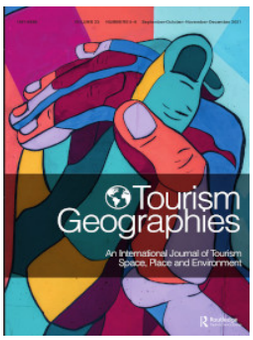

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RESEARCH ARTICLE

Leverage points to address climate change risk in destinations

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ABSTRACT

Transformational system change is required to respond to the current climate emergency and the COVID-19 induced structural break presents an opportunity to progress such change. While the tourism industry accepts the need for change, how this may look like remains unclear. This article contributes to identifying pathways by presenting critical reflections on the research process and findings from a three-year research project on reducing climate change risk in Vanuatu. The approach is anchored in systems thinking and draws on the concept of leverage points. Seven points are identified for intervening in the tourism system to reduce climate change risk and achieve varying levels of systemic change. Each is explored in the context of Vanuatu before its broader relevance is discussed. The findings highlight the importance of engaging with deeper influences of risk and unsustainable system outcomes. This has implications for how decision-makers approach crisis management and what 'tourism recovery' means, especially when considering that system resilience might stand in the way of more profound transformational change required to address long-term risks.

中文摘要

为了应对当前的气候突发事件，需要进行转变性的制度变革。新型冠状肺炎引发的结构性突破为推动这种变化提供了机会。虽然旅游业接受了有必要进行改变，但这可能会变成什么样子仍然是未知数。该文通过对一项为期三年的关于减少瓦努阿图气候变化风险研究项目过程和结果的批判性反思，提出对气候变化进行转变性制度变革的路径。本文方法以系统思维为基础，并借鉴杠杆点的概念，提出对旅游系统进行干预的七个要点，以减少气候变化风险，实现不同程度的系统性变化。每个要点都是先在瓦努阿图的范围内进行探讨，然后再讨论其更广泛的启发意义。研究结果强调应对风险和不可持续系统的更深层次影响因素的重要性。该研究结果对决策者如何处理危机管理和理解"旅游业复苏"的意义有启发，尤其当决策者考虑到系统的弹性可能会阻碍解决长远风险所需要的更深远的转变性变革。

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Introduction

Despite our growing understanding of the tourism and climate change nexus, climate risk to destinations continues to increase whilst climate action remains limited (Scott, 2021; Scott et al., 2019). The COVID-19 crisis has disrupted global tourism in ways that decades of climate change negotiations failed to deliver. The pandemic has exposed systemic failures that have been raised by tourism critiques for quite some time (Sharpley, 2020), but were ignored due to the short-term economic benefits that tourism appeared to deliver. Given that the global temperatures are estimated to have increased already by 1.07 °C from 1850–1900 to 2010–2019 (IPCC, 2021), the chances of limiting warming to 1.5 °C are slim. Despite the urgency, 'humanity has not managed to fundamentally change the trajectory of the global coupled human–environment system' (Fischer & Riechers, 2019, p. 2). In response, experts have called for transformational system changes (IPCC, 2018), including in tourism (Higham & Miller, 2018), where a low-carbon tourism economy 'will require nothing less than a revolution in the sector' (Scott & Gössling, 2018, p. 6). How to achieve such systemic change for tourism remains unresolved.

The complexity of both the tourism (Baggio, 2008) and climate system, each crossing geographical scales and traditional decision-making scopes, and interacting with considerable uncertainty in terms of impacts and responses, make achieving systemic change challenging. Tourism's past success only adds to this challenge, as the deeply embedded growth paradigm has led to a rapid expansion, resulting in pressure on popular destinations that undermines the sustainability of local systems (Higgins-Desbiolles et al., 2019). Tourism growth has also cemented the structures and interests of existing sector leaders that stand in the way of decarbonising the industry (Becken, 2019). The recent halt to international tourism thus provides a unique opportunity to break away from old paradigms and channel recovery efforts towards low-carbon, potentially closer-to-home sustainable and resilient tourism alternatives that deliver long-term benefits to host communities (Gössling et al., 2021; Higgins-Desbiolles, 2020; Lew et al., 2020). Yet, Hall et al. (2020) warn that the pandemic provides limited possibilities to transform the global tourism system unless the broader socio-economic system changes as well. The dominant position of major tourism bodies that advocate for a rapid return in travel activity (e.g. in the form of 'sustainable growth' – see WTTC, 2020a) is symptomatic of the system trying to bounce back.

To achieve significant change towards a more sustainable and resilient tourism system (e.g. OECD, 2021) it is necessary to balance economic aspects with other dimensions of tourism. Systems thinking provides a suitable approach to achieve this through examining complexity across multiple system scales (Ostrom, 2007; Wilbanks & Kates, 1999). Systems theory serves as a lens to reflect on the shortcomings of the existing tourism system, while also identifying necessary change and how it may be created. Despite its relevance, systems thinking remains limited within the tourism literature (Loehr & Becken, 2021; Sedarati et al., 2019).

To address these gaps, this article examines how the current tourism system could be transformed to sustainably reduce climate change risks (both carbon risk and climate change impacts) to destinations, using the concept of leverage points

(Meadows, 1999, 2008). Levers for change is a widely accepted pathway for climate change transformation, for example in the context of adaptation (Rosengren et al., 2020). Critically reflecting on a three-year research project, leverage points are explored and discussed in the context of Vanuatu, an island destination in the Pacific that has invested in sustainable tourism planning, yet is facing a range of challenges from tourism and non-tourism pressures. The Vanuatu perspective is then broadened to generate wider insights for other destinations.

Literature review

Forms of system transformation

A system has been defined as 'a set of things interconnected in such a way that [they] produce their own pattern of behaviour over time' (Meadows, 2008, p. 2). In systems research, transformation is understood as the result of a system crossing a threshold, leading to (or triggered by) collapse with a subsequent re-emergence as a new system with a different structure (Gallopin, 2006). How easily systems transform is determined by the characteristics of the 'state space' within which they are positioned, and the values of the system influencing its resistance (Walker et al., 2004). A system highly sensitive to change, for example a ski field at lower altitudes with a declining snow base and warming temperatures (Becken, 2013) would have limited response options or ability to self-organise.

Transformation can happen through external shocks or mismanagement and be avoided through increasing resilience. Alternatively, transformation may be a goal of adaptation actions (Pelling et al., 2015) and a deliberate choice leading to system change to avoid collapse (O'Brien, 2012). Regardless of the driver of change, definitions agree that transformation is concerned with the depth of change (Matin et al., 2018; Pelling et al., 2015), leading to the creation of a new system configuration – positive or negative (Gallopin, 2006). Whilst it is not always easy to discern whether change is desirable or not, in the case of climate change the science provides clear guidance regarding far-reaching environmental impacts – and degradations – due to climatic change. In addition, it is sufficiently understood that climate change also triggers major risk for economies and security on a global and local level (Barnett, 2003; Stern, 2007). These projected threats require 'fundamental societal and systems transitions and transformations' (IPCC, 2018, p. 22). Time is of the essence, as scientists have argued that our global socio-economic system will reach a point where deliberate transformation is no longer possible as the system passes ecological tipping points where life on Earth as we know it may no longer be possible (Lenton et al., 2019; Steffen et al., 2018). Tipping points are often not well understood and determining how close a system is to its limit can be challenging (Lenton et al., 2019). Espiner and Becken (2014) argue that the tourism industry's dependency on natural resources at a particular place combined with often geographic peripherality provide limitations to how far the sector can transform itself.

Given this precariousness, how can we achieve deliberate transformation in tourism towards low-carbon, sustainable, resilient development? One key challenge is that the notion of transformational change raises questions about current values,

assumptions and beliefs (O'Brien, 2012), including how they manifest in decision-making processes and powers. Previous studies suggest a groundswell of views and movements that challenge dominant ideologies (e.g. Dwyer, 2018; Higgins-Desbiolles et al., 2019; Loehr & Becken, 2021). The pandemic has further increased calls for change and 'green recovery' (OECD, 2021; UN, 2020; WTTC, 2020a). Deliberate transformation could capitalise on such momentum, factor climate change into the redesign of the existing tourism system and create different levels of change up to the most fundamental leverage point of shifting values and beliefs.

Intervening in social-ecological systems

Systems approaches are well established in environmental geography; however, human geographers have raised concerns that the domination of the positivist paradigm and mechanistic analysis commonly applied in system studies fail to appropriately understand social systems (Anderberg, 2005). Human and environmental systems differ in their dynamics, partly because humans can give meaning to activities – for example, through 'myths, paradigms, or ideologies' – leading to purposefulness or planned behaviour (Westley et al., 2002, p. 105). Views on what constitutes desirable or undesirable systems vary across individuals and cultures, as they are influenced by symbolic artefacts, traditions and social norms and value systems (O'Brien, 2012). Attempts to establish more universal normative guidance, such as the Sustainable Development Goals (SDGs) or codes of ethics, might help establish a common platform from which to determine the preferred direction of change. However, human psychology is often biased towards maintaining the status quo (Weber, 2015), which likely impacts the perception of current system states as (sufficiently) desirable. This prevents deeper change. Who ultimately determines what is desirable (past, present and future) is often moderated through power and social structures (Cote & Nightingale, 2012), both locally and globally.

To incorporate the human dimensions adequately, studies are increasingly applying qualitative approaches, including studies specifically concerned with the relationship between humans and place (Rosengren et al., 2020). In the case of tourism, this involves conceptualising tourism as a social-ecological system (Ostrom, 2007) that relies on natural resources (Cole & Browne, 2015; Mai & Smith, 2015), interacts with landscapes (Heslinga et al., 2017), is exposed to climate risk (Loehr, 2020; Loehr et al., 2020) and develops mechanisms of resilience (Becken, 2013; Calgaro et al., 2014; Espiner & Becken, 2014). Despite some advancements, our understanding of how to design multi-level (i.e. different leverage points) interventions in social-ecological tourism systems to achieve deliberate transformation remains limited.

Problem scope and system scale

Geographical systems, including tourism spaces, are open systems, which makes it more difficult to apply systems analysis (Anderberg, 2005). Our understanding of change is influenced by the scope chosen to assess and address a problem. For example, many of the existing tourism responses to shocks such as extreme weather

events are often reactive and at the local level (Hughey & Becken, 2014). However, underlying drivers to both risks and response options are situated at larger systems scale. These include loss of biodiversity, population growth, and overconsumption (Lovelock, 2009), and they are rarely addressed in tourism policy responses. Thus, to what stressor (i.e. what level) resilience should be developed needs to be clearly defined. Systems thinking can help as it not only identifies the problem, but also the scale at which it needs to be understood (White, 1995). This may require defining artificial system boundaries to reduce complexity. In practice, however, rather than choosing boundaries based on the nature of the problem and research question (Meadows, 2008), problems tend to be addressed based on the decision-making scope of an organisation, thus limiting the effect of interventions, especially where cross-sectoral collaboration and integration is limited (Becken et al., 2020; Loehr & Becken, 2021). As a result, actions addressing complex sustainability issues often fail to make a real difference (Abson et al., 2017).

Leverage points

Building on years of system research, Meadows (1999) developed the concept of leverage-points for system change, points where intervention in structure can lead to a relatively larger change in system outcomes. These levers bear the potential to inspire profound ways of understanding and addressing sustainability challenges (Abson et al., 2017; Fischer & Riechers, 2019). However, they are often counter-intuitive (Meadows, 2008) and rarely addressed (Raworth, 2017). For example, governments seek growth to address problems such as poverty or environmental destruction, considering only the benefits of growth and ignoring the costs. This can exacerbate the very problems they are trying to address, when slow or no growth could sometimes lead to better outcomes (Forrester, 1971; Meadows, 1999). Leverage points thus require an understanding of system behaviour, including feedback loops, to avoid unwanted or unintended knock-on effects. Applications in tourism are limited.

Meadows (1999) identified 12 places to intervene in a system, ranging from shallow (relatively easy to implement, but limited ability to create significant change) to deep (difficult to implement but leading to transformational change). These are: 12. Constants, parameters, numbers (such as subsidies, taxes, standards). 11. The sizes of buffers and other stabilizing stocks, relative to their flows. 10. The structure of material stocks and flows (such as transport networks, population age structures). 9. The lengths of delays, relative to the rate of system change. 8. The strength of negative feedback loops, relative to the impacts they are trying to correct against. 7. The gain around driving positive feedback loops. 6. The structure of information flows (who does and does not have access to information). 5. The rules of the system (such as incentives, punishments, constraints). 4. The power to add, change, evolve, or self-organize system structure. 3. The goals of the system. 2. The mindset or paradigm out of which the system – its goals, structure, rules, delays, parameters – arises. 1. The power to transcend paradigms.

Abson et al. (2017) further classified these into four categories of system change: (1) parameters (changing flow of material or rewards – often targeted by policymakers); (2) feedbacks (altering interactions between elements); (3) design (adjusting the

structures and institutions that manage parameters and feedbacks); and (4) intent (changing the underlying value, goals or world-views that determine system trajectory). Even if the outcome is deliberate transformation, shallow leverage points enable the system to absorb stress without crossing a tipping point. They may only lead to incremental changes, but they can still prepare the system for the implementation of deeper leverage points in the future. Deeper leverage points, on the other hand, include asking normative questions that can alter the meaning created by actors and institutions within the system. Changes in what is seen as desirable will impact the trajectory of the system and enable its transformation to a new stable state. Deeper leverage points are much more difficult to implement (Meadows, 2008).

Methodology

The purpose of this research was to explore the potential of leverage points and how they could be implemented to catalyse transformational change in tourism. A desirable outcome of system change would be greater preparedness to climate risk. Vanuatu's tourism system serves as a concrete case study, but connections to other destinations or the global tourism system are presented as well to signal wider applicability.

Vanuatu as a case study

Vanuatu is a South Pacific small island developing state (SIDS) consisting of 83 islands (Figure 1). In 2019, the World Risk Report ranked Vanuatu as the country with the highest disaster risk (Day et al., 2019). Despite the high adaptive capacity of South Pacific people, their reliance on ecosystem services for livelihood activities (Savage

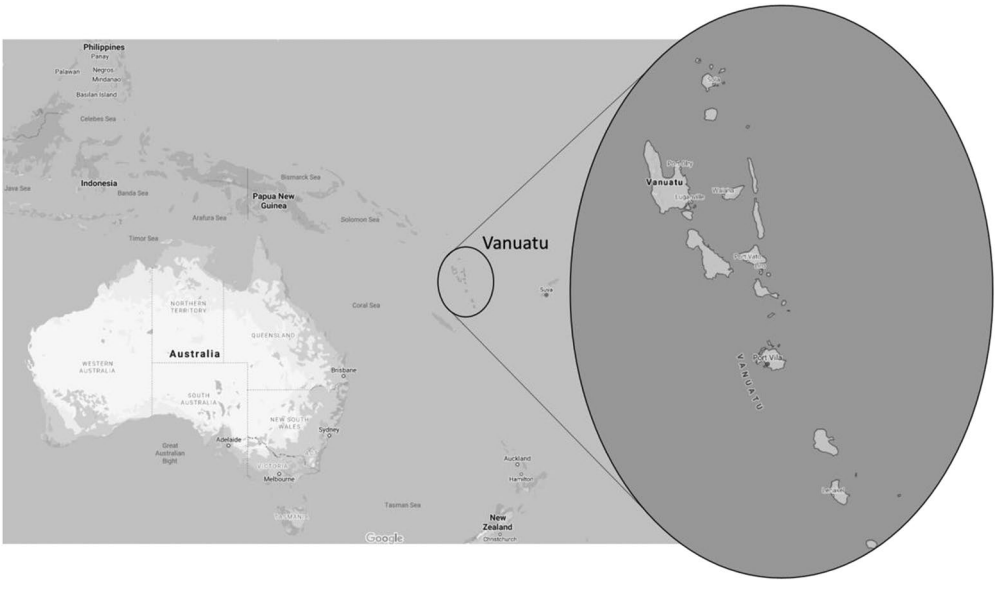

Figure 1. Vanuatu (amended from Google maps).

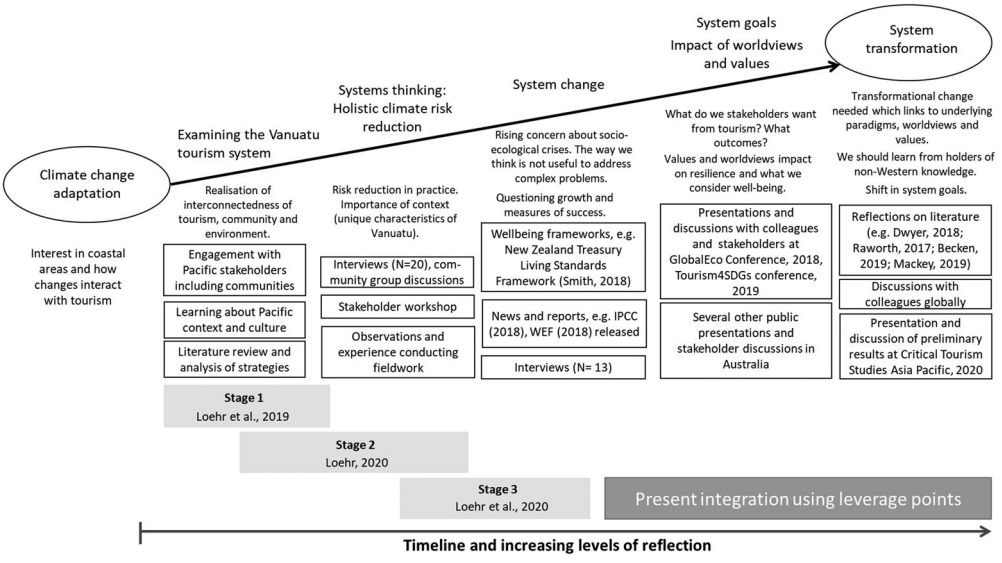

Figure 2. Progression of thoughts towards understanding system transformation, inputs into the reflective process and outputs from earlier research stages.

et al., 2020) and proximity of settlements to the shoreline (Andrew et al., 2019) combine to high vulnerabilities to the impacts of climate change. Pre COVID-19, international tourism was one of Vanuatu's main export industries, representing 34.7% of GDP and 36% of employment (WTTC, 2020b). Due to increasing environmental change, and the fact that Vanuatu is modifying its approach to tourism policy (Loehr et al., 2019; Vanuatu Sustainable Tourism Policy 2018–2030, 2019), it was deemed a suitable case study for the purpose of this study.

The data that informed the examination of leverage points stem from field work and conceptual research that occurred between 2017 and 2020. The earlier work was organised in three distinct stages, resulting in three separate research outputs (Loehr et al., 2019; Loehr, 2020; Loehr et al., 2020). Each of these delivered an in-depth examination of particular system elements and dynamics and served as a basis for deeper and cross-cutting reflections. In addition, other sources such as events, publications and discussions provided material for consideration and progression of thoughts (Figure 2).

While climate change adaptation and risk reduction to the Vanuatu tourism system are context specific (Füssel, 2007), the broader areas of interventions may be relevant for other destinations, even if their implementation may take a slightly different form. The relevant climate change literature, alongside industry reports and bespoke policies, helped to broaden the examination of leverage points to the global tourism system.

Research approach

This paper follows a critical and reflective approach consolidating the findings from a three-year research project that examined the role of tourism in reducing climate risk at destination level in Vanuatu. Reflections enable researchers to examine their

implicit assumptions. It may thus provide a guide to stepping away from 'fixed and potentially restrictive ways of thinking' and enhance our understanding how change may be achieved (Fook, 1996, p. 199). To contribute to social change 'critical research is essential for setting an agenda for ethical management, governance and coexistence with the wider world' (Tribe, 2008, p. 245). Combining the constructivist and the critical research paradigms helps to acknowledge that the world as people see it is internally constructed, whilst physical realities exist that influence the system (perhaps unbeknown or ill-understood) (Morley, 2008). Both the constructed and 'real world' can be questioned and reflected upon in their existence and meaning.

The critical research paradigm also requires the researcher to engage with the forces that influence the act of producing tourism knowledge. These forces exist at macro and micro levels, guiding the researcher to look inward and outward, thus reflecting not only on the personal influence but also the relationships and dynamics of the wider research setting (Ateljevic et al., 2005). In the context of this study, the macro forces are ideologies, institutional arrangements and power structures. All of these influence both how tourism responds to climate change and how this is captured in the research process, which after all is a product of the prevailing science system (Loehr & Becken, 2021). At the micro level, the researchers' own experiences and values and their interaction with the research subjects are influential. This reflective process, for example, has clarified the researchers' ontological, axiological and epistemological assumptions (Hudson & Ozanne, 1988). This work is aligned to an ideology opposing neoliberalism, consumerism and a growth focus, instead considering broader purposes and outcomes, and how they can be achieved through tourism (Becken, 2017; Dwyer, 2018).

The reflections represent a meta-level relative to the original three-stage research project in Vanuatu, and provided an opportunity to take a holistic approach that, one step removed, allows for a critical examination of opportunities for system change. The reflective process involves looking back to the field experiences, engagement with research participants and results generated (Mortari, 2015), but it is also influenced by the latest climate change science, public debate on tourism and COVID-19 recovery (e.g. through industry communication and media), newly released Vanuatu tourism strategies, and discussions with other experts in tourism transformation. From this, a realisation arose that drastic transformational change across the tourism systems is necessary to effectively address climate risk. The concept of leverage points, informed by Meadow's (1999, 2008) work, helped to identify levers of change that challenge both micro and macro level forces.

Results and discussion: leverage points for climate risk reduction in Vanuatu

To increase sustainability and reduce climate risks for destinations, this article presents seven leverage points ranging from shallow to deep (Figure 3). Each leverage point is discussed below by first providing an account of their relevance for Vanuatu before extending what each means more generally by discussing their relevance for similar destinations (see Rosengren et al., 2020). Suggestions are made as to how these

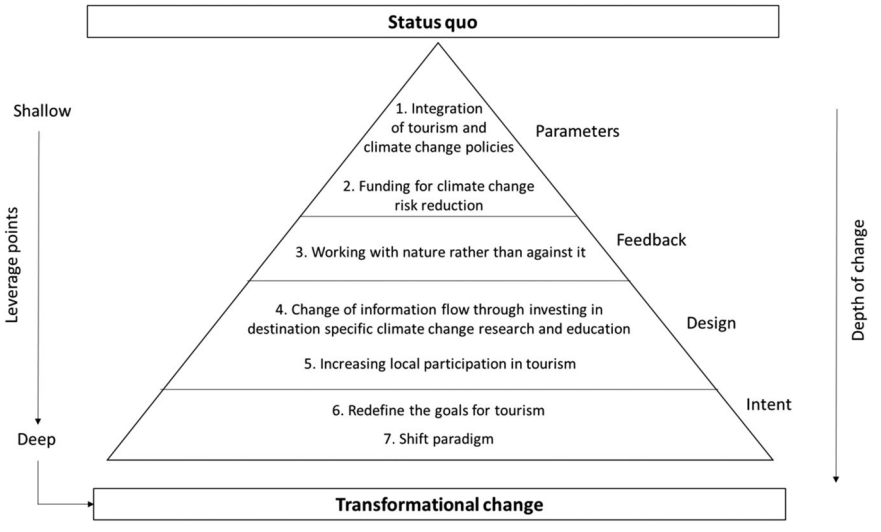

Figure 3. Leverage points for climate risk reduction in Vanuatu destinations and level of change required to implement them (Source: Adapted from Abson et al., 2017; Meadows, 2008).

interventions could be implemented, and knowledge gaps and research needs are highlighted.

Parameters

Integration of tourism and climate change policies

There is a common belief that tourism is a green development pathway (Government of the Republic of Vanuatu, 2015), and as a relative notion this is somewhat shared by the researchers despite detailed knowledge of tourism impacts. This positive predisposition is reflected in national policy, where tourism is mentioned in the National Adaptation Program for Action, meaning that there is a direct funding pathway for sustainable tourism initiatives. As a government interviewee explains in Stage 2: 'For a lot of those [climate change] projects, even the World Bank, UNDP, that [funding] came from the national adaptation priorities, agenda or action plan'. In contrast, tourism is not mentioned in national mitigation plans, and this makes it more difficult to secure funding for tourism decarbonisation initiatives. To create an effective and sustainable response in tourism, tourism and climate change policies must be integrated and consider all aspects of climate risk. Such integration would also ensure that tourism development objectives do not contradict adaptation capacities and emission reduction targets. Progress is already evident in that climate change has been incorporated in the latest Vanuatu Sustainable Tourism Policy 2019–2030 (2019) with an emphasis on improving tourism's contribution to both the sustainability and resilience of Vanuatu. As new national and provincial tourism plans are being developed, there is an opportunity to include more tangible actions to reduce climate risk. The review of relevant strategies in Stage 1 of the research revealed further opportunities, for example the Vanuatu Tourism Permit and

Accreditation Program could be extended to include climate change and resilience criteria. The mandatory scheme is currently focused on creating a baseline for quality in tourism (Department of Tourism, 2019). It thus provides an easily implementable option to raise the sustainability performance of tourism businesses.

While there appear to be beginnings of policy coordination in Vanuatu, Becken et al. (2020) found that, at a global scale, tourism and climate change policy integration remains limited. This is surprising given the large number of countries that have ratified the Paris Agreement and explicit recognition of climate change risks by tourism organisations (e.g. UNWTO, 2019; WTTC, 2019). In addition to national tourism policies, criteria addressing climate risk should be included in national certification schemes, operating permits, building permits, and business loans and grants. Considering the substantial government investment through COVID-19 responses, such sustainability conditions are pertinent and timely (OECD, 2021).

Funding for climate change risk reduction

Vanuatu receives external financial resources to address climate change and there is an assumption that these are needed for tourism to address climate risk. A government Interviewee explains in Stage 2: 'Because oftentimes, you might only have so much domestic funding but a lot of climate change funding is from donors'. In Stage 2, a consultant working on climate change projects discussed building back after extreme weather events: 'It's a big challenge for them', however, he continues: 'for some of these initiatives they [the government] would like to see the private sector also contribute'. External resources have several limitations, making it difficult for communities and small tourism businesses to access financial support for adaptation or mitigation. Interviewees in Stage 2 of this study noted that accessing bank loans was extremely difficult, especially for locally owned businesses, due to the high risk of low credit ratings and general lack of financial capability and good governance. Focused funding in the form of small grants has been provided for local civil society initiatives in Vanuatu by the Global Environment Facility to initiate bottom-up change, which was found to make a positive difference. Such programmes could be extended to small and medium-sized tourism businesses to address climate risks. Simple application processes and guidance for businesses with limited capacity might improve access to finance.

In addition to funding, strengthening capacity and processes within local organisations to manage funds and invest into projects independent of donor preferences will be advantageous, as it empowers local decision-makers to respond to community priorities (Stage 2). Destinations can generate extra funding for climate risk-reduction programs through a tourism tax or levy. Such an approach may also create a balancing feedback loop (see leverage point 3), an intervention challenging the growth paradigm. According to Florida (2018), 22 countries have implemented a tourism tax, typically aimed at supporting tourism development – for example, through infrastructure investment. More recently, countries such as New Zealand started to implement tourism levies aimed at environmental conservation (New Zealand Government, 2019). Developing countries, including Vanuatu, could implement such a levy to help fund tourism climate change projects (leverage points 1 and 3), or to invest in education, training and awareness programmes (leverage point 4).

Feedback

Working with nature rather than against it

Humans, including the researchers and operators interviewed, have the tendency to focus on positive flow-on effects (a positive bias), while overlooking or disregarding negative ones. The third leverage point focuses on enhancing positive flow-on effects while reducing negative ones. This can be applied effectively when the tourism sector works *with*, rather than against, nature. The state of the natural environment, including coral reefs, is critical not only for the success of the tourism sector but for the wider Vanuatu's socio-ecological systems (Hafezi et al., 2021). Tanna island, a destination in Vanuatu, provides an example where tourism businesses were instrumental in establishing a Marine Protected Area. Such initiatives provide conservation benefits and increase the resilience of coral reefs (Reid, 2016). As explained by an operator in Stage 3: 'The best sign is shells coming back, you can see them. I've never seen some of the shells that I've seen here'. The quote also indicates that regenerating a healthy marine ecosystem might be rewarding; perhaps motivating further action towards greater system change. Healthy ecosystems play a crucial role in climate risk reduction, as they tend to cope better with shocks than degraded systems (Munang et al., 2013). A healthy ecosystem provides better ecosystem services and reduces the likelihood of reaching tipping points. Working with nature thus allows Vanuatu to absorb higher levels of climatic change while investing in diverse livelihoods – including agroecological tourism, which focuses on integrating traditional agricultural practices and conservation with tourism (Addinsall et al., 2017). Another option is to directly reinvest some tourism-derived benefits into nature-based approaches.

EbA research in tourism is limited; however, individual tourism-related initiatives exist, including coral restauration and reef conservation (Westoby et al., 2020), mangrove planting and protection (Becken, 2005), wetland rehabilitation (Khan & Amelie, 2015) and reforestation (Hambira et al., 2013). In many Pacific island states, local people involved in tourism rely on the land and sea to meet their livelihood needs (Scheyvens & Russell, 2012). Recent work has shown that this has proven beneficial as access to natural resources has enabled communities to remain flexible during the COVID-19 pandemic (Scheyvens & Movono, 2020). Conservation and EbA initiatives can therefore be expected to become increasingly popular as destinations face future crises and as the interconnectedness of humans and nature needs to be recalibrated (Pollock, 2019; see leverage point 6).

Design

Change of information flow through investment in destination specific climate change research and education

Some representatives from the Vanuatu tourism sector do not feel responsible for addressing climate change risk. Instead, there is an assumption that this falls under the scope of other agencies, potentially because there 'was a lot of confusion when we set up the Ministry of Climate Change to say, well, now they are taking out all the role from everybody else' (development organisation, Stage 2). Lack of information might be one cause. This could be addressed by changes in system design to improve

the flow of information (Meadows, 1999), for example through destination-specific data and climate change awareness campaigns. The Vanuatu's Sustainable Tourism Policy has great potential, but greater awareness of climate change amongst tourism officials is desirable (Klint et al., 2012). All of these advance knowledge, and as a result create new feedback loops and improved decision-making (see leverage point 1 and 2). Vanuatu does not currently include tourism as a sector in its national carbon accounts, and the lack of data – a common issue in many destinations – dilutes tourism responsibility (Weaver, 2011). To combat this, specific research on the destination's carbon footprint and climate impacts is required. Better information on tourism and climate change can be complemented by tourism training for businesses. In the case of Vanuatu, educational or upskilling programs could be run at the provincial or local level, potentially integrated with existing training initiatives, such as the Vanuatu Skills Partnership (Cheer et al., 2018).

Increasing decision-makers' access to climate change information and education is relevant for all destinations, as this has several positive flow-on effects for system governance. Scenarios, for example, would inform long term planning by key actors to meet international climate targets and adapt to climate change (Gössling & Scott, 2018). Helping stakeholders understand the need for, and benefits of, policies on climate action will enhance participation in the policy-making processes and stimulate subsequent action (Bramwell & Sharman, 1999). This may, in turn, support the restructuring of formal institutions and modification of rules and regulations, which will enable further climate action (Abson et al., 2017). At this crucial point in time, deeper understanding will increase the chances that investment into pandemic recovery considers future risk and does not lock destinations into carbon-intense development pathways. Education and awareness programs may also enhance cross-sectoral cooperation, which generate further relevant knowledge, improve information flows and foster integrated initiatives, such as helping tourism businesses to measure and reduce their emissions (Loehr & Becken, 2021). Greater cross-agency collaboration will encourage policy integration (see leverage point 1).

Increasing local participation in tourism

The authors went into the project with the belief that Western knowledge provides suitable solutions to tourism development and environmental change – and participants of the study also oftentimes held the assumption that suitable solutions derive from sources external to the system. For example, one of the local operators interviewed in Stage 3 stated that: 'There have been a lot of big questions around why this [climate change] is happening and because for the locals we don't really know and see why are the things happening […]. But after several people, like the Westerners, the experts, are coming here and are informing us about some of these things, we feel like it is important that we try and implement what they say'. This quote reflects a level of engrained colonialism and ignores the fact that local people, Ni-Vanuatu, are deeply knowledgeable about their place and ecosystems. Whilst the original research had made considerable effort to engage with local communities (including via community group discussions and a local translator), it is likely that the full perspective has not been captured adequately. It became obvious that foreign

ownership of tourism businesses in Vanuatu is high due to land alienation, development and foreign investment in tourism (Stefanova, 2008), as well as operations controlled by patriarchal authority figures or 'big-men' (Cheer et al., 2013). This increases economic leakages (Cheer et al., 2018) and reduces the decision-making power of the local population. To reverse this trend, Ni-Vanuatu ownership and participation in tourism businesses could be increased to allow local people to influence destination management and adaptation decisions. Increasing benefits derived from tourism to the local communities can help accumulate savings for times of crisis (Stage 2). More importantly, increasing local ownership of tourism businesses puts control over benefits back into the hands of local people (Scheyvens & Momsen, 2008), including decisions concerning climate responses. This has been an important goal as part of developing Vanuatu's Sustainable Tourism Policy (2019–2030), which takes a bottom-up and place-based approach (Stage 1).

In other Pacific destinations, enabling local participation in tourism has increased empowerment, particularly of women (Movono & Dahles, 2017). Enhanced participation increases diversity of viewpoints and experiences that inform decision-making and the development of effective interventions. The resulting change in system structures is then a function of the capacity for self-organisation and strongly contributes to the adaptability of systems (Meadows, 2008). This, together with the integration of Indigenous local knowledge, provides an opportunity for resource management that enhances resilience more effectively (McMillen et al., 2014). While the importance of Indigenous local knowledge to address climate risk has been widely recognised in adaptation science (Nalau et al., 2018), it has been less influential in tourism (Loehr & Becken, 2021). This represents a major gap, as the integration of different knowledge types generates a more holistic and context specific view of risk, reduces trade-offs between different stakeholders, develops more appropriate adaptation interventions and thus reduces negative flow-on effects created through tourism (Loehr, 2020).

Intent

Redefining the goals for tourism

There is a common assumption amongst many tourism actors, including participants of the study, that tourism is 'good' because it delivers economic outcomes, and thus the goal of the tourism system should be to grow in order to increase benefits. This impression was gained in Stage 1 and reflected in Stage 3, for example by one of the operators noting: 'So if you have more guests you have more income and it will help to uplift the standard of the business and the service of the business and more money comes in to the villages'. All systems have a goal directedness, function or purpose towards which the system feedback loops will work (Meadows, 2008). Feedback loops can have individual goals that are usually easy to detect, but the whole-of-system goals are less obvious, leading to frustration among actors (Meadows, 1999). This is problematic because 'if the goal is defined badly, if it doesn't measure what it's supposed to measure, if it doesn't reflect the real welfare of a system, then the system can't possibly produce a desirable result' (Meadows, 2008, p. 138). For this reason, redefining system goals can change the intent of the system - a deep leverage point.

Vanuatu's government is committed to the Paris Agreement (Government of the Republic of Vanuatu, 2020); however, the goals of the tourism industry may be different, which can put the success of wider climate responses at risk. To ascertain this, Governments may ask normative questions 'What do we want tourism for?' Viewpoints on how these questions should be answered will vary, and more work is needed to understand all stakeholders' views regarding those fundamental questions. Reflecting back, the answer to this question likely differs between the Ministry of Tourism at the national level, and decision-makers in more remote islands. Most recently, the Vanuatu Sustainable Tourism Policy (2019–2030) and Vanuatu Sustainable Tourism Strategy (2021–2025) suggest that tourism in Vanuatu aims to deliver holistic benefits to host-communities. This means that the success of the tourism industry is not limited to its economic contribution *per se*, but the wider sustainability and resilience outcomes to which tourism contributes.

In a broader context, research has shown that a country's focus on growing economic output alone does not help economies to reduce pressure on the natural and social systems (O'Neill et al., 2018; Raworth, 2017). Similarly, the success of tourism could be determined by measures such as its contribution to national emissions reduction targets, biodiversity conservation, an increase in equity and equality, education and health, among others. The importance of redefining the purpose of the tourism sector, and how to measure whether the system is on track to produce holistic wellbeing outcomes, are thus critically important questions that only a few destinations are starting to address (Musikanski et al., 2019).

Promising frameworks are emerging with ideas of a regenerative economy (Raworth, 2017). Regeneration refers to regenerating capitals that provide goods and services contributing to our wellbeing (e.g. Smith, 2018a, 2018b). Regenerative tourism focuses on creating net benefits from tourism across economic, socio-cultural and environmental dimensions (Pollock, 2019). These must occur without exceeding planetary boundaries – currently a key challenge for tourism due to its carbon dependency, owing largely to transportation. The systems approach inherent in such regenerative economies provides a sound pathway to address climate risks. Subsequently, a system goal for tourism in Vanuatu, as well as other destinations, could be to provide benefits to the community and reduce climate risk without exceeding the boundaries of ecosystems.

Shift paradigm

The deepest leverage point identified for system change is shifting of paradigms, as 'paradigms are the source of systems' (Meadows, 2008, p. 163). They determine system structure, behaviour and intent, and thus influence all other leverage points (Meadows, 1999). This is particularly important because paradigms influence stakeholders' perceptions of system goals. Supporting tourism and climate change decision-makers in understanding that they are all part of the same system may help them identify common goals.

There are structures embedded within the tourism system that are built on Western ideologies. However, the field trip observations and discussions, as well as formal interviews, indicated that opposing views are gaining ground in Vanuatu. Vanuatu's

new Sustainable Tourism Strategy provides further evidence that the goal for tourism is changing by creating equitable benefits and well-being for Vanuatu and its people while emphasising the importance of the traditional economy (Department of Tourism, 2021, p. 5). Western neoliberalism, which considers growth as imperative (Dwyer, 2018) and one of the solutions to solve climate mitigation (Gössling & Scott, 2018), has dominated the global economic system since the 1980s (Raworth, 2017). Accordingly, and except for few critical voices (Regenvanu, 2009), there has been an expectation that Vanuatu will follow this path (Allen, 2008). Neoliberal macroeconomic policy supports foreign corporations (Westoby, 2010) to invest in the Vanuatu tourism industry. Western belief systems influence business decision-making as expatriates take over and develop businesses. Local people explained in community discussions that they need tourism to generate cash income in an otherwise largely subsistence economy. The fact that wealth (Westoby, 2010) and development in Vanuatu are often measured based on 'Western culture-laden economic indicators' (Trau, 2012, p. 153) further contributes to the system shaping in this direction (see leverage point 6 on the importance of defining system goals). Yet the traditional *kastom* economic paradigm provides an opposing perspective, which focuses strongly on community as opposed to individuals. It thus supports community solidary and wealth redistribution (Trau, 2012), which has been shown to contribute to people's wellbeing and resilience (Regenvanu, 2009). As part of conducting fieldwork for this study, it became clear that Ni-Vanuatu possess an intrinsic and customary understanding of how human and environmental system elements interlink, and this could be at risk from externally imposed worldviews.

The importance of 'holism' is evident in other Pacific worldviews, and the related social structures were found to strengthen the capacity of communities to respond to change (Movono et al., 2018; Parsons et al., 2018). Similarly, Ostrom (1990) highlights that Indigenous cultures provide important lessons into the management of common pool resources, whereas the western ideology of capitalism is lacking this understanding and most commonly leads to natural resource depletion. Abson et al. (2017, p. 34) argue that the functioning of socio-ecological systems 'is influenced by the degree to which nature is identified as essential to a good life'. The understanding that all system stakeholders are part of nature may help to define a common (and sustainable) system goal. Loehr and Becken (2021) found that alternative ideologies are now emerging in the body of tourism climate change knowledge.

Despite deeper knowledge, according to Meadows (2008, p. 163), societies 'resist challenges to their paradigms harder than they resist anything else'. There are thus no easy answers to shifting paradigms of destination stakeholders. While presented as ranging from shallow to deep, all seven leverage points are interlinked. To achieve transformational change, deeper leverage points need to be implemented, such as redefining the goals of the system. However, shallower leverage points may lay the foundation to reflect upon, and change, the system's intent. Changing the system goal or dominant paradigm will in turn influence shallower leverage points, including decision-making, and how and why system elements link and therefore create changes in feedback loops. For example, if the value of ecosystem health is considered and reflected in decision-making, wider benefits are created for all elements of the destination. Influencing deep leverage points is difficult, and more research is needed

to inform how to shift the intent of destination systems, and the global tourism system in which they are embedded. Fischer and Riechers (2019) suggest backcasting to stimulate thinking about bold goals, which are outside the scope of traditional forecasting. Alternatively, developing different scenarios for destination under 3 °C or 4 °C global warming may also shift thinking. Finally, Meadows (1999, 2008) identifies a paradigm deeper than shifting paradigms, transcending paradigms, showing that no paradigm reflects the full truth and all paradigms have limitations in understanding systems.

Conclusion

This article presents critical reflections on research undertaken on the Vanuatu tourism system, and the changes required to redesign the system to better address climate change risks. In doing so, the concept of system transformation was linked to leverage points to identify strategies for intervention within the system. A holistic assessment of the earlier research process and outputs, as well as more recent changes in the tourism system due to COVID-19, made it clear to the authors that to achieve deliberate transformation, deep leverage points need to be addressed. This article explored what these are in the context of Vanuatu destinations and how they could lead to transformational change. The identified leverage points and the direction of change resonate well with the pandemic responses and leadership evident from the Vanuatu Government to date, including their strengthening focus on community wellbeing.

Inherently, transformation to address climate risk or respond to a pandemic represents a significant shift. This is difficult when the current system is geared towards high stability and resilience to change, for example 'bouncing back' to pre-COVID-19 volumes and forms of tourism. This raises questions how to interpret the much-recommended goal of destination resilience, when this restricts necessary changes to manage future climate change risk. More work is needed to better understand how resilience strategies put in place by tourism organisations can at the same time influence the ability of systems to transform, including away from tourism if needed. These theoretical questions, and the potentially conflicting nature of resilience and leverage points for change are applicable to other destination systems and other types of risks. This is particularly relevant where the idea of transformation centres around tourism recovery plans (e.g. OECD, 2021; UN, 2020; WTTC, 2020a).

Finally, this work shows that there is an urgent need for tourism researchers to engage with the troubling outcomes of the existing tourism system. It is now timely to shift the focus from merely addressing feedback and parameters (shallow leverage points) to redefining system design and intent. For risk and resilience research, this means asking normative questions and critically reflecting on what a desirable system state looks like. Only then can efforts to 'transform' tourism result in reduced risk and enhanced sustainability for local communities and environments.

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