities.
- Community creativity

https://organizingengagement.org/models/spectrum-of-public-participation/

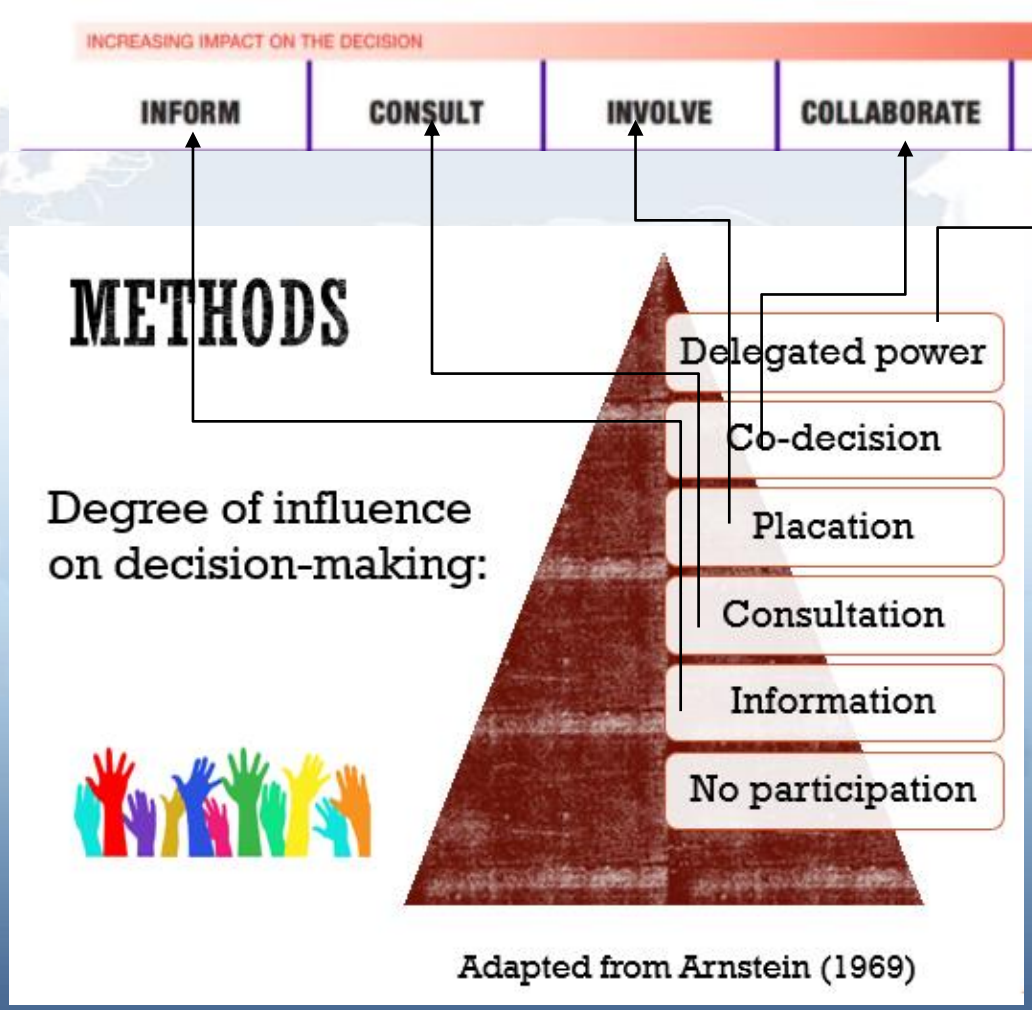
3 Coastal adaptation to sea-level rise: Case studies (Engagement, Spain)



- BCN and SVQ different but both have same EU and Spanish legal framework
- Key infrastructure and emergency response top-down planning and design
- BCN Climate and Green design and implementation

Mar Satorras et al (2020) Climate Resilience co-planning: a comparison between Barcelona and Seville. Urban Resilience to Climate Change Conference (2020) available https://www.urcc2020.eu/index.php/downloads/

3 Coastal adaptation to sea-level rise: Case studies (Engagement, Spain)



Take-aways

- Outcomes depend on officer interpretation of the regulatory and legal framework (BCN vs SVQ)
- Horses for Courses:
  - use collaborative approach where high stakes, and community ownership, creativity and support required.
  - otherwise technical design and execution

Mar Satorras et al (2020) Climate Resilience co-planning: a comparison between Barcelona and Seville. Urban Resilience to Climate Change Conference (2020) available https://www.urcc2020.eu/index.php/downloads/

3 Coastal adaptation to sea-level rise: Case studies (definition)

Coastal communities will face increasing risk of floods in the future
©Jerik, Adobe Stock 2020

Background

- In the absence of climate action and with continued demographic pressure and urbanisation along coastlines, annual damages from coastal flooding in the EU and UK could increase sharply from €1.4 billion today to almost €1.6 trillion by 2100, with 3.9 million people exposed to coastal flooding every year
- Coastal Adaptation (Europe) could prevent 95% of economic losses dure to rising sea levels
- Hybrid solutions (dykes and nature based)
- 500 people km^{-2} benefits outweigh costs

https://ec.europa.eu/jrc/en/news/new-report-coastal-adaptation-against-sea-level-rise-makes-economic-sense
Vousdoukas, M.I., Mentaschi, L., Hinkel, J. et al. Economic motivation for raising coastal flood defenses in Europe. Nat Commun 11, 2119 (2020). https://doi.org/10.1038/s41467-020-15665-3

3 Coastal adaptation to sea-level rise: Case studies (#1 UK EA)

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"…Many of you may know Dymchurch in the beautiful Romney Marshes. Those marshes, and most of the communities that have been there for centuries, owe their existence to the Dymchurch Wall, a sea defence that was probably first built in Roman times and has been improved and looked after by the locals ever since. There was a saying in Dymchurch passed down over generations, and it was this: Serve God, honour the King, but first maintain the Wall…"

Sir James Bevan, CE Environment Agency address to CIWEM October 2020

https://www.gov.uk/government/speeches/creating-climate-resilient-places-a-new-direction-for-a-nation

3 Coastal adaptation to sea-level rise: Case studies (Adaptation, Realignment UK EA)

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Abbotts Hall. Protecting prime farmland from flooding, existing 3.5km seawall (300-400 years old) failing and CBA not supporting constant repair.

No dwellings or people. 3.5M UKP 2002. Seawall breached 100m and 4x10m, new sea-defenses moved inland
Saltmarsh acts as a soft defense, system damping effects of sea level rise.

https://coastadapt.com.au/case-studies/managed-coastal-realignment-projects-uk-working-nature

3 Coastal adaptation to sea-level rise: Case studies (Adaptation, Realignment UK EA)

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Medmerry Sussex. Protecting two towns and an urban area from flooding, new 183h wildlife habitat.

2 towns, 350 properties. Also urban area. 28M UKP 2013. Shingle bank breached 110m and 7km new sea-defenses moved 2km inland Saltmarsh acts as a soft defense, system resilient: $1a^{-1}$ flood risk improved to 1 in 1000a.

https://coastadapt.com.au/case-studies/managed-coastal-realignment-projects-uk-working-nature

3 Coastal adaptation to sea-level rise: Case studies (Adaptation, Defense UK EA)

Shoreham-by Sea and Lancing flooding along River Adur and estuary and piecemeal repair of defenses not economic.

New estuary and (glass) wall protection 1 in 300y event (50-100year sea-level rise). Protecting about 40,000 people (2,300 homes). 32M UKP 2019.

Existing defenses upgraded, and new defenses installed. This reach was 'hold the line', others are 'do nothing' or 'coastal realignment'.

https://www.kiteglass.co.uk/portfolio_page/flood-barrier-shoreham-by-sea/
https://www.gov.uk/government/publications/shoreham-adur-tidal-walls-scheme/shoreham-adur-tidal-walls-scheme
https://www.gov.uk/government/publications/shoreham-adur-tidal-walls-scheme-latest-update/shoreham-adur-tidal-walls-scheme-latest-update

3 Coastal adaptation to sea-level rise: Case studies (Adaptation)

Bangkok, Wuhan (pilot), Amsterdam: Sponge Cities: past, actual and future
A sea dike along the North-Holland coast is protected by an artificial dune.

https://www.nrcan.gc.ca/changements-climatiques/impacts-adaptation/towards-adaptation-case-studies-british-columbia/10393
http://www.coastalwiki.org/wiki/File:HondsbosseDuinen.jpg and http://www.coastalwiki.org/wiki/Climate_adaptation_policies_for_the_coastal_zone

3 Coastal adaptation synthesis “42”

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Main common factor of successful adaptation is:

Although many factors were affecting each of the sites, the stand-out single factor that was present in those communities that were able to adapt without substantial loss of well-being were those communities with strong self-organized local institutions or groups.

Key features of these institutions included

- setting and enforcing rules locally and communication across scales.
- self-governing local institutions which have been associated with sustainable management of natural resources.

Policies to strengthen, support, recognize, and accommodate local institutions could improve adaptation outcomes. Where these groups or organisations were weak or absent, communities seemed less able to adapt. Involvement of first peoples was also important.

Berman, M., Baztan, J., Kofinas, G. et al. Adaptation to climate hange in coastal communities: findings from seven sites on four continents. Climatic Change 159, 1–16 (2020). https://doi.org/10.1007/s10584-019-02571-x Available: https://doi.org/10.1007/s10584-019-02613-4

Take-aways, Best Practice

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Engagement:

- Collaboration not Consultation
- Opportunity is to increase scope and quality of decision making
- Wide, deep and lasting engagement
- Local example is the New Brighton Spit ‘nothing about us, without us’

Take-aways, Best Practice

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Adaptation:

- Opportunity to reverse some of the massive environmental and social damage. “Leave no-one behind”
- Adaptation is not about belief or dogma: nature based supported by engineering is effective
- Reforming economies does not mean breaking them. Transition. Social Justice requires Economies not to be broken
- Investing in communities and local organisations facilitates adaptation
- Repairing environment repairs our economy (investing in natural capital)

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Questions

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"…Judge a person by their questions, not their answers…"

X

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In summary we exist to expedite adaptation in the NZ economy to reduce the period and extent of economic, social and environmental damage and disorder. We achieve this by working with and facilitating communication between Communities, Businesses and Government(s) and reporting the results

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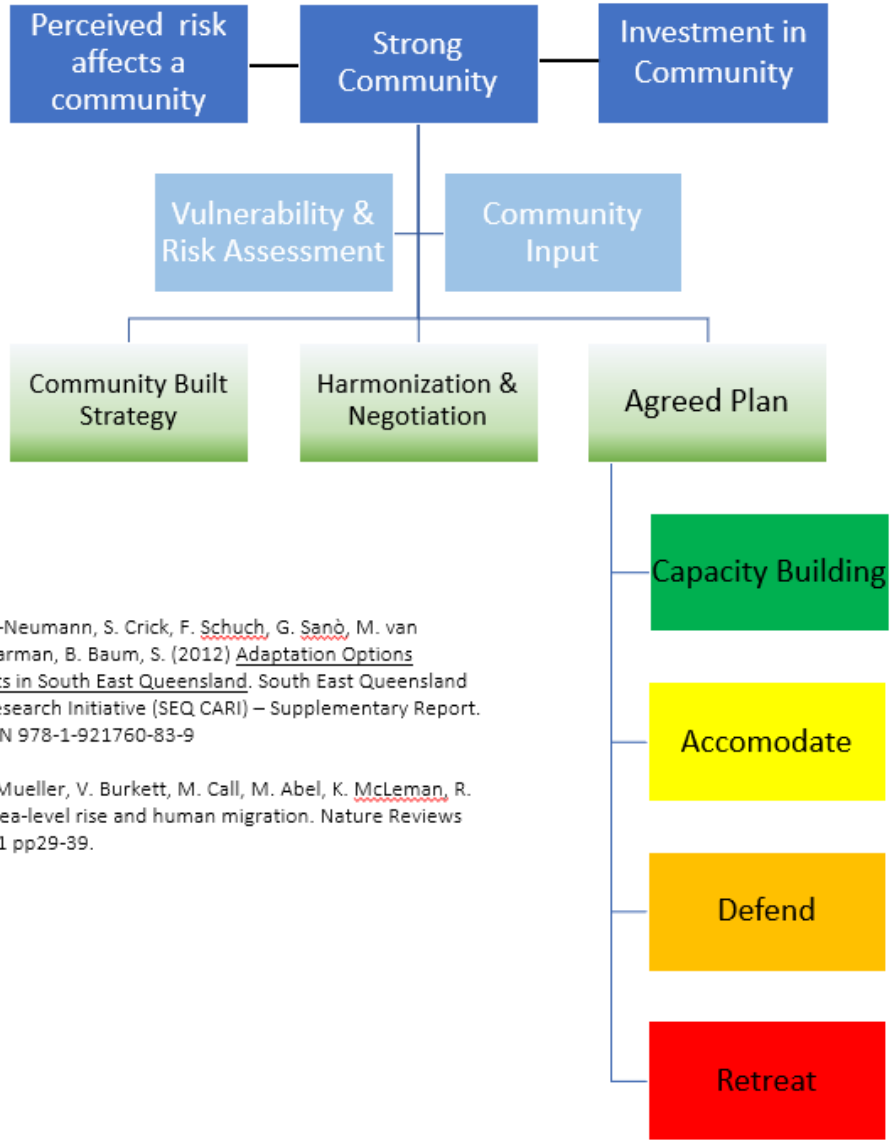
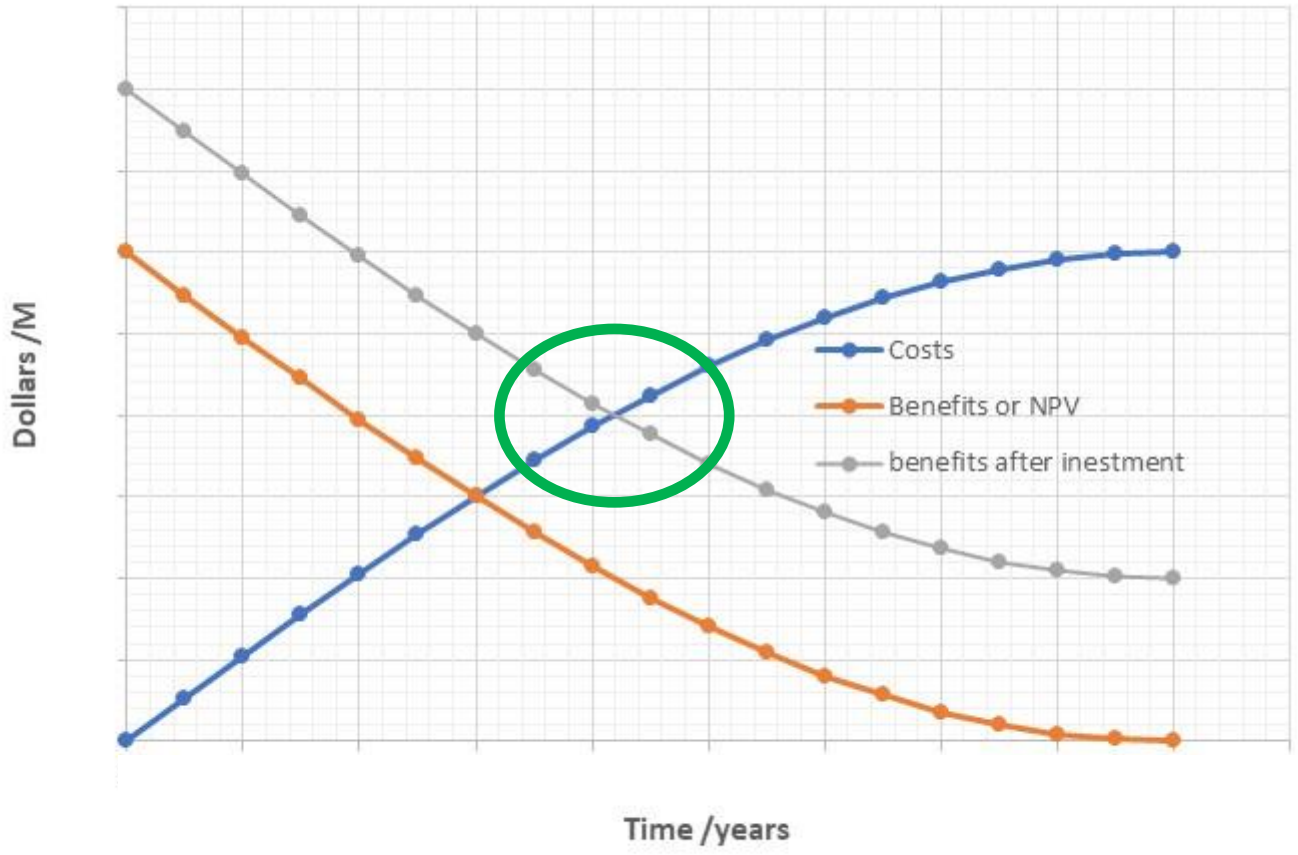


Based on :
Low Choy, D.L. Serrao-Neumann, S. Crick, F. Schuch, G. Sanò, M. van Staden,R. Sahin, O. Harman, B. Baum, S. (2012) Adaptation Options for Human Settlements in South East Queensland. South East Queensland Climate Adaptation Research Initiative (SEQ CARI) – Supplementary Report. Griffith University. ISBN 978-1-921760-83-9
and
Haur, M.E. Fussell, E. Mueller, V. Burkett, M. Call, M. Abel, K. McLeman, R. Wrathhall, D. (2020) Sea-level rise and human migration. Nature Reviews earth & environment 1 pp29-39.

Honouring sense of place and shared histories as well as economic realities means that communities must build and own their own strategies

.. and shape their futures



Schematic Diagram Only

For communities, when benefits (all benefits) are outweighed by costs, (all costs) a tipping point:

- communities invest
- communities do not invest.

If benefits exceed costs, public pays, *e.g.* parks or roads. If this is a move decision, the community investment has extended the lifetime of their community, but at their own cost.

Stanley, J, Birrell, B, Brain, P, Carey, M, Duffy, M, Ferraro, S, Fisher, S, Griggs, D, Hall, A, Kestin, T, Macmillan, C, Manning, I, Martin, H, Rapson, V, Spencer, M, Stanley, C, Steffen, W, Symmons, M & Wright, W 2013, What would a climate-adapted settlement look like in 2030? A case study of Inverloch and Sandy Point. National Climate Change Adaptation Research Facility, Gold Coast, 221 pp..

.. and shape their futures..

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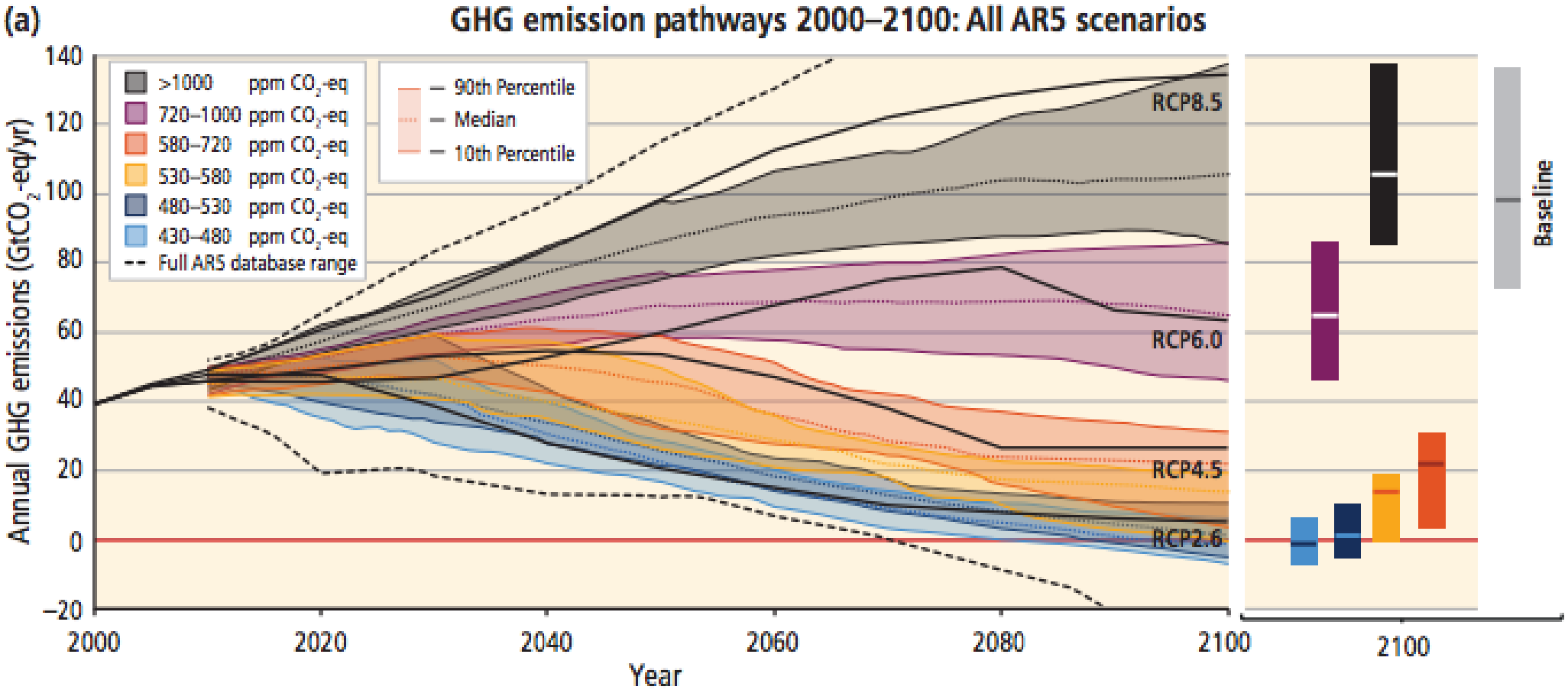
All communities and major infrastructure above the 10m contour:

- in 20 years? 🤣
- In many hundreds of years ? 🙂

We will not recognize the world even in 100 years. Make decisions now that do not reduce options later.

X

Questions



https://www.google.com.sg/search?q=ipcc+fifth+assessment+report&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiow7jc7vLZAhVHqI8KHac-B1cQ_AUICigB&biw=1262&bih=650#imgrc=8stYREUNnq1wLM;

Evolving Understanding of Antarctic Ice-Sheet Physics and Ambiguity in Probabilistic Sea-Level Projections Robert E. Kopp Robert M. DeConto Daniel A. Bader Carling C. Hay Radley M. Horton Scott Kulp Michael Oppenheimer David Pollard Benjamin H. Strauss