

# Avoiding Maladaptation:

## Understanding Vulnerability to Climate Change & How to Encourage Resilience Through Policy



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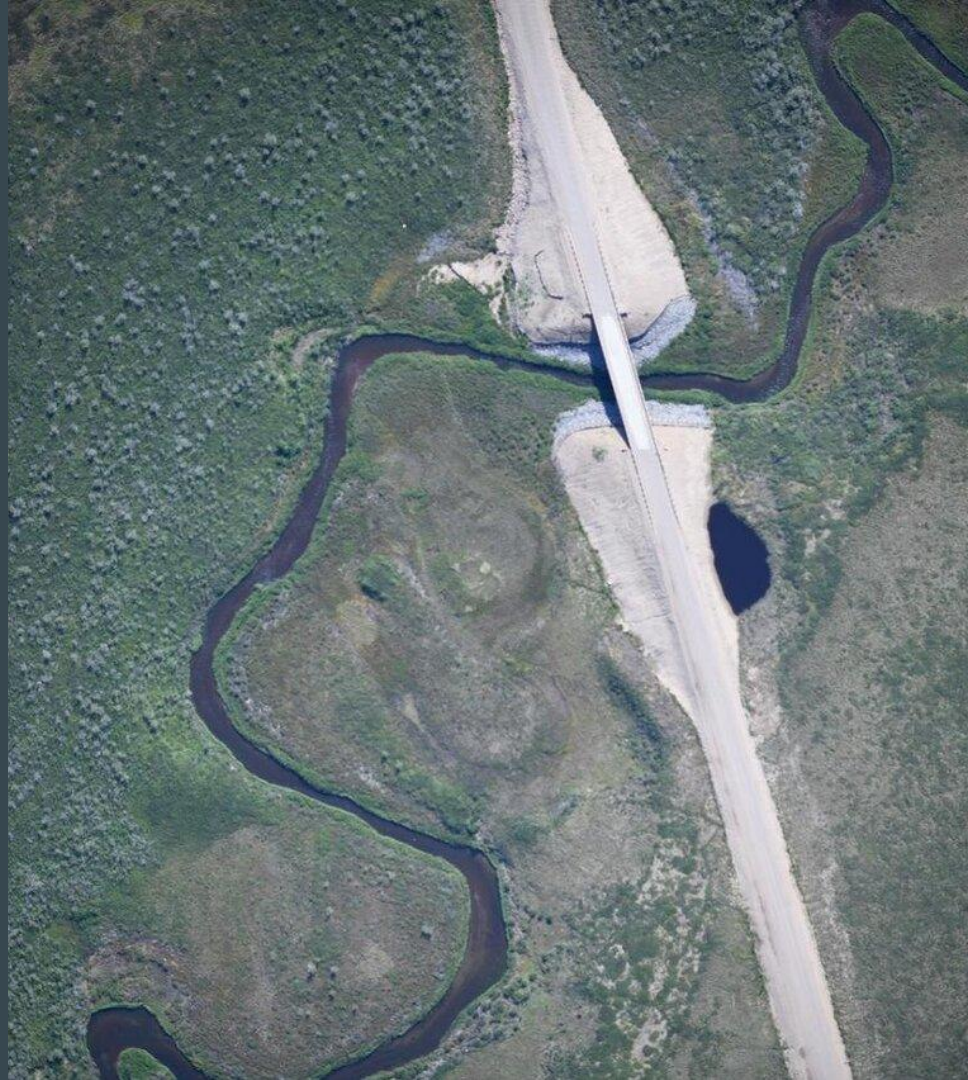
# Research

Building off of two recent papers, this work introduces current research

1. Kehler, S., & Birchall, S. J. (2021). Social vulnerability and climate change adaptation: The critical importance of moving beyond technocratic policy approaches. *Environmental Science & Policy*, 124, 471–477.
2. Birchall, S. J., Kehler, S., & Bonnet, N. (2022) Climate change adaptation strategies for existing and planned infrastructure in the Canadian north. *School of Public Policy*, University of Calgary.

# Outline


1. What is **Vulnerability** to Climate Change?
2. To **Adapt** or Maladapt?
3. **Resilience** Through a Dynamic Approach



# 1. Vulnerability

What is Vulnerability to Climate Change?



An aerial photograph showing a two-story house with a dark roof and a red door, partially submerged in turbulent, brown floodwaters. The house is situated on a small patch of land, and the surrounding area is completely inundated. The water is churning with white foam, indicating strong currents. In the background, a line of trees is visible above the floodwaters.

**Why does  
vulnerability  
exist?**





Vulnerability is both  
**Physical & Social**

The image is a composite of two aerial photographs of a forest fire. The top photograph shows a dense green forest with thick, white smoke billowing upwards from the canopy. The bottom photograph shows the same forest, but with a bright orange fire line visible through the trees, and more smoke rising from the burning area. The text "Vulnerability is both Physical & Social" is centered in the middle of the image, with "Physical & Social" in a larger, bold, yellow font.

# Physical Vulnerability

Exposure to hazards and physical risk



# Social Vulnerability

Social stressors & environmental injustice



# Vulnerability to Climate change

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graph TD; A[Vulnerability to Climate change] --- B[Social Issue]; A --- C[Economic Failure]; A --- D[Ethical Conundrum]; B --- E[Adaptation policy is ineffective without addressing social stressors]; C --- F[Facing the expense of climate change adaptation is the most fiscally sound option]; D --- G[Complex systems that perpetuate vulnerability disable planning ethics];
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## Social Issue

Adaptation policy is ineffective without addressing social stressors

## Economic Failure

Facing the expense of climate change adaptation is the most fiscally sound option

## Ethical Conundrum

Complex systems that perpetuate vulnerability disable planning ethics



# 2. Adaptation

To Adapt or Maladapt?

# Why is Adaptation Important?

- Reduces Risk
- Mitigates Cost
- Addresses Uncertainty
- Provides Additional Benefits





# What Enables Adaptation?

## 1. Adaptive Capacity

- Finances, technology, information, skills

## 2. Adaptive Readiness

- Political leadership, stakeholder engagement, public support

## 3. Equitable Approach

- Place-based, co-produced, participatory

## 4. Implementation, Monitoring & Evaluation



An aerial photograph showing a vast expanse of dark water covered with numerous small, irregular ice floes. The sky is filled with heavy, grey clouds, with a hint of light breaking through near the horizon. The overall tone is somber and dramatic.

**There are risks & limits to adaptation.**

Unmitigated warming is already outpacing our capacity to adapt.

## **Maladaptation:**

when adaptation measures result in unintended negative consequences that further increase risk and vulnerability



# 3. Resilience

Resilience Through a Dynamic & Collaborative Approach



**Climate Resilient Development**  
integrates adaptation measures  
and their enabling conditions  
with mitigation to advance  
sustainable development for all.

(IPCC, 2022)



## Planning for Climate Resilient Development



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graph LR; A[Planning for Climate Resilient Development] --- B[Physical Risk Reduction]; A --- C[Social Vulnerability Reduction];
```

### Physical Risk Reduction

- Soft & hard adaptation
- Ecosystem stewardship

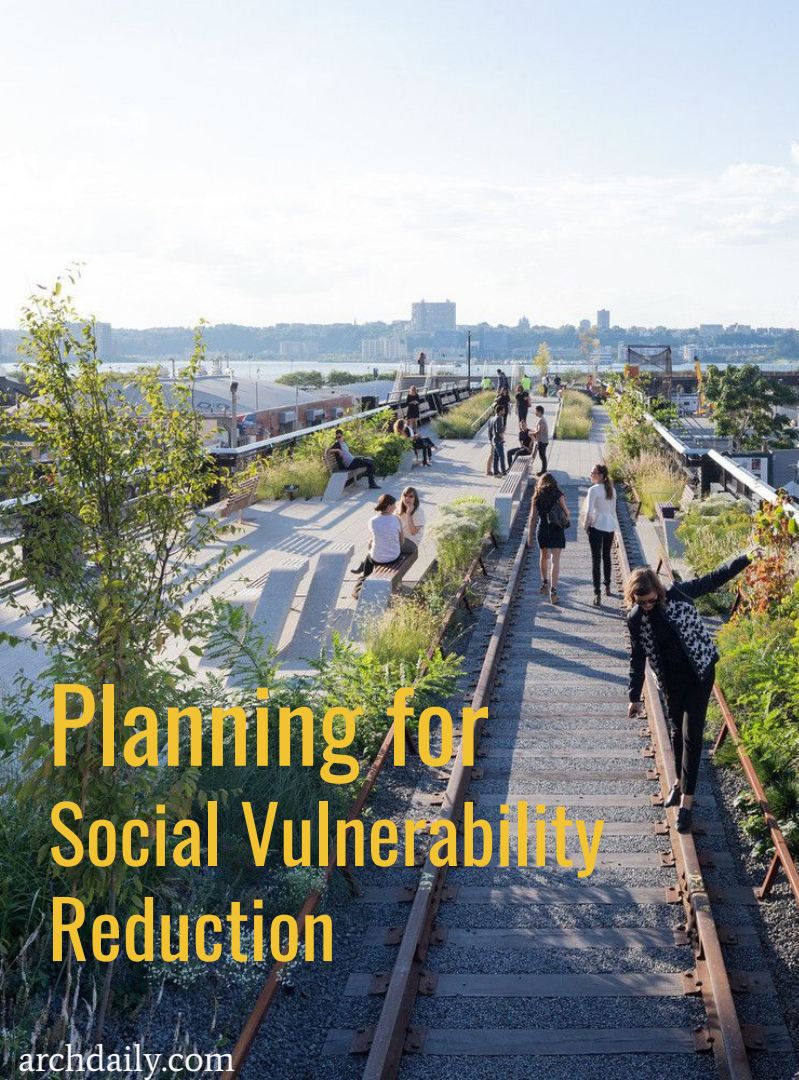
### Social Vulnerability Reduction

- Equity & justice
- Inclusion

# Planning for Physical Risk Reduction







# Planning for Social Vulnerability Reduction

## 1. Sustainable Planning Theories

- Smart Growth, TOD, Biophilic Cities, Sustainable Cities, New Urbanism, 15-minute Cities

## 2. Equitable Planning Methods

- Advocacy, Place-based, Co-produced, Participatory



## Examples:

- Sustainable local food networks
- Social safety nets
- Sustainable land use & urban planning
- Human health systems
- Green infrastructure
- Energy diversification
- Basic services & infrastructure
- Economic diversification


# 4. Conclusion

# Key Takeaways

- **Vulnerability** is physical & social
- **Effective adaptation** requires us to have the capacity & willingness to equitably implement measures
- Adaptation has limits & risks of **maladaptation**
- **Resilience** means effectively adapting to physical risks while consciously planning for sustainability through equitable methods







“The cumulative scientific evidence is unequivocal: Climate change is a threat to human well-being and planetary health. Any further delay in concerted anticipatory global action on adaptation and mitigation will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all.” (p.35, IPCC, 2022)

# Thank you

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