Explaining land use and forest change: more theory or better methodology?

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Abstract

Context Theorizing complex phenomena like human–environment relationships is difficult and often of dubious explanatory value. If our goal is to understand causal interactions between people and the land and to explain environmental changes in the landscape, the more pressing need is for better causal–analytic methodology, not for more or better theory per se.

Objectives This paper presents a research methodology based on causal–historical analysis, called Abductive Causal Eventism (ACE), and makes the case that social scientists and environmental change researchers may benefit from adopting this instead of a theory-focused approach.

Methods ACE is described and its application illustrated by recent research on land use change and reforestation in Saint Lucia, West Indies. Key findings are related to the literature on so-called forest transitions (FTs).

Results Early writings about FTs sought to theorize the phenomenon, but studies have since revealed that FTs are the outcome of diverse causal pathways and contingent events. Likewise, Saint Lucia’s recent FT reflects a variety of causal influences interacting in complex ways, and FTs have occurred there before.

Conclusions These findings counsel against hasty theorizing and policy prescription and highlight the advantages of a methodological approach (ACE) that is adaptable to different and changing contexts and accounts for both general and contingent causes. Theories and policy that emerge from ACE research will be the richer (and wiser) for it.

Keywords Research methodology · Causal–historical explanation · Forest transitions · Saint Lucia

Introduction

This special issue explores the potential for social theory to contribute to landscape ecology. Theory typically plays a more central role in the social sciences than in ecology and environmental science (Hawthorn 1987; Abend 2008), so it is not surprising that social scientists who study environmental subjects often view them as insufficiently theorized (e.g., Robbins and Fraser 2003; Munroe et al. 2014; see Vayda and Walters 2011). In fields like landscape ecology and land change science, where the actions of people are often central to understanding environmental patterns and changes, the adoption of social science theories has seeming appeal.

However, there are good reasons to be skeptical of the proposition that research in fields like landscape...
ecology would necessarily benefit from more theory per se (‘social’ theory or otherwise). This is because the core challenge of doing human–environment research relates to the complexity and interdisciplinary character of the subject matter. In short, interactions between people and the environment are characterized by greater heterogeneity, contingency and change than is typically observed in the purely social world. Explanatory approaches that prioritize theory and that predominate in much of the social sciences may simply not be well-suited for research on human–environment interactions (Walters and Vayda 2020; cf. Kincaid 2004). Theory and other forms of generalization have their place, but probably won’t get us very far in terms of understanding and explaining the sorts of complex phenomena that are of interest to landscape and environmental change scientists.

Fortunately, there are routes to achieving better explanations in human–environment research without necessarily resorting to novel or expanded theories. Specifically, where causal explanation is a goal of land use and environmental change research, more attention should be given to issues of analytic-research methodology—not theory—that address head-on the challenges of complexity and interdisciplinarity that are central to those subjects.

The paper is structured as follows: in the first section, some conceptual issues are clarified and related to recent writings on the topic of causal explanation. Next, I examine and illustrate some of the formidable challenges facing theory development in human–environment research. Abductive Causal Eventism (ACE) is then presented as a research methodology that addresses these challenges. Next, the Forest Transition (FT) is examined as a recent example of the difficulties theorizing about land use change. This is followed by an empirical case study of land use and forest change in the Caribbean, based on my own research, which reveals both the potential and limitations of theory and advantages of ACE methodology for doing causal-explanatory research. The paper concludes with some remarks on the role of generalizations and theory in land use and environmental change research.

Causal explanation and research methodology

Before proceeding, it is important to clarify some key concepts central to the topic of this essay. Specifically, I will distinguish theory from methods and methodology and then contrast descriptive, interpretive and causal explanatory research.

Theory has diverse meanings (Abend 2008), but common to most is the notion of a conceptual schema that imparts generalizable understanding about the relationship between a certain set of events or variables. Theories are usually developed with explanatory intent, but they may or may not be explicitly causal in content. Where they are not, it is more accurate to view them as descriptive or interpretive (see below). Methods are the tools and techniques of research. By contrast, methodology is the logic and justifications guiding the deployment of methods and interpretation of research results. Choice of methodology in part reflects whether the goal of research is primarily description, interpretation or causal explanation (Scriven 1962; Vayda 2013; Cartwright 2020).

Descriptive research entails answering what questions about the world and typically involves collection, condensation and classification of information to reveal notable patterns, trends or historical narratives. Interpretive research gives meaning to such trends or patterns. It does not seek to establish causes of specific events but aims for general insight and consilience about the apparent ordering of events and affairs (McCullagh 1998; Martin 2011). By contrast, causal explanation seeks to answer why questions about specific events in the world and entails a commitment to evaluation of alternative, cause-and-effect hypotheses based on logical reasoning and rigorous assessment of empirical evidence (Scriven 2008; Woodward 2015).

There is value to each of these research goals and to a degree they overlap. For example, interpretations and causal explanations entail some description. Likewise, descriptive research (answering the what question) is often prerequisite to causal analysis (answering the why question), and one needs good evidence of what before starting on why (Vayda 2013). Interpretations may also serve as analytic heuristics to guide research in the search for causes, and causal explanations may influence the content and scope of descriptive narratives or interpretive theories.
But causal explanation has exacting methodological requirements that descriptive and interpretive research—even when these aspires to be explanatory—do not (Scriven 2008; Martin 2011; Vayda and Walters 2011). Human–environment researchers are, nonetheless, often unclear (to themselves and others) about these distinctions and frequently presume explanatory knowledge while deploying ambiguous concepts and interpretive schemes that are in fact inscrutable to causal analysis (Lewontin 2011; Woodward 2015).

I make causal explanation (rather than description or interpretation) the primary goal of research because it is arguably the principal epistemic goal of the natural and social sciences (Woodward 2015; Pearl and Mackenzie 2018). It also satisfies my deep sense of curiosity about why things happen in the world and provides the kinds of explicit, concrete understanding that can be of direct relevance to management and policy. In this respect, the knowledge produced by causal explanations may assist researchers and policy makers to make better predictions about the future, another common goal of research (of which more will be said later).

There are different ways to approach causal explanation (McCullagh 1998; Glennan 2011; Woodward 2015; Pearl and Mackenzie 2018). The specific conception of causal explanation advanced here is informed by contemporary writings on the philosophy of explanation, where causal explanation no longer entails a commitment to nomological-positivism (NP) (Vayda and Walters 2011). According to NP, empirical facts are explained by subsuming them under general theories, and all such theories (and facts they entail) are ultimately reducible to fundamental physical laws. This once-dominant view was inspired in the last century by advances in physics and the logic of mathematics (Cartwright 2020). By contrast, contemporary views of causal explanation have also been influenced by developments in the social, biological and evolutionary sciences and so are more closely aligned to what environmental change researchers do (Gaddis 2002; Kincaid 2012; Glennan 2014). These contemporary views emphasize causal histories and mechanisms as foundations of explanation and acknowledge that causal explanations are often highly contextual and may be singular in occurrence (Hawthorn 1991; Roberts 1996; Mahoney 2000; Glennan 2011; Lewis 2011; Priest 2017; Walters and Vayda 2020). Deductive, theory-focused approaches to research that predominated for decades in the natural and social sciences are simply no longer viewed as efficacious by many philosophers who study explanation (Hawthorn 1987; Vayda and Walters 2011).

### Theorizing human–environment interactions

The role of theory in explanation has long been debated (Scriven 1962; Merton 1968; Hawthorn 1987; McCullagh 1995; Abend 2008; Cartwright 2020). Appeals to theory specifically for research on human–environment interactions face particularly daunting challenges. Primary among these is the complexity of the subject matter which usually necessitates interdisciplinary approaches (Klein 2004; Welsh 2014). This presents formidable challenges from a theoretical point of view because there are tradeoffs between expanded interdisciplinary breadth and theoretical coherence (Persson et al., 2018). In short, what is achieved at the level of abstract synthesis typically comes at the expense of explanatory relevance and application to real world phenomena. Since theories within specific social and ecological science disciplines have for the most part demonstrated limited scope and generality (Hawthorn 1987; McCullagh 1998; Taconi 2011; Pigliucci 2013; Sagoff 2016), why then would one expect theories claiming to account for vaster and messier realms of empirical phenomena to be successful?

In fact, the track record for human–environment theory to date suggests skepticism is warranted. As noted above, a common problem is researchers being unclear about what is meant by ‘theory’ and what role it is supposed to play in research on human–environment interactions. The view presented here is that theory should be viewed and assessed in terms of it serving the goal of causal explanation. By contrast, many have embraced theory on interpretive, rather than causal-explanatory grounds, whereby causal links between empirical phenomena and broader theoretical constructs are often presumed but not rigorously demonstrated. This is evident, for example, in the widespread promotion of ‘resilience’ and related ‘socio-ecological systems’ schema (adaptive cycles, etc.). The theoretical literature on resilience offers mostly vague, functionalist assertions about the systemic character of human–environment interactions.
(e.g., Gunderson and Holling 2002; Folke 2006) and remains stubbornly unclear about what is actually on-offer (i.e., do these various concepts in part or in sum constitute theories, heuristics or what? see Walker et al. 2006). Given all this conceptual vagueness and analytic ambiguity, resilience constitutes a theoretical perspective of dubious explanatory value (Walters 2012, 2017; Olsson et al. 2015; cf. Chernoff 2012). The same can be said about appeals to vague theoretical constructs such as ‘capitalist’, ‘neo-liberal’ and ‘neo/post-colonial’ landscapes.

Another common problem, especially apparent among Marxist and post-structuralist theorists, is the tendency to present social theory explanations of environmental change as categorical alternatives to conventional explanations and, by doing so, elevating socio-political causes above all others (e.g., Robbins and Fraser 2003; Lestrelin et al. 2013; Munroe et al. 2014). This fosters confirmation bias (Vayda and Walters 1999; Vayda 2009). By confounding interpretation and causal explanation, these social-theory minded researchers often portray explanation as entailing an either/or choice between political or non-political causes, where in fact explanations often entail the causal influence of both (Walters 2017, 2019; Caulfield et al. 2019).

To be explanatory, researchers need to get past these kinds of highly general and typically vague explanatory interpretations and show in precise and concrete ways the causal connections between actual environmental changes and causal events, like corporate investment or neo-liberal market reform, that have incentivized and led to expansion of certain land uses and decline of others. To counter confirmation bias, researchers need to rule-out alternative, plausible explanations for the observed changes (Walters 2019; cf. Chamberlin 1965; Hawthorn 1991; Scriven 2008) because it is reasonable to expect that factors unrelated to political economy also influence changes in land use. Even where causes related to capitalist or neoliberal policy can be shown, for example, their influence may contradict conventional assumptions in social theory, as indeed my own research demonstrated (Walters 2017, 2019). If we are to indulge at all in such broad interpretations about changes in the land, then at least acknowledge these as tentative, ‘how-possibly’ explanations (Vayda and Walters 2011; cf. Behnke and Mortimore 2016). Getting to the ‘how-actually’ explanations entails the hard work.

One response to these challenges has come from advocates of so-called ‘middle-range theories’ (MRT). In contrast to conventional ‘big’ theories that aspire to be vast in scope and applicability, MRTs have more modest ambitions; their range and scope is limited, typically constrained by local circumstances, and so they are not readily transportable between contexts (Merton 1968; Cartwright 2020). This contextual sensitivity offers clear advantages given the heterogeneity of human-influenced landscapes (Meyfroidt et al. 2018; Bhatia and Cumming 2020). As well, MRTs are often explicitly tied to the workings of specific causal mechanisms (Cartwright 2020). The potential contribution of MRTs to research on land use and landscape change is therefore more promising.

Yet, as Walters and Vayda (2020) have argued, researchers should not handcuff themselves to the notion that causal explanation necessarily entails demonstrating the existence of causal mechanisms. And even if one grants that MRTs offer advantages over conventional theories, researchers should still avoid prioritizing them in advance of research for reasons already noted (confirmation bias, etc.). Instead, MRTs, mechanisms and other causal generalizations should be viewed as providing an array of conceptual-analytic tools that can be drawn upon where appropriate in service of the larger goal of causal explanation.

**Causal explanation using Abductive Causal Eventism (ACE)**

My colleague, Andrew Vayda, and I have addressed the specific challenges of doing interdisciplinary environmental change research by developing an explanatory research methodology based on causal-historical reasoning, called ‘Abductive Causal Eventism’ or ACE, which is summarized by Walters (2017, p. 611) as follows:

ACE is an explanation-oriented methodology, based on a pragmatic view of research methods and

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1 Empirical research done under the broad rubric of ‘resilience’ often incorporates causal analysis of various kinds, albeit these are often absent any meaningful theoretical commitment to systems. For many of these researchers, resilience and related systems concepts appear to serve only as rhetorical devices.
explanation that places at the center of research inquiry the answering of ‘why’ questions about events, including human actions and environmental changes, rather than evaluating causal theories, models or factors that are thought in advance to influence such changes. ACE entails constructing causal histories of inter-related social and/or biophysical events backward in time and outward or inward in space through a process of eliminative inference and reasoning from effects to causes. Avoiding rigid a priori assumptions about which events (or kinds of events) will do the explaining, the researcher may seek whatever socio-economic and bio-physical information is expected to be relevant to answering specific questions of interest. Diverse types of evidence are then effectively integrated by virtue of focus, not on what is prescribed by some general theory or model, but rather on clear, concrete events as possible, situation-specific causes.

The approach and underlying rationale for ACE have been detailed elsewhere (Vayda 2009, 2013; Walters and Vayda 2009, 2020; Vayda and Walters 2011). ACE is consistent with already noted developments in the philosophy of explanation and deals head-on with the challenges facing interdisciplinary research on subject matter that is characterized by heterogeneity, contingency and change (Walters 2017, 2019). ACE has commonalities with the historic-analytic perspective applied in historical ecology (e.g., Balee 1998) and forest and landscape history (e.g., Batterbury and Bebbington, 1999; Agnoletti and Anderson 2000; Burgi et al. 2017), although it is more explicit in its causal-analytic logic and requirements. There are also parallels (albeit important differences too) between ACE and causal-mechanistic approaches like ‘process tracing’ in the social sciences (Meyfroidt 2016; Walters and Vayda 2020). With a focus on human actions as events, insights gained from ACE research might also productively inform agent-based analysis and modeling.

The ‘Forest Transition’: general theory or causal-historical generalization?

My recent research interests have focused on land use and forest change, so developments in this field will be used here to illustrate the challenges of theorizing about human–environment phenomenon and the advantages of pursuing causal-historical explanation. In fact, land change scientists are for the most part not especially enthusiastic about theorizing their subject matter, but instead have emphasized inductive-quantitative methodological approaches in their research (which presents its own set of limitations, see Walters and Vayda 2009). Theories nonetheless play a role in LCS (see Hersperger et al. 2010; Meyfroidt et al. 2018; Caravaggio 2020) and consistent with the theme of this special issue, there have been calls for more of it (e.g., Robbins and Fraser 2003; Munroe et al. 2014; Turner et al. 2020).

The ‘forest transition’ (FT) is an especially notable example of a theoretical construct that has gained prominence in contemporary scholarship about land use and forest change. The basic idea of FT is derived from observations of land change in countries where long-term trends of deforestation have been followed by significant forest recovery. There is debate about the causes and epistemic status of the FT, i.e., does it constitute a general theory of land use change or is it just a set of diverse historical trajectories that have some common features, or is it something in between? (Mather and Needle 1998; Robbins and Fraser 2003; Rudel et al. 2005, 2020; Sloan 2007; Barbier et al. 2017). My view is that FTs are constituted by quite heterogenous events, mechanisms and causal histories, but elements of these histories may be generalizable within and across sites experiencing FTs. As such, FTs should be conceptualized in terms of their distinct and often unique histories from which certain causal-historical generalizations—often but not always construable as causal ‘mechanisms’—may nonetheless be found (Walters and Vayda 2020). By emphasizing their historical character, this view shares similarities with the ‘causal pathways’ or ‘trajectories’ conception of FTs (Rudel et al. 2005; Liu et al. 2017), but it prioritizes understanding of the distinctive character of local and regional causal histories of forest change over demonstrating the generalizability of such pathways per se.

This view seems consistent with the growing body of empirical evidence: the more researchers study FTs, the more varied are the spatial and temporal changes found and more diverse are the causes discovered (Sloan 2007; Redo et al. 2012; Lestrelin et al. 2013; Munroe et al. 2014; Heilmayr et al. 2016; Bhatia and Cumming 2020; Kaczan 2020; Lorenzen et al. 2020).
Thus, early scholarship proposed one general theory or pathway to a FT (Mather and Needle 1998), but scholars later identified two (Rudel et al. 2005), then three (Mather 2007) and then five distinct pathways (Liu et al., 2017 citing Meyfroidt and Lambin 2011). These different pathways claim significant causal relationships between changes in forests and various economic and political developments (e.g., agricultural modernization, trade liberalization, adoption of state conservation and reforestation policies, etc.).

Recent literature (e.g., Hecht and Saatchi 2007; Leblond 2019; Rudel et al. 2020) suggests additional causal pathways could be added to this list, as well as events, such as wildfire and warfare, that confound usual interpretations of FTs (Oliveira et al. 2017; Iriarte-Goni and Ayuda 2018).

It is beyond the scope of this paper to review and interrogate these various interpretations of FTs. However, it is not surprising that as more cases and more in-depth analysis of the FT phenomenon are done, the seemingly straightforward history of FTs has become increasingly nuanced and complicated. The good news is that our understanding of the phenomena of forest reversals or ‘transitions’ is growing as has the catalogue of causes and mechanisms that researchers might draw-upon to help explain FTs elsewhere. But early enthusiasm for a broad, unified theory of forest transitions has clearly waned.

A Caribbean forest transition

My own research on the West Indian island nation of Saint Lucia is instructive regarding the challenges of theorizing about land use and forest change. Specifically, the study was undertaken to explain recent, widespread expansion of forests across the island’s uplands (Walters 2016, 2017, 2019). ACE methodology was employed, which entailed doing detailed measurements of land use and forest changes in two study watersheds followed by in-depth archival and field-based investigations of identify causes of these changes.

Findings revealed the most consequential change in recent decades to Saint Lucia’s rural environment has been widespread reforestation of lands abandoned from farming. This change occurred irrespective of land tenure type but was most commonplace on steeper slopes, further from roads. Such lands have been abandoned since the 1960s, but an especially large wave of abandonment swept the island in the late 1990s because of price declines for exportable bananas related to the erosion of preferential market access to the United Kingdom (UK) due to a series of WTO trade-dispute rulings. The effects of commodity market declines have been reinforced by wider demographic and economic changes. Specifically, many subsistence-focused farms were abandoned in the 1960s/1970s in response to a shift to smaller family sizes and large out-migrations of younger adults to the UK, USA and Canada. More recently, movement of labour from farming to fast-growing construction, tourism and services sectors has sapped agriculture of low-cost labour, accelerating abandonment. A major source of alternative employment has been an island-wide, residential construction boom caused by remittances from abroad and a protracted wave of return migrants, many themselves former farmers. Fast growth of tourism since the early 1990s has also drawn labour out of farming and created economic incentive and political support for protecting forests to sustain ecotourism and freshwater supplies.

At a general level, these findings are consistent with studies of forest transitions elsewhere that have found agricultural downsizing and reforestation to be associated with economic modernization, rural out-migration, and globalization of agricultural commodity markets (Rudel et al. 2005). But careful examination of the diverse causes and causal chains involved reveals evidence for all five of the causal pathways identified in the FT literature, albeit some are more prominent in consequence than others (Walters 2019).

Things get even more complicated as one goes back further in time. Since European colonization, Saint Lucia experienced at least ten distinct bouts of significant agricultural decline followed by significant reforestation (Table 1). Each of these arguably constituted a FT of sorts, although most were later reversed. Each was also unique and the outcome of

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2 Distinct FT ‘pathways’ include (i) economic development pathway; (ii) forest scarcity pathway; (iii) state forest policy pathway; (iv) globalization pathway, and (v) smallholder, tree-based land use intensification pathway (Meyfroidt and Lambin 2011; Liu et al. 2017). An additional, distinct pathway arguably results from conflict-driven outmigration (e.g., Hecht and Saatchi 2007; Leblond 2019).

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different causes, although some generalizations were apparent. For example, earlier agricultural declines (pre-1880s) were mostly caused either by weather-related calamity or political-military conflict, whereas later declines were usually associated with agricultural commodity market challenges. But these are generalizations drawn from very limited information about past events. More detailed investigations would almost certainly complexify each of the causal histories.

**Generalize, but with caution**

One can remain skeptical about theory, yet still draw insightful and potentially useful generalizations (descriptive and explanatory) from causal-historical research. The conundrum is that good causal-historical explanations often do not readily translate into theoretical generalization or firm policy prescription because ACE research embraces the influence of contingent and context-specific causes in explanations. Where explanations are heavily influenced by such causes—and they usually are—it is risky to extrapolate findings to other contexts.

This challenge is not a shortcoming of ACE (although some readers might think it is). Theory and policy typically entail gross simplification but are more likely to succeed where their contents reflect key elements of how the world actually works. Denying the causal influence of contingent and contextual factors where these are important is a recipe for both theoretical and policy failure (Cartwright 2020). In fact, the genius of effective policy making is appreciating how (and why) general policy prescriptions can be crafted or adapted to specific circumstances (Rodrik 2017). There is no ready recipe for doing this. Knowledge of causal histories imbues the thoughtful analyst with humility about what we can know, predict and control, and discourages the kind of intellectual hubris that is all too common amongst advocates of social theory (Hawthorn 1987; Gaddis 2002; Kelly 2016; Gavin 2019).

Two examples of findings from the Saint Lucia research illustrate this. One causal-historical generalization is the relationship found between global trade

| Dates   | Key features of decline                                                                 | Primary causes of decline                                                                 |
|---------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 1600s   | Amerindian gardens abandoned                                                           | Indigenous populations decimated by disease and conflict with Europeans                  |
| 1780    | Widespread damage & abandonment of plantations (cocoa, coffee, cotton, sugar)         | Severe hurricane strike                                                                  |
| 1792–1798 | Exodus of French planters and abandonment of many estates     | French Revolution-inspired slave revolts and the ‘Brigands Wars’                     |
| 1831–1840’s | Widespread downsizing, sale and abandonment of estates | Hurricane strike (1831); post-emancipation labour shortages                           |
| 1880s–1890s | Marginal sugar estates downsize, are abandoned, or sold-off to smallholders | Collapse of sugar prices due to surge in cane and beet sugar production elsewhere      |
| 1930s   | Marginal estates cease production of sugar and many are abandoned; remaining estates reduce sugar production | Depression-driven decline in sugar export prices; labour strife amongst sugar workers |
| 1957–1963 | Collapse of remaining sugar industry                                                   | Weak export prices; labour strife                                                      |
| 1950s-1970s | Widespread decline in subsistence cultivation                                           | Declining fertility plus increased out-migration of young adults to UK, etc            |
| 1968–1970 | Sharp drop in banana production from estates and smallholders                         | Weakened currency raises cost of farm inputs causing declines in quality and production; growing market competition from producers elsewhere |
| 1996–2000 | Collapse of dominant, smallholder banana industry; widespread farm abandonment       | WTO ruling erodes protected UK market for banana exports; farm labour migration to services sector exacerbates decline |
liberalization, local agricultural decline and reforesta-
tion. This was manifest most dramatically in the
collapse of banana farming as a result of WTO rulings
that forced the opening of an otherwise protected
market. Evidence suggests that neighboring islands
have experienced similar changes for similar reasons.
But this causal story gets complicated, first, because
agricultural trade liberalization has had the opposite
effect (i.e., deforestation) in other places (e.g., regions
of Brazil, West Africa and Indonesia). Second, other
causes contributed to farmland downsizing and refor-
estation in Saint Lucia besides trade liberalization,
including reduced family sizes, rural out-migration,
and increased efforts to conserve forests for watershed
protection. These causes converged to re-enforce
trends in farmland abandonment and reforestation
(Walters 2017, 2019).

A second causal-historical generalization is the
relationship found between farmland abandonment,
reforestation and remittance income. One might
expect such remittances to lead to agricultural re-
investment and expansion and, in fact, studies else-
where have shown this. But findings in this study
revealed a different dynamic: remittance income was
mostly spent on home construction and consumer
goods, not to expand farming. In fact, remittances
helped fuel a residential construction boom across the
island which has had the unintended effect of encour-
aging farm downsizing by providing a surge in
alternative employment in the construction industry
for persons who would otherwise practice farming
(Walters 2016).

Other causal-historical generalizations emerged
from the research, but these examples suffice to
illustrate that, where empirical generalizations can be
drawn, they are likely and to varying degrees histori-
ically and geographically context-specific. It is thus
unclear whether or how these changes could be halted
or reversed through deliberate policy intervention, for
example, by reestablishing greater protectionism or
incentivizing agricultural investment. The demo-
graphic and economic character of Saint Lucia is
evolving so fast and is so subject to being changed by
unexpected events (hurricane strikes, BREXIT,
COVID-19 pandemic, etc.) that theories and policy
prescriptions based on even recent experience may
become quickly outdated. Caution should thus always
be exercised.

Conclusion

Theory and other analytic generalizations will con-
tinue to play an important role in research on land use
and landscape change. But opportunities for signifi-
cant theoretical advance in these fields will continue to
be especially challenging by virtue of the heteroge-
nous, contingent and changing character of the subject
matter. In a nutshell, this reflects the historical
character of landscapes and peoples’ ever-changing
relations to them. A causal-history approach (ACE)
enables researchers to address these challenges head-
on, while still maintaining high standards of analytic
rigor. We should indeed pay more attention to the
social dynamics of land use and environmental
change, but we should do so with a greater appreci-
ation of the methodological issues and challenges
involved, not by overburdening our investigations
with social-theoretic concerns.

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