EXPLORING CLIMATE RESILIENCE

Anne Waple
Thanks
Second Nature
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American College & University Presidents’ Climate Commitment (ACUPCC)

Alliance for Resilient Campuses
MISSION

Our mission is to proactively build a sustainable and positive global future through initiating bold commitments, scaling successful actions, and accelerating innovative solutions among leadership networks in higher education.
Why Resilience?
The Good:
- Not only climate
- Inclusive of adaptation and mitigation
- Resonates
- Systems approach

The Bad:
- Confused with adaptation (not so bad)
- Too broad to understand
- Political expediency, easy sell
- Actionable?

The Ugly:
- Means nothing/everything. New buzzword
Resilience and Adaptation

• Resilience is valuable even without climate change

• Provides a foundation of adaptive capacity – savings + investment

• Adaptation involves anticipated climate changes

• Natural allies
Stages/Levels of Resilience

Determining (unstable)
Invested (stable)
Existing (unstable)

Complexity/adaptability

Vibrant, dynamic
Livable
Tolerable
Survivable
Systemic Failure

Maslow’s Hierarchy of Needs

Self-actualization
Esteem
Love/belonging
Safety
Physiological
Stages/Levels of Resilience

- Determining (unstable)
- Invested (stable)
- Existing (unstable)

Vibrant, dynamic
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Tolerable
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Systemic Failure

Complexity/adaptability

System 'Map'
Stages/Levels of Resilience

- Vibrant, dynamic
- Livable
- Tolerable
- Survivable
- Systemic Failure

External Disturbance

Decision Outcomes
Resilience as Directional Change

- Not just a return to a prior state
- Drives towards an improved state: system and its components
  - Flexible
  - Diverse
Adaptive Capacity and Resilience

Social Capital

Financial Capital

Human Capital

Natural Capital

Physical Capital

Ellis 2000, Nelson 2007
Adaptive Capacity and Resilience

• Social Capital
• Human Capital
• Physical Capital
• Natural Capital
• Financial capital

Basis for flexible but coherent indicators of change and direction
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Variable</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human and physical health</td>
<td>Self assessed health</td>
<td>Capacity of land managers to undertake NRM based on their health status</td>
</tr>
<tr>
<td></td>
<td>Age/ill health as a constraint to NRM</td>
<td>Limitation of land managers to undertake NRM based on old age or illness</td>
</tr>
<tr>
<td>Education and training</td>
<td>Highest qualification in household</td>
<td>Knowledge that land managers have to manage natural resources</td>
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<tr>
<td></td>
<td>Vocational training (number and type of accredited training)</td>
<td>Skills that land managers have to manage natural resources</td>
</tr>
<tr>
<td>Retaining young people</td>
<td>The proportion of young people in regional populations</td>
<td>Talent available for current and future NRM</td>
</tr>
<tr>
<td></td>
<td>Education levels of young people</td>
<td>Knowledge of future natural resource managers</td>
</tr>
<tr>
<td>Occupation and Industry</td>
<td>Successful industry transition</td>
<td>Ease with which natural resource managers can switch between livelihood options</td>
</tr>
<tr>
<td>Bonding</td>
<td>Personal trust</td>
<td>Capacity of family and community networks to support NRM</td>
</tr>
<tr>
<td>Bridging</td>
<td>Generalised trust</td>
<td>Capacity of wider community networks to support NRM</td>
</tr>
<tr>
<td></td>
<td>Participation in government programs</td>
<td>Generalised trust in government programs to support NRM</td>
</tr>
<tr>
<td>Linking</td>
<td>Adoption rates of NRM practices on-farm</td>
<td>Effectiveness of linking with government programs to obtain ideas and resources to support NRM</td>
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<tr>
<td></td>
<td>Internet use</td>
<td>Collective capacity to undertake NRM through bonding, bridging and linking within communities, particularly remote communities, and potential access to NRM information</td>
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</tbody>
</table>

Nelson 2007
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<tr>
<th>Indicator</th>
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<tr>
<td><strong>Natural</strong></td>
<td></td>
<td></td>
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<tr>
<td>Productivity of land</td>
<td>Crop yield</td>
<td>Productivity of the land contributing to adaptive capacity</td>
</tr>
<tr>
<td></td>
<td>Livestock stocking rates</td>
<td></td>
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<tr>
<td></td>
<td>Source of water for agricultural production</td>
<td>Potential contribution of water resources to agricultural productivity</td>
</tr>
<tr>
<td></td>
<td>Irrigation (water use)</td>
<td></td>
</tr>
<tr>
<td>Sustaining productivity</td>
<td>Effort expended to manage threats to land productivity (area and labour)</td>
<td>Investment in the future productivity of agricultural land</td>
</tr>
<tr>
<td>Conservation of ecological assets</td>
<td>Management of riparian zones</td>
<td>Investment in conservation of rivers to conserve or enhance the future adaptive capacity of agricultural land</td>
</tr>
<tr>
<td></td>
<td>Area of native vegetation</td>
<td>Biodiversity supporting the future adaptive capacity of agricultural land</td>
</tr>
<tr>
<td></td>
<td>Concern about environmental issues</td>
<td>Intent by land managers to conserve the future capacity of agricultural land</td>
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<tr>
<td><strong>Physical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-farm</td>
<td>Structures (sheds, houses, silos etc)</td>
<td>Physical assets contributing to the productivity of agricultural land</td>
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<td></td>
<td>Changes in irrigation practices</td>
<td>Investment in the future adaptive capacity of agricultural land by increasing the efficiency of water use</td>
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<td></td>
<td>Dams</td>
<td>Water resources contributing to the adaptive capacity of agricultural land</td>
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<tr>
<td></td>
<td>Investment in NRM</td>
<td>Investment in NRM to reduced threats of future productivity of agricultural land</td>
</tr>
<tr>
<td>Regional</td>
<td>Remoteness Index</td>
<td>Combined effect of regional infrastructure on the capacity of rural communities</td>
</tr>
<tr>
<td></td>
<td>Capital expenditure</td>
<td>Changing stocks of physical capital across rural communities</td>
</tr>
<tr>
<td></td>
<td>Stocks of housing</td>
<td></td>
</tr>
<tr>
<td><strong>Income and capacity to save</strong></td>
<td>Value of Agricultural Commodities Produced (VACP)</td>
<td>Revenue generated on-farm contributing to adaptive capacity of farm businesses</td>
</tr>
<tr>
<td></td>
<td>Average income</td>
<td>Incomes contributing to the adaptive capacity of rural households</td>
</tr>
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<td></td>
<td>Possible future data: Business Income Tax (BIT) data</td>
<td>Farm business income in a future adaptive capacity index (replace VACP)</td>
</tr>
<tr>
<td><strong>Financial</strong></td>
<td></td>
<td></td>
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<tr>
<td>Diversity of income sources</td>
<td>Diversity of the farming activities contributing to VACP</td>
<td>Farmers’ ability to switch between alternative sources of on-farm income</td>
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<tr>
<td></td>
<td>Diversity of regional employment</td>
<td>Potential diversity of non-farm employment opportunities</td>
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<td>Possible future data: Business Income Tax (BIT) data</td>
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Nelson 2007
Planning for Resilience

- Resilience as a foundation
- Levels defining whole system/community or sub-components
- Applies to external changes and internal decisions
- Five areas of adaptive capacity underpinning resilience
- Implications for indicators

So what does this mean in terms of planning and action?
Planning for Resilience

Assessment of current resilience
- Indicators, Long-term evaluation criteria, vulnerability

Preferred futures
- Inclusive process

Anticipated External Risks

Vulnerability assessment

Costs and Opportunities
- (prioritization)

Decision Options and Actions
- (moderating vulnerability AND towards preferred future)
An anticipated external risks assessment of current resilience indicators, Long-term evaluation criteria, and decision options and action can be used to build social and human capital. Scenarios as partial solutions can help in scenario planning, including current vulnerability, preferred futures, future vulnerability, costs and opportunities (prioritization), and divergent and convergent decision options.
Stages/Levels of Resilience

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System ‘Map’
The Role of Tech (social)

- Citizen-data
- ‘Smart’ cities
- Connected
- Challenge and benefit to resilience

- Moving beyond ‘reporting’ to dynamic assessment
Role of Higher Education

• New kinds of knowledge generation
• Technology as a tool and opportunity
• Currently cities out in front
• Currently limited scaled learning, analysis

• Integration of science and practice – formally
• Interdisciplinary opportunities

• Embedding learning, planning, and implementation
Resilience Planning

• Building capacity throughout the process as well as an intended outcome

• Scenarios and indicators as a component of sustained dynamic assessment

• Not just about reducing the future negatives.

Designing for:
• Reducing the use of the ‘rainy day’ fund
• Appropriate investment portfolio
THANK YOU

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