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Introduction

Introducción

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Introduction

Sustainable development is one of the dominant paradigms of the 21st century, providing a framework not only for the conservation of nature, but also for economic development and the long-term protection of livelihoods. In response to the challenges posed by this paradigm, Costa Rica developed its own definition, called *desarrollo sostenible a la tica* (Monge-Hernández, 2015). Thanks to this, Costa Rica has become a global pioneer and role model in environmental protection, climate action and sustainability. In 2019, the Central American country was named a UN Champion of the Earth for its renewable energy goals, and in 2020 it actually generated 99.93% of its electricity from non-fossil sources (Instituto Costarricense de Electricidad, 2020). Costa Rica has not only invested heavily in new technologies such as biogas, solar, wind and hydroelectric power plants, but has also made significant progress in reforestation and the establishment of biodiversity corridors, so much so that in 2021 the country received the Earthshot Prize from the Royal Foundation of the Prince and Princess of Wales for its payment for ecosystem services scheme (The Earthshot Prize, 2021).

In addition to its leadership in environmental protection, the country is also known for its high biodiversity level, estimated at 5% of the world's known species, which led to a *política de biodiversidad* and corresponding agenda under the government of Luis Guillermo Solís in 2015 (Ministerio de Ambiente, Energía y Telecomunicaciones, MINAE, 2015). The two components, environmental protection and biodiversity, are intertwined in the *topos of excepcionalismo verde*, which projects the image of a green, sustainable and paradisiacal Costa Rica through various media (Gutiérrez-Arguedas & Granados-Chaverri 2020, 2). This *topos* is a key component of both external perceptions and the nation's self-image, which becomes particularly tangible when looking at the website esencialcostarica.com, which is managed by state agencies and the government and explicitly promotes a national brand of the same name as *marca país*. The *mensajes claves*, aimed at tourists, digital nomads, entrepreneurs, investors, and students, include references to the country's exceptional biodiversity and sustainability efforts. According to the website, the country adopted sustainability as a development strategy in the 1980s, pushing for



the protection of forests, which ultimately led to an increase in GDP (Esencial Costa Rica, 2024). However, the image of sustainability cultivated here does not match reality, as a look at the highly problematic agricultural sector shows. Along with information and communication technology and medical equipment, agricultural products, produced mostly in monocultures, are among the country's most important economic exports (Harvard's Growth Lab, 2021). However, the prevailing production methods have negative social impacts and cause extensive environmental damage. This is most evident in pineapple production, which serves as a particularly illustrative case study.

In Costa Rica's "Sixth National Report to the Convention on Biological Diversity" (MINAE et al., 2018), various governmental environmental agencies challenge the sustainability narrative promoted by the website in question: The expansion of pineapple cultivation in Costa Rica - subsidized by the state since the 1980s - which has secured the country's status as world leader since 2008, with a market share of 57% in 2021 (Harvard's Growth Lab, 2021), has encroached on and taken over protected forests (Blanco-Obando 2020; Programa Estado de la Nación, 2014). At the same time, transnational corporations practicing intensive agriculture have largely replaced the other two groups of agricultural producers, namely small-scale cattle or crop farmers and national cooperatives producing traditional monocultures such as sugar cane, coffee, and rice (León-Araya, 2022). Accordingly, the country has experienced a remarkable 700% increase in pineapple production over the past 15 years (United Nations Development Programme, UNDP, n.d.). In the Atlantic region alone, pineapple production expanded from 600 to 6,850 ha between 1984 and 2014, while the total national agricultural area decreased by 20% during the same period (Blanco-Obando, 2020; GRUTA, 2017). As this intensification was accompanied by a 340% rise in pesticide use between 1977 and 2006, the pineapple industry has significantly contributed to Costa Rica becoming the world leader in pesticide use per unit of food produced in 2015 (Blanco-Obando, 2020; Morataya-Montenegro & Bautista-Solís, 2020). The herbicides, fungicides, nematicides, insecticides, and chemical fertilizers applied contaminate water and soil, affecting both the health of the local population and the country's biodiversity, to the extent that the populations of certain species have decreased significantly (MINAE et al., 2018). In addition,

pineapple production is associated with precarious working conditions, the illegal and unsafe employment of workers, especially from Nicaragua, and the displacement of diversified subsistence agriculture in favor of expansive monocultures (Maglianesi-Sandoz, 2013). Because subsistence living as practiced by rural communities is distinct from conventional GDP-influenced wealth metrics due to its limited contribution to formal wealth production, communities practicing these inherently sustainable livelihoods have often been subject to dispossession (Isla, 2015, p. 75).

In relation to the political economy of pineapple cultivation and its sustainability, the role of the border deserves particular attention. In the Huetar Norte region, which accounts for 67% of the total area under pineapple cultivation, correlations and determinants are evident. The state-promoted cross-border plantation economy is based on the power imbalance between Costa Rican landowners and their transnational counterparts, on the one hand, and the vulnerability of Nicaraguan migrants, who are exploited as cheap, uninsured labor without rights, on the other (León-Araya & Montoya-Tabash, 2021). The expansion of the pineapple industry in Costa Rica and its demand for labor has drawn large numbers of Nicaraguans, impoverished and oppressed by concurrent crises, across the border. In the process, political and economic conflicts between Costa Rican and Nicaraguan workers have been framed through a nationalist lens, fostering xenophobia and obscuring the real issues of labor exploitation. The ecological consequences and collateral damage discussed, which affect nature, local populations, and migrants alike, challenge two components of the national self-image outlined above. On the one hand, it becomes clear that the expansive pineapple cultivation, which is presented by government circles as a national success strategy, has taken into account the economic disparity with the neighboring country. On the other hand, the relationships outlined raise questions about the compatibility of extractive pineapple cultivation and sustainability, especially since pineapple production is promoted to consumers as ecologically sustainable (Del Monte, 2021; Kifah & Andraka, n.d.). The fact that an agricultural production method that contaminates entire areas and displaces traditional production methods can be labeled as sustainable calls for an examination not only of the country's particular approach to sustainability, but also of the underlying concept of sustainable development.

Sustainable development is one of the dominant paradigms of the 21st century, providing a framework not only for conservation, but also for economic development and the long-term protection of livelihoods. Relevant studies have shown that the strong economic orientation of the dominant sustainability paradigm can explain the paradoxes and contradictions outlined above (Herrera-Rodríguez, 2013, Isla, 2015, León-Araya, 2021, Monge-Hernández, 2015, Ramírez-Cover, 2020). The original definition of sustainability by the Club of Rome was more concerned with unlimited economic growth. In its 1972 report, the Club of Rome formulated seven conclusions highlighting, among others, the global limits of resource availability, global wealth inequalities, and anthropogenic environmental problems (Díaz Balteiro, 2008; Meadows et al., 1972). In the same year, at the Stockholm Conference, the United Nations expressed the need for an environmentally friendly development model (Mariño-Jiménez et al., 2018). Thus, in 1974, the concept of “eco-development” was introduced by Ignacy Sachs. This refers to reconciling increased production in third world countries with respect for their ecosystems, within a dynamic necessary to maintain the habitability of the planet (Mariño-Jiménez et al., 2018; Sachs, 1977). Since post-growth development approaches contradicted the common definition of development as economic growth, in 1979 the UN replaced the term “eco-development” with “sustainable development,” which could be linked to the term “self-sustaining growth” introduced by Rostow (1956) (Mariño-Jiménez et al., 2018). In this context, the Brundtland Report of 1987 established a model based on the definition of sustainable development as economic growth. However, the important role of economic development within the sustainability paradigm was criticized early on (Escobar, 1995; Sachs, 1991; 2000; Schmieder, 2010) and is at the center of current debates on the sustainability concept (Bendell, 2022; Herrera-Rodríguez, 2013; Mariño-Jiménez et al., 2018; Rivera-Hernández, 2017; Santamarina et al., 2015; Wanner, 2015).

Costa Rica has embraced the concept of sustainable development as promoted by the UN since the Rio de Janeiro Summit in 1992, as this approach fits well with its neoliberal economic system, which has its roots in the 1980s (Herrera-Rodríguez, 2013, p. 195). Such an economically driven concept of sustainability promotes the economization and commodification of nature, which is quantified in terms of its resources and integrated into the market economy. In Costa Rica, a corresponding



commodification of nature can be seen, for example, in the (eco)tourism boom that has accompanied the establishment of national parks and nature reserves since the 1990s, selling the Central American country as a green – and now also sustainable – vacation destination (Gutiérrez-Arguedas & Granados-Chaverri 2020, p. 11). At the same time, the economically based concept of sustainability made it possible to reconcile the economically important export monocultures with the country's green (self-)image, as José María Figueres did when he proclaimed the country's special brand of sustainable development: *desarrollo sostenible a la tica* (León-Araya 2021, p. 104; Monge-Hernández 2015, p. 8). The state-sanctioned economization of nature, evident in the tourism sector and also in the state-subsidized pineapple expansion, means that land use must increasingly yield a profit: "land uses [...] must pay for their right to exist" (Herrera-Rodríguez 2013, p. 198-199). The negative consequences of economic or environmental projects can be concealed or trivialized by overemphasizing their economic benefits or potential (León-Araya 2021, p. 112), in other words, by promising sustainable economic growth through the use of technology, these projects downplay the destructive side effects for the Costa Rican population (León-Araya 2021, p. 122). The contradictions highlighted above by the example of pineapple cultivation can thus be understood as sustainability paradoxes: they are based on a model of sustainable development that is designed to promote economic growth and thus allows for the greenwashing of conventional, environmentally damaging agricultural practices, which in turn legitimizes them.

Accordingly, Bendell (2022) criticizes sustainable development as a myth that encourages rather than prevents environmental exploitation and damage. Consequently, he proposes other concepts, such as disaster risk management, as an alternative framework for international cooperation. Latin American sustainability discourses in particular offer approaches in this regard, as they often distinguish between the terms *sostenibilidad* and *sustentabilidad*. The latter term is embedded in a knowledge of postcolonial entanglements in the sense of entangled histories and has established itself as a critical concept that can be linked to a strong understanding of environmental sustainability, although it is not recognized as such in the Real Diccionario de la Academia Española (Aguilar-Aguilar et al., 2021; Cantú-Martínez, 2012; RAE, 2023; Rivera-Hernández et al., 2017). Accordingly, León-Araya



(2022) analyzes such entanglements of global economic cycles around Costa Rican pineapple production, emphasizing that not only transnational corporations, but also their entanglement with the Costa Rican national economy played a crucial role in pineapple expansion.

Outline of this issue

Against this background, this issue of Arjé focuses on the contradictions in the dominant sustainability paradigm, using pineapple production in Costa Rica as an example. It seeks to respond to the implications of a weak concept of sostenibilidad by bringing together contributions that address the sustainability paradoxes from an interdisciplinary perspective, but also explore new environmental practices that, like the IPBES framework (Díaz et al., 2015), incorporate local knowledge and other epistemologies. The aim is to question the economic foundations of sustainability thinking and to outline alternative approaches, i.e. the contributions not only strive to uncover contradictions and aporias, but also try to formulate future perspectives and propose solutions.

The authors are members of the Universidad Técnica Nacional and the University of Osnabrück and are collaborating within the framework of the DAAD-funded project “Transformative Research and Capacity Building in the Education Sector to Protect Livelihoods and Biodiversity in Costa Rica”. As the complex and all-encompassing interrelationships that dominate the sustainability paradigm require a holistic understanding, the articles in this issue will take a multidisciplinary approach that crosses sectoral boundaries, combining different perspectives from the social, environmental, political, cultural and literary sciences on how national pineapple production contradicts the country’s sustainable reputation. In this way, the special issue aims to contribute to a broader and more critical understanding of sustainability, challenging its strong economic orientation as “environmentalism for profit” (León-Araya 2021, p. 104).

The first article focuses on the use of pesticides and heavy metals in pineapple production and their harmful effects on the environment and health, examining the underlying narratives and discourses and presenting new perspectives on



regeneration. In their article “[Agrochemicals in Costa Rica's pineapple industry: A review of environmental and human health impacts](#)” Philipp Gorris and Maynor Vargas Vargas offer a systematic review of articles and reports from academic databases, scientific journals, government reports, and reputable international organizations to address the environmental and human health impacts of the use of agrochemicals in the pineapple production process.

In “[Narratives from the Pineapple Republic. On national self-understanding and sustainability paradoxes in Costa Rica as detected in Adrián Jiménez Brais' play PIÑA](#)”, Susanne Schlünder takes up the issue of contamination. In her literary study, she analyzes how the young Costa Rican author's dystopian play addresses and deconstructs underlying narratives of national identity and political discourses that promote pineapple extractivism.

Subsequently, in “[Insights into community life from the 'Capital of Pineapple'](#)”, Esteban Durán Delgado presents a qualitative analysis of the social and cultural dimensions of pineapple production in the Costa Rican border district of Pital. Utilizing interviews with local key informants and low-income mothers, the study examines the transformations to community life driven by this dominant agrarian model.

This is followed by “[Commons vs. Commerce – managing water resources between pineapple production and nature conservation](#)” by Dennis Wilke, Andrés Araya Araya and María Fernanda Arias Araya, who investigate the impact of expanding pineapple production on community-based water organizations (ASADAs), exemplified by a case study of water contamination in the northern Costa Rican canton of Río Cuarto. The article analyzes consequences for ASADAs and the process of problem resolution through eight semi-structured stakeholder interviews, ultimately showing potential pathways towards improved water management and advocating for a more balanced development model that prioritizes environmental conservation and local interests.

The following paper, “[New approaches to govern pineapple supply chains from Costa Rica: Towards more just and sustainable production and trade?](#)” by Almut Schilling-Vacaflor and Michel Ortlund analyzes new and innovative approaches to better govern the pineapple supply chain, focusing on the impact of new

sustainability certifications, European Human Rights and Environmental Due Diligence (HREDD) laws, and solidarity-oriented circular bioeconomy approaches.

Next, in their article “[Comprehensive Valorization of Pineapple Cultivation Residues for High-Value Products: A Global Perspective Review](#)”, Maynor Alberto Vargas Vargas and Arlette Jiménez Silva present a comprehensive review of sustainable technologies for transforming pineapple cultivation by-products – including peels, crowns, and cores – into valuable resources. The article explores potential applications across diverse sectors like renewable energy, agriculture, bioplastics, and nutraceuticals, drawing on a global perspective to highlight the economic and environmental benefits of a circular economy approach to pineapple waste.

Finally, the article “[Pineapple production and visions of regeneration– contrasting Costa Rican \(agri\)cultural paradigms](#)”, Luana Schwarz, Carolin Janssen and Johannes Halbe, compares the visions of a diverse group of Costa Ricans interviewed on sustainable food systems and regenerative development with the dominant paradigm of desarrollo sostenible a la tica and asks whether there is room for (re) conciliation and bridging of perspectives, or whether the discrepancies are too great and sustainable development in Costa Rica needs to be fundamentally rethought.

In conclusion, the contradictions highlighted by the example of pineapple cultivation in Costa Rica underscore the urgent need to question the currently dominant sustainability paradigm and to explore alternative approaches in order to enable more ecologically and socially just development.

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