A Radical Journal of Geography
ANTIPODE

Depleted by Debt: "Green" Microfinance, Over-Indebtedness, and Social Reproduction in Climate-Vulnerable Cambodia

Vincent Guermond

Department of Geography, Royal Holloway, University of London, Egham, UK, vincent.guermond@rhul.ac.uk

Dalia Iskander

UCL Anthropology, University College London, London, UK

Sébastien Michiels

Centre national de la recherche scientifique (CNRS) / Centre de recherche en économie et statistique (CREST), ENSAE Paris, L'Institut Polytechnique de Paris, Paris, France

Katherine Brickell

Department of Geography, King's College London, London, UK

Gráinne Fay

Senior Research Executive, Accent MR, London, UK

Long Ly Vouch

Independent Researcher, Phnom Penh, Cambodia

Nithya Natarajan

Department of International Development, King's College London, London, UK

Laurie Parsons

Department of Geography, Royal Holloway, University of London, Egham, UK

Fiorella Picchioni

Natural Resources Institute (NRI), University of Greenwich, Chatham, UK

W. Nathan Green

Department of Geography, National University of Singapore, Singapore

Antipode Vol. 0 No. 0 2023 ISSN 0066-4812, pp. 1–23 doi: 10.1111/anti.12969

Abstract: The operations of microfinance are exalted in mainstream development thinking as a key means of supporting smallholder farmers facing growing crises of agricultural productivity in the context of daily, ongoing, and often slow-onset climate disasters. Microfinance products and services are claimed to enhance coping and adaptative capacity by facilitating both risk recovery and reduction. Challenging the status quo, this paper brings together original and mixed-method data collected between 2020 and 2022 in Cambodia to critically examine the "green finance" agenda by highlighting the ways in which microfinance contributes to reproducing and exacerbating climate precarity and harm for many. We evidence how credit-taking can lead to more dangerous and individualised efforts to cope with, and adapt to, existing conditions at home, often at the cost of emotional and bodily depletion. By doing so, we contribute to answering calls for connecting literatures and thinking on social reproduction, depletion, and climate change adaptation.

Keywords: green microfinance, depletion, social reproduction, climate change adaptation, Cambodia

Introduction

The idea that microfinance can be used as an instrument of adaptation to climate and environmental change has come to the fore in development policy circles in the last decade. In an abridged version of a report commissioned by the Grameen Foundation and Oxfam US, economist Asif Dowla (2017:78) argues that "within the populations that will be most affected by global warming, the plight of many individuals is linked to the ability of microfinance institutions to adapt to the consequences of climate change". A study by the World Bank-housed Consultative Group to Assist the Poor (CGAP) shows how international funders who had committed US$56 billion for financial inclusion in 2020 considered green/climate finance to be one of the main priorities for financial inclusion in the next five years (Tolzmann 2022).[1] At the heart of this new discourse lies the promise that already-existing and newly-adapted financial products and services including credit, insurance, remittances, and savings can help the poor reduce their vulnerability to, and better recover from, climate-related shocks as well as slow-onset disasters. Dowla (2017:78) goes so far as to argue that climate change "opens up opportunities for the microfinance institutions and their clients".

In recent years, a set of new and apparently improved products, programmes, and strategies have been developed that specifically enable microfinance institutions to further facilitate adaptation in two key ways: "by (1) improving ex-post [after the event] risk recovery by enhancing coping capacity; and (2) improving ex-ante [before the event] risk reduction by enhancing adaptive capacity" (Fenton et al. 2017:193).[2] However, for financial inclusion proponents, many of the existing actions of microfinance institutions do already "automatically reduce vulnerability to climate risk" even when active steps are not taken (Agrawala and Carraro 2010:9). They suggest that people and communities who have access to existing microfinance are better placed to diversify their livelihoods, spread risk, and build assets (Rippey 2009; Scheyvens 2015). Microfinance is considered well-

placed to fill what is commonly called the "adaptation deficit"—that is, the "shortage of adaptive capacity that a household has because of its lack of capital in its various forms" (Scheyvens 2015:vii). Microfinance, the argument goes, constitutes a unique conduit to channel climate finance resources at the sub-national level (Agrawala and Carraro 2010; CIF 2018).

These new developments constitute a nascent and less-addressed part of the broader green finance agenda. Where the commodification of carbon tends to dominate critical literature on green finance (see, for example, Bracking 2018; Bridge et al. 2020; Buller 2022), the redeployment of microfinance as a tool of climate adaptation speaks to a broadening of green finance towards addressing the impacts of climate change by incorporating affected people into global financial circuits. A critical body of literature has demonstrated how financial products and services such as micro-insurance and micro-credit promote a type of climate adaptation in climate-precarious agrarian settings infused with neoliberal logics, resulting in individualised, decentralised, and incremental solutions, geared towards the further integration of populations into processes of capital accumulation (Felli 2021; Johnson 2013). By being urged to become climate adaptable via microfinance products in the face of climate-related shocks and disasters, structural climate vulnerabilities are not addressed and, instead, borrowers' capacity to navigate and survive ordinary climate crises is recast as profitable investment opportunities (Joseph 2013; Sealey-Huggins 2017). Microfinance thus contributes to the further extension of the market and can even lead to increased and/or new risks and maladaptive outcomes via, among other things, over-indebtedness and exposure to market fluctuations (Fenton et al. 2017; Green 2022a; Jordan 2020; Müller et al. 2017; Taylor 2015).

Through examining original data from rural Cambodia, we caution against microfinance for climate adaptation becoming *modus operandi*. The Southeast Asian country provides an important evidence base for this. Foreign direct investment has flooded into Cambodia's microfinance industry for nearly three decades, driven as much by processes of financialisation and neoliberal economic policy, as by development priorities. In its early stage of commercialisation in the late 1990s, the industry received hundreds of millions of dollars in concessional loans, grants, and equity investments from large development finance institutions, including the International Finance Corporation, French Development Agency, KfW Development Bank, and Asian Development Bank. As these large development finance institutions entered the market, they provided the confidence and co-financing to attract private investors. As such, the industry became a major destination for private funds managed by microfinance investment vehicles (Bevacqua 2017). By 2016, Cambodia received more than 10% of all global microfinance investment vehicle investments, the most in the world (Symbiotics 2017).

Against this backdrop—and with rice farming becoming more expensive, more unpredictable, and increasingly vulnerable to floods, droughts, and rising temperatures (Chhinh and Millington 2015; Lawreniuk and Parsons 2020; Nguyen and Sean 2021; Sok et al. 2021)—microfinance loans are being taken out in ever-greater numbers by Cambodian farmers to: finance agricultural production;

diversify their livelihoods; repay other debts; migrate nationally and internationally; and finance social reproduction (e.g. healthcare, food, and home improvements) (Bylander 2014; Green 2022b; Green and Estes 2022; Natarajan et al. 2019, 2021; Seng 2018). The bulk of research revealing the impacts of this financialised, neoliberal industry in Cambodia has focused on the issue of household over-indebtedness. Following the 2008 financial crisis, when many households were hit hard by rising debts and a loss of income, the industry became increasingly concerned about over-indebtedness as many borrowers began to default on their loans. Multiple reports (Bliss 2022; Liv 2013; MFC and Good Return 2017) have highlighted the widespread problem of over-indebtedness, citing figures of between 22% and 50% of households either already or about to become so.[3] While climate adaptation-tailored microfinance products are only slowly emerging in Cambodia, this is likely to change with speed given their promotion in the international development arena and Cambodia's climate vulnerability. It is therefore of timely importance to take stock of farmers' experiences of dealing with both unpredictable and erratic weather patterns and microfinance borrowing.[4]

To do this, we pay attention not only to loans that are taken soon after a climate-related shock to cope, but also to the ways in which farmers deal with climate events and agriculture loss while being indebted. While providing some assistance in the short term, this paper demonstrates the growing problem of over-indebtedness and the harmful set of coping strategies which are used to repay loans on time. Rather than being the end of the (climate) shock they are intended to respond to, microfinance loans defer suffering and are often the catalyst for other often harmful coping strategies to ensure repayment, pushing households to borrow and work more, sacrifice food quality and quantity, erode and sell their assets, including land, and even quit farming.

The burden of these over-indebted livelihoods is borne by the bodies of borrowers, who face physical and mental depletion as the price of this financialised coping mechanism. Building from conceptual thinking on depletion through social reproduction (Rai et al. 2014) and calls for connecting depletion of both the environment and through social reproduction (Rai and Goldblatt 2020), this paper calls into question microfinance as a harm-free tool of climate adaptation. The literature review that follows brings into dialogue these diverse sets of literature—on climate adaptation and depletion through social reproduction—for the first time. We then turn to the research methods underpinning the data presented later in the paper. Further information is then provided about the rise of microfinance in Cambodia and the inescapability of debt among rice farmers in climate-vulnerable rural settings. We subsequently show through the empirical sections that in the face of overwhelming debts to repay in an uncertain climate, many farmers have little choice but to adopt coping strategies which deplete their health and wellbeing. We contend that such sacrifices ultimately erode borrowers' already-limited resources and undermine their capacity to adapt to a changing climate in the longer term. The conclusion provides final reflections on microfinance as a controversial instrument of climate adaptation.

Depletion through Social Reproduction

Financial inclusion critiques are part of a larger body of literature that situates the emergence and consolidation of microfinance in the context of a crisis of social reproduction in the global South since the 1970s (Federici 2014; Weber 2006). The retrenchment and dismantling of welfare programmes, the privatisation of utilities, and the liberalisation of the financial sector among other things rendered the use of credit, and microcredit, necessary to pay for individuals' and households' social reproduction (Brickell et al. 2020; Green and Estes 2019; Guermond et al. 2022; Roberts 2013; Soederberg 2014). In this article, we advance the argument that this privatisation of social reproduction and climate adaptation via credit-taking leads to necessary coping strategies and tactics that are physically and emotionally depleting. Here, depletion is understood as being engendered by the physical and emotional nature of work and sacrifices that household members undertake in bearing and repaying debt (Green and Estes 2019, 2022; Res 2021). We take our point of departure from Rai et al. (2011, 2014) who consider the effects of devaluing social reproduction in the market economy. In this context, the term "depletion" refers to the leaching of these unrecognised resources necessary to perform social reproduction, at rates that outpace "replenishment". Without a focus on Depletion through Social Reproduction (DSR), development policies risk concealing their embodied costs, effectively allowing social reproduction to subsidise both the market—by suppressing wages—and the state—by legitimising limited public expenditure on welfare. As a concept, DSR thereby "studies the structural aspects of social reproduction that undermine the sustainability of everyday life in a given social context" (Rai et al. 2014:89). DSR "provides a new tool" to capture the effect of this neglect, by capturing the "harm" inflicted on those who perform social reproduction (Rai et al. 2014:100). In doing so, it uncovers the extent of this harm, often (but not always) disproportionately experienced by women, and disguised in the "everyday social economy of individuals, households and communities" (ibid.).

We pursue DSR first by exploring coping strategies amongst over-indebted farming households which are having an adverse effect on their physical and emotional health. These strategies are conceptualised by Rai et al. (2014:91) as constituting the basis for understanding DSR, whereby such harm represents "a measurable deterioration in the health and wellbeing of individuals and the sustainability of households and communities". We extend the concept of DSR to think about the growing reliance on debt and in the servicing of this debt, the sacrifice of food quality and quantity, and the erosion and selling of assets (such as land). We find relatedly that stress and anxiety associated with the labours of caring for debts (Federici 2014; Roy 2010) and the doing of "life's work" (Mitchell et al. 2003:415) are leading to emotional depletion amongst farming households particularly. As we point out in several points in the paper, given that social reproductive labour tends to burden women more than men, the everyday "survival work" of money management in Cambodia tends to be a feminised undertaking (Brickell 2020; Natarajan and Brickell 2022).

Second, we look at how DSR is articulated with climate change. The paper asks how debt-taking, which has recently emerged as a touted tool of climate

adaptation, serves to deepen the impacts of climate-related events such as floods and droughts on people's livelihoods. Again, we achieve this through studying the everyday. Bee et al. (2015) adopt a feminist lens to argue that climate change governance, which tends towards techno-managerial, individualised solutions, is often disassociated from how different subjects experience the everyday impacts of climate change. They highlight the everyday as a locus of climate impact and suggest that "cracking open the neoliberal logic of climate change … requires careful consideration of how power works through everyday spaces and practices" (Bee et al. 2015:343). In taking inspiration from their argument, we consider how one such techno-managerial policy—microfinance—fares as a means of enabling climate adaptation for farming households. Focusing on participants' quotidian experiences, we assess DSR through microfinance and debt-taking linked to climate and environmental shocks and events. Here, wider research on smallholder agriculture in Cambodia speaks to the rising use of microfinance institutions (MFI) in such contexts (Green et al. 2023). By questioning how microfinance debt-taking is linked to the intensification and commodification of agricultural production, we examine how climate and environmental risks are being increasingly individualised through financial instruments (Bracking 2018).

Methods

This article draws from field research carried out between October 2020 and February 2022 in three villages in the provinces of Battambang, Prey Veng, and Kampong Cham in Cambodia, as well as in the capital, Phnom Penh. It is part of a broader research project entitled "Depleted by Debt? Focusing a Gendered Lens on Climate Resilience, Credit, and Nutrition in Translocal Cambodia and South India" (https://www.debt-climate-health.org), which examines the relationship between climate change, debt, health, and nutrition in Cambodia and India. Specifically, the project probes at the issue of how to ensure that "climate resilience" through credit provisioning does not come at the cost of borrowers' emotional and bodily depletion in the context of daily and often slow-onset climate disasters. In the case of two of the participant communities, the research team possesses a history of collaboration, helping to smooth the introduction of the research and build on existing trust and understanding. In the case of the third, this relationship needed to be built afresh, necessitating preliminary visits and explanation of research goals.

The project's methodology in Cambodia is anchored in social science methods and environmental science. First, 621 quantitative household surveys—complemented by 1,161 individual questionnaires—were carried out in the three provinces in three villages with differentiated vulnerabilities to droughts and floods, and distinctive reliance upon rice-based agriculture. Surveys examined demography, household occupations, migratory histories, household assets, and liabilities, saving, borrowing, and lending practices, as well as experiences of and capacity to adapt to the impacts of climate change. Second, an environmental profiling of all three villages was conducted, including primary and secondary GIS data collection, secondary environmental, climate, and agricultural data collection, semi-

structured interviews with villagers and local stakeholders, as well as landscape observation and photography. Third, semi-structured interviews were carried out in the three villages with 30 households (60 participants overall). For each household, two members were interviewed, often but not always comprised of the two spouses. A stratified sample of households was first drawn from the quantitative household survey, representing different levels of indebtedness. Four households in each of the five indebtedness strata were then purposively sampled based on survey data on land ownership, sources of debt, as well as migration trajectories. Interviews with participants explored the links between debt, nutrition, physical and emotional health, and climate and environmental change and disasters, with the aim of giving voice to experiential and subjective interpretations of this debt-nutrition-health-climate change nexus. Fourth, qualitative interviews were complemented by the nutrition-physical activity quantitative analysis. Each pair was allocated an accelerometer device for a period of six consecutive days, during which a team of enumerators administered daily time-use and food-intake surveys (Zanello et al. 2017). Fifth and finally, 39 and 22 interviews were carried out with local and national stakeholders respectively, in the three villages and in Phnom Penh. Stakeholders included representatives of local authorities, microfinance institutions, informal credit providers, health professionals as well as government ministries, central and regional development banks, and international financial and development institutions. Interviews with national stakeholders discussed the links between microfinance and climate change adaptation, the impacts of COVID-19 on the microfinance sector, and issues of over-indebtedness and land sales, while interviews with local stakeholders explored broad socio-economic changes in the villages, the impacts of climate and environmental change on the villagers, and the various challenges that villagers face regarding debt repayment.

Inevitably, the research process brought challenges, not least COVID-19, which interrupted research on multiple occasions by forcing stoppage of data collection. However, the Cambodian context did far better than many peers in this regard, meaning that research could intermittently continue for this project during the pandemic. During this time, we naturally were very aware to take health and safety precautions. The challenge of capturing all villagers in the survey itself was also notable. The need to construct survey logistics according to the demands of complex working schedules across agricultural seasons proved difficult, necessitating a high level of knowledge around the local economy, and trust building to understand who is absent and why.

To facilitate this trust, all interviews except those with national stakeholders were conducted in Khmer by some of the researchers as well as a local Cambodian research assistant and a team of local enumerators. Interviews were later transcribed into English. Given the sensitive and political nature of microfinance indebtedness in Cambodia, all participants were provided informed consent, and participants were told that interviews could be ceased at any time if they felt uncomfortable. The names of all villagers have been changed to protect their identities, and no locations are specifically disclosed (we refer to Villages A, B, and C). As for local and national stakeholders who did not wish to be identified, names and organisations have also been anonymised.

Rice Farming, Climate Change, and Microfinance in Rural Cambodia

Rice farming has been and continues to be a crucial livelihood activity for many households in rural Cambodia. While a large part of the population has diversified their livelihoods and generally become less dependent on farming, fishing, or forestry activities (Marschke 2017), many households still rely upon rice farming to eat and/or generate income. In the three study villages upon which this article focuses, rice-farming households represent between a quarter and a half of all surveyed households.[5] As a middle-income, traditionally agrarian nation highly dependent on rice monoculture (NIS and MAFF 2015), Cambodia has long been recognised as acutely vulnerable to the impacts of climate change. The overall temperature of the region has increased by 0.9°C since 1960 (World Bank 2022), while livelihoods exposure to heat, floods, and droughts are rising rapidly. Cambodia now experiences 46 more very hot days—defined as days where the maximum temperature exceeds 40°C or is more than 5°C above the monthly average—every year compared to the 1960 baseline (World Bank 2022). Especially problematic for farmers, rainfall patterns have shifted substantially over the last hundred years, with the traditional bi-modal pattern of wet season rainfall (heavy in May and September, less so in between) having all but disappeared by the 1990s and been replaced by a less predictable mono-modal pattern (Diepart 2015). While fluctuations to the Southeast Asian Monsoon—a subsystem of the East Asian Monsoon—create high levels of variability in climatic conditions, the incidences of flood and drought have steadily increased. The early 2000s exhibited a pattern of "alternating floods and droughts" for five years consecutively. Not only this, but the 2016 drought was declared by the Cambodia Prime Minister to be the "worst natural disaster to hit Cambodia in 100 years" (Save the Children 2016:3).

At the provincial level, major floods in Battambang impacted 20% and 45% of the total cultivating areas in 2011 and 2013 respectively. Damage to rice cultivation has occurred more frequently since 2014, with between 20% and 30% of the total cultivated areas being impacted in 2015, 2016, and 2019 due to droughts and floods. In Kampong Cham and Prey Veng, while major floods in 2011 and 2014 impacted between 10% and 20% of the overall cultivated areas, recent severe and moderate droughts occurred in 2018 and 2019. Importantly, the environmental profiling carried out primarily between October 2020 and December 2021 shows that, over the last decade, patterns of rice damage at the provincial level have followed patterns of floods and droughts in the three study villages. For instance, records show that droughts have been frequent in recent years in Village C. Farmers also complained about rice being damaged by floods due to uneven seasonal flooding and poorly designed infrastructure development. Interviews with farmers from Village A in January 2021 indicated that rice cultivation had been damaged by a combination of very unusual heavy rains during the harvest in November 2020 and ineffective drainage systems.

As a result of a wider "conjuncture" of agrarian change (Li 2014), with climate change an important driver, Cambodian farmers have risen to these latest challenges and shifted their practices substantially. The exodus of younger rural

inhabitants to the "modern" sector, catalysed by the garment sector's skyrocketing expansion from a few thousand workers in the early 1990s to three-quarters of a million by 2018 (ILO 2018), has drastically reduced the rural labour supply. At the same time, farmers have become increasingly dependent on capitalist markets for producing and consuming commodities, including rice (Green 2022c). This combination of reduced rural labour supply and growing dependence on capitalist markets with the growing unpredictability of rainfall has contributed to the almost nationwide transition from labour-intensive transplanting methods (requiring 30 person-days per hectare), to more capital-intensive methods of farming (requiring only two person-days per hectare) (Liese et al. 2014). The latter needs substantial investment in seeds, fertiliser, pesticide, machine rental, and irrigation (Liese et al. 2014). This latest adaptation to climatic and political-economic conditions is a work around of sorts to the problems facing Cambodian farmers. Yet the money to farm in this way has to be found from somewhere. In recent years, that somewhere has increasingly been commercialised microfinance.

Hailed as a "tremendous success" (World Bank 2009:1) by the World Bank as long ago as 2009, microfinance provision as a tool for rural development and risk reduction has been part of the Cambodian government's strategic adaptation planning since 2013 (RGC 2013), contributing to exponential growth in the sector. In a country that had practically no banking services in the early 1990s, the industry now provides micro and small loans to 3.06 million borrowers out of the country's 16.9 million people (CMA-NIX 2022), the majority of whom are in rural areas. In the past two decades, the industry's total micro- and small-loan portfolio grew from $98 million in 2004 to more than $16.4 billion today, equivalent to approximately 60% of the country's gross domestic product (CMA-NIX 2022; Green and Bylander 2021). In 2021, the average micro- or small-loan size was $4,280, greater than 95% of all incomes in the country (Equitable Cambodia and LICADHO 2021).[6] Alongside the overall percentage of households borrowing from the microfinance industry, Cambodia has been ranked as the most microfinance saturated country in the world, an outlier even among other countries with large microfinance industries (MIMOSA 2020).

Our study corroborates this as data suggest farming households are taking on increasing amounts of debt. In fact, the household survey indicates that farming households in all three study villages are significantly more indebted than non-farming households. 61% and 35% of participants in farming-only households and in households that do farming alongside other types of economic activities (respectively) reported a major increase in their use of credit for agriculture compared to 10 years ago. The household indebtedness ratio—or total outstanding debt to total disposable income ratio—for farming-only households was 181% compared to 139% and 118% for farming households relying on other economic activities and non-farming households respectively (see Table 1).[7]

Our data shows that in addition to taking loans to invest in agriculture, diversify their livelihoods, repay other debts, migrate, and finance social reproduction needs, many farmers were taking on debt to cope with the aftermath of a climate-related shock, including repaying other debts as well as covering social reproduction needs. Across the three villages, 12.2% of surveyed participants said

Table 1: Average outstanding debt per occupation and household indebtedness ratio in the three study villages (indebted households only)

	Average total debt (formal and informal)—HH level ($)	Household indebtedness ratio (%)
Non-farm indebted households (n = 218)	2,399	118
Indebted households who farm alongside other economic activities (n = 94)	3,355	139
Farming-only households (n = 93)	2,883	181

the last time they borrowed from a microfinance institution was partly to deal with climate-related agriculture loss. For instance, Kunthea's household income mostly comes from her and her husband farming rice three times a year. Following a bad harvest caused by pests and a heatwave, Kunthea and her husband Bunroeun, residents of Village A, decided to take out a microfinance loan partly to repay other debts, notably their supplier who provided them with farming equipment and fertilisers: "I lost a lot of my production. That is why I borrowed from the bank" (Kunthea, Village A, qualitative interview).

Other farmers attempted to manage their debt payment liabilities in other ways. Da, another farmer in Village A, said that one of the reasons her household started to cultivate rice three times a year was because of the many debts they had to repay. The problem, Da explained, is that because they "continuously farm", they don't have time to dry the ground. She said that this makes the rice more prone to disease (*plong*) and can lead to production loss. Here, microfinance repayment pressures contribute to push farmers like Da to work the land more, making farming an even riskier endeavour: "Because we have a lot of debt to cover, we must try to do more".

Depletion through Debt Repayment

As described above, following a poor or failed harvest due to increasingly erratic weather patterns, many farmers we spoke to said they either had to take out new loans or struggled to repay existing ones. Two or three bad harvests in a row could lead to even more dire consequences. With high levels of debt taken on to bolster household production and social reproduction, research participants typically did not achieve *repaying* debt in full. Rather, most were in a state of continually paying debt with no realistic debt-free time in the future that they were working towards (Adkins 2017). In what follows, we show how instead of helping indebted borrowers to cope with and recover from climate-related shocks such as droughts and floods, microfinance loans were usually the catalyst for participants having to adopt harmful coping strategies to service debt. Specifically, facing both frequent bad/failed harvests and debt-repayment problems, individuals and households felt they had little choice but to work and borrow more, sacrifice food quality and quantity, erode and sell assets, and consider quitting farming. We

show how each sacrifice came with a set of unduly high and ongoing costs, borne by the bodies of borrowers, who suffered physical and mental depletion as a result of servicing so much debt—the epitome of over-indebtedness (Schicks 2013).

Working and Borrowing More

> The main challenge [farmers] are facing, I think, is debt. Most take loans for farming [but] the problem is rice yields are not stable from year to year. Farmers cannot settle their debts. Farmers pay back the interest monthly and pay the principal back only once they harvest. [When they cannot settle the debt], they sometimes get a loan from other institutions to pay back the current one. (MFI Branch Manager, Village C)

As the MFI Branch Manager above attests, when struggling to repay their loans, particularly in the face of a bad or failed harvest, many farmers reported having "no choice" but to take out further loans to service existing debts. As farmer Vibol put it, they just "don't know what else to do". In fact, across the three villages, 12.5% and 9.1% of surveyed indebted participants said the last time they borrowed from a microfinance institution and an informal moneylender respectively was partly to repay other loans (see also Bylander 2015; Green et al. 2023; Res 2021).

As noted above, Kunthea and her husband (Village A) decided to take a loan following a climate-related shock. They explained how the extra income that was required to repay their debt every month meant that their daughter in Phnom Penh had to work longer shifts in a garment factory:

> It is difficult for my daughter; she does not have enough time to rest as she needs to work overtime at the factory until 10pm. It is challenging for her too. (Bunroeun, Village A, qualitative interview)

Like Kunthea and Bunroeun, several participants said that members of their households had to take up additional—often physically demanding—jobs to be able to repay their debts while others had to continue working against their doctors' recommendations due to debts they owed microfinance institutions.

Still unable to keep up with payments, Kunthea and Bunroen ended up borrowing from local moneylenders to be able to repay their microfinance loan. This is despite some informal moneylenders—especially *luy roab* or daily lenders—charging the highest interest rates (on average five times higher than microfinance institutions in all three study villages), making them the source of borrowing participants most wanted to avoid. When converted to an annual percentage rate, the true cost of borrowing from private money lenders could amount to up to 200%. Although the share of debt that rural Cambodians owe money lenders declined from 11.8% in 2014 to 4.4% in 2019/20 (NIS 2020), this is likely attributed to the simultaneous dramatic growth of microfinance loans. Senior executives of some of the microfinance institutions interviewed called for the regulation or even ban of such moneylenders, with one MFI CEO suggesting that their organisation was the real "victims" of such loan sharks. However, our data shows that

rather than being mutually exclusive, private moneylenders and microfinance institutions reinforced each other as people often relied on both sources of borrowing simultaneously to service debt.

Rather than contributing to the eradication of such moneylenders, microfinance institutions were therefore the reason why some farmers borrowed from them (see also Green et al. 2023; Ovesen and Trankell 2014). As a senior executive of a major bank who wished to remain anonymous reported, "horror stories", whereby loan officers pressurised borrowers to repay by turning to moneylenders, were common. "The minute a borrower goes to a money lender, that's it, there's no hope", the senior executive further remarked.

For many, the burden of managing these debts depleted their physical and mental wellbeing, with many participants reporting high levels of stress and anxiety as well as sleeping problems as a result. While the burden of juggling debts took its toll on both men and women (see also Guérin et al. 2013), many women reported taking on the extra burden and depleting effects of managing daily finances. For example, the stress of managing multiple loans was having significant effects on Kunthea's health and wellbeing:

> Every time when the loan fee date is coming, I am so worried. I cannot fall asleep; I cannot eat anything … When I am awake, I think too much about every other thing, I don't have money to pay the loan fee, and my daughter cannot earn money either. I am afraid that my children will get sick. Look at me, I am also sick, and I have to be responsible for the loan. (Kunthea, Village A, qualitative interview)

While farming has become more expensive and now necessitates significant (micro)credit-taking, failed or bad harvests due to increasingly erratic weather patterns often push farmers into even more debts. Further loans, both formal and informal, are taken out to pay back already-existing loans. As we further underline below, rather than contributing to building adaptive capacity among borrowers, such loans deplete borrowers' already-limited resources and contribute to emotional and physical depletion for many.

Sacrificing Food

For the past three years, Seda and her household have experienced bad harvests. Floods during the first year, followed by an unusually-long dry period the year after, and a rice-related disease during the third year, all had a very negative impact on their yield and income. "This year, we received no profit. We barely broke even because the yield was so bad. Our usual yield is 30 bags of rice but this year, it was only 15 bags", Seda said. While unable to produce their usual harvest, Seda and her husband Pisey still had to repay the debt they acquired to farm. This significantly affected the quality of food they were able to afford:

> My food conditions were so poor. I needed to minimise my expenses as much as I could to save money to pay the loan … We ate crabs, snails, and other basic and non-nutritional foods that we had. We were used to eating good and healthy foods. Instead, we had to eat those tasteless and non-nutritional foods. (Seda, Village C, qualitative interview)

Our data suggest that the biggest threat to achieving food security among our participants was reduced availability and access to grown, foraged, and bought foods. The Household Food Insecurity Access Scale (HFIAS)[8]—which is a measure of the degree of food insecurity (access) in the household in the past four weeks—indicates that among the 1,161 respondents of the household survey, the mean HFIAS score was 4.6, indicating that households were suffering from mild food insecurity. While only 30.6% of households could be considered food secure, the rest were categorised as mildly (39.2%), moderately (26.9%), and severely food insecure (3.2%). Importantly, and as Table 2 shows, indebted households (<US $4,200) experienced greater food insecurity than non-indebted households across

Table 2: Household Food Insecurity Access Scale, by debt level

	Debt quintiles at HH level						
Food insecurity items (% yes)	No debt n = 216	Debt $1–450 n = 86	Debt $451–1,000 n = 94	Debt $1001–2,250 n = 75	Debt $2251–4,200 n = 74	Debt $4,201+ n = 76	All n = 621
In the past four weeks, did you worry that your household would not have enough food?	75.0	84.9	81.9	93.3	79.7	67.1	79.2
In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	60.2	77.9	77.7	82.7	71.6	44.7	67.5
Did you or any household member have to eat a limited variety of foods due to a lack of resources?	46.3	64.0	60.6	69.3	55.4	30.3	52.8
Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	37.5	55.8	52.1	52.0	48.7	21.1	43.3
Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	24.1	41.9	35.1	33.3	31.1	18.4	29.5
Did you or any other household member have to eat fewer meals in a day because there was not enough food?	13.9	25.6	20.2	16.0	14.9	7.9	16.1

all the indicators. The situation was however reversed as far as the most indebted households (>US$4,200) were concerned.

One reason for this is that these changes in agriculture and finance provision depicted earlier have been beneficial to some farming households, largely determined by class relations (e.g. owners of machinery, big landholders). Credit—and therefore debt—does not necessarily constitute a burden for all farming households but rather can facilitate the financing of production for some. In this paper, the focus is mostly on those for whom debt reproduces and exacerbates socio-economic and climate precarity, specifically households that rely on labour incomes to reproduce themselves. Yet, it is crucial to note that (over-) indebtedness, and the link between debt and food insecurity, should be understood as shaped by class relations (see also Taylor 2015). In fact, our data shows that the revenues of the most indebted households (>$4,200) are twice as much as the revenues of non-indebted households. The most indebted households are also more likely to own plots of land than any other debt groups.

For those for whom levels of debt directly impacted their capacity to achieve food security, the necessity to pay back loans sometimes came at the expense of food preferences, food diversity, nutritional quality, and more occasionally entire meals. As Kunthea (Village A) articulated: "We have to pay the debt first" (see also Res 2021). Importantly, our data suggests that women tend to be more food insecure than men. While both spouses within the same household are usually responsible for earning money and both contribute to paying back loans, we found women to hold the primary responsibility for the daily management of expenses and debt repayment. This usually entailed gathering money, counting, prioritising which debts to repay and when, and, in some cases, "filling the gaps" through adjusting their food consumption when the amount of money in hand is not enough to repay the debt on a particular month.

In this context of constrained food security, participants increasingly rely on processed and ultra-processed foods to augment their diets, with half our participants classified as overweight and at risk of having other diet-related non-communicable diseases such as hypertension, diabetes, and hypercholesterolemia (Iskander et al. 2022). Others reported how their inadequate diets were also leading to an increase in illnesses such as dizziness, fatigue, weight loss, and insomnia. For instance, Choum and Amara cultivate rice three times a year and sell part of the harvest to pay back their loan. After their field got flooded one year and their income dropped as a result, they still had to prioritise the repayment of their debt:

> I did not want them [Credit Officers] to come over to my house … When I have less money, I keep it for my debt … I was tired because I did not have enough food. When I have nice and enough food, I have energy and don't feel tired at all. (Amara, Village A)

Eroding/Selling Assets

In the event of a bad or failed harvest, many farming households resorted to selling assets to repay loans. Key among these were jewellery, livestock, and, more

Table 3: Reasons why households have sold at least one plot of agricultural land in the last 10 years

Reasons why households have sold at least one plot of agricultural land in the last 10 years	% (n = 90)
Health expenses	34
To repay loans	31
Daily needs	15
Agricultural investment	12
Marriage/ceremony	7
Business investment	6
Funeral	3
Education	3

importantly, land. 15% of surveyed households reported selling at least one plot of agricultural land over the past 10 years.[9] As Table 3 shows, 31% reported one of the reasons they did so was to repay loans. Our data also suggests that farming households were the most susceptible to selling assets partly to service debt with 14% of farming-only households, 11% of mixed farming households, and 7% of non-farming households resorting to this coping strategy. Overall, 5.2% (21 out of 405) of all indebted households have had to sell their agricultural land partly to repay a loan over the past 10 years. In a similar vein, a recent quantitative study funded by the German Federal Ministry for Economic Cooperation and Development—a large industry investor—has detailed the extent of land sales in Cambodia caused by microfinance institutions (Bliss 2022). The study estimates 6.3% of households sold land to repay loans (167,400 is extrapolated to all of Cambodia) over the past five years (ibid.). Green and Bylander (2021:214), citing previous socio-economic household surveys, state that in 2009, 6.93% of all households sold land in the reference year, of which 18.58% sold it to repay a loan. In 2016, it was 2.29% of all households, with 19.32% of these due to a loan repayment (ibid.).

The issue of land sales linked to over-indebtedness was partially acknowledged by some staff interviewed in microfinance institutions and ministries but was often framed as an issue of personal (ir)responsibility. As one representative from the Ministry of Rural Development stated, resorting to selling assets was usually done because individuals borrowed "without a business plan". However, participants reported selling assets was often a "last resort" option when all other options had been exhausted. Selling assets is well recognised as a highly harmful strategy in the management of risk (ILO 2019) and one of the main reasons why the poor in the global South fall into irretrievable poverty (Hulme et al. 2001). As a researcher in a local NGO articulated:

> What is the threshold? How many need to suffer human rights abuses before it becomes a serious issue? … I've had this actor say: "1% of borrowers suffering human rights abuses would be catastrophic." And I'm sure it's above 1%, I'm absolutely sure. Because I walk into the villages and I find them all over the place. (Qualitative interview)

To be sure, the impacts of asset loss were unevenly felt among farmers across different socio-economic groups. For instance, while Kunthea felt "empty" after having to sell her one and only cow to be able to partially repay her microfinance loan, Amar said he did not regret selling some of his cows as he still had many left. What this shows nonetheless is that microfinance loans in the context of unpredictable weather patterns and climate shocks often lead to asset erosion for many, directly contradicting claims of financial inclusion proponents that microfinance facilitates the accumulation of assets and the spreading of (climate) risks.

Quitting Farming

> I quit farming. I quit taking loans. I survive on my own [now]. My children work [in another province], and I work here. I live based on what I can earn. I have taken risks for two or three years already, but it did not turn out very well. We couldn't develop. (Rachana, Village C)

As a result of feeling trapped in debt, several participants like Rachana, who was unable to make a profit from farming after three years of flooding and droughts, took the decision to quit farming altogether. Rice farming was considered too risky and no longer worth it. "When I took my loan of [of US$1,000], I expected that there would be rain. But there was no rain. This was a failure", Rachana lamented. Thus, rather than facilitating livelihood diversification, as the argument goes among proponents of microfinance as a tool of climate adaptation (e.g. Hammill et al. 2008), microfinance loans can push borrowers away from agriculture and reduce their income options.[10] Like Rachana, these participants often sold all or part of their land and took other jobs or migrated to urban centres to work in the construction and garment sectors. While Rachana remained in her home village, growing enough food for her and her husband's consumption on their remaining two hectares of land, her daughters took up work in garment factories in Phnom Penh, sending remittances back to them. As she describes, the decision to quit farming in favour of factory work came at both physical and mental costs to all of them:

> Even though it was difficult, I still had to pay. I thought a lot. I was upset but some of my children said: "Mother, you grow this and that so that there's something to eat and save money. We have to work to earn so that we could pay the bank back." They could earn a lot in the factories. However, a lot of people got poisoned because they sprayed chemicals on the cloth … I was so worried that my children could get poisoned with the chemical spray. As long as [the microfinance institutions] were able to lend us, we were happy. If we struggled or delayed repayment, there wouldn't be a next time. Thus, we paid them back in full … and I never failed to pay back. (Rachana, Village C, qualitative interview)

While farmers often linked their physical and emotional stress to the next loan instalment, they also emphasised that the shame and reputational damage of having credit officers come to their homes to claim late payments was to be avoided at all costs. In fact, repaying debt on time and in full was essential to remain creditworthy—that is, to be able to continue taking out loans in the

future. The necessity of creditworthiness, therefore, came at a high cost for many, including ultimately quitting farming.

When Devi, another farmer in Village C, took out microfinance loans to help him grow sweet potatoes, "it did not turn out as expected". Following a drought that destroyed their harvest, Devi and his wife decided to work in brick kilns instead. When this strategy failed to earn them enough money to pay back their loans, Devi took the risk of leaving Cambodia altogether despite not having the right documents to work:

> We didn't have hope and were frustrated. We didn't want to continue farming and thought to rent our land to others. It was better to work for others. I did not have money for the daily expenses. I had borrowed money from two microfinance institutions at the time, so I had to go [to Thailand] … My wife didn't want me to work in Thailand. She was worried I would be arrested by the police … but I was committed to leaving Cambodia. (Devi, Village C, qualitative interview)

While domestic and international migrations are often framed as climate adaptation strategies, Devi's case highlights how microfinance indebtedness exacerbates not only the everyday financial challenges at home but also the fragility of coping and adaptive strategies that migrant households employ across space (see also Green and Estes 2022).

Conclusion

The operations of microfinance in rural Cambodia have become ubiquitous over the past three decades. While its general positive impacts have now been seriously called into question, policies and market initiatives that see microfinance as an instrument of climate change adaptation have recently arisen in many countries of the global South, including Cambodia.

In contrast to the much lauded adaptative potential of microfinance products and services, in this paper we have delved into some of the depleting effects that microfinance borrowing is having on the health and wellbeing of farmers trying to sustain their agricultural livelihoods in a changing climate. Worsening climate and environmental conditions, and the difficulties of overcoming them, means that farmers are both struggling to repay existing loans and are becoming more indebted as crops fail. Farming in a changing climate is expensive and unpredictable and adaptation-tailored microfinance products are not going to change this. While microfinance for climate adaptation has significant kudos amongst mainstream development actors and is increasingly a new turn in the broader "green finance" agenda as a form of finance for adaptation, the data presented in this paper has demonstrated the need for these promissory horizons to be reconsidered due to fundamental constraints revealed here.

Any new financial products are likely to remain a coping mechanism to sustain the daily social reproduction of households rather than bring about a long-term pathway out of climatic vulnerability and poverty. For several farmers that have needed to quit farming, for example, their "diversification" as a result of overwhelming microfinance debts has entailed turning to high-risk occupations such

as brickmaking where debt bondage and injury are rife in Cambodia (Brickell et al. 2018; Natarajan et al. 2019; Parsons 2023). In this sense "ongoing climate change amplifies, compounds, and creates new forms of injustices and stresses" (Sultana 2021:447) in combination with financialised modes of adaptation which can entrench rather than relieve harms being felt by farming communities in the global South. The importance of tracing the intersections between depletion through social reproduction and the impacts of climate and environmental change (Rai and Goldblatt 2020) are thus affirmed. Facing not only increasingly frequent failed harvests but also debt repayment problems, farming households are pushed to take on depleting and sometimes dangerous strategies to manage worsening conditions at home. Such a repertoire of strategic sacrifices—which rely upon the physical and emotional depletion of so many borrowers—ranges from cross-borrowing to the reduction of food consumption and diversity, to unwanted migrations and asset loss, including land. Adaptation-oriented microfinance products are most likely to offer only tweaks to a development agenda that: individualises risk management and leads to harmful coping strategies; leaves intact the root causes of poverty and inequalities at the local, national, and global scales; and, perhaps most importantly, evades any questions of responsibility for the world's ecological crises.

Acknowledgements

"Depleted by Debt? Focusing a Gendered Lens on Climate Resilience, Credit, and Nutrition in Translocal Cambodia and South India" (2019–2022) was funded by the UK Research and Innovation's Global Challenges Research Fund (ES/T003191/1). We are sincerely thankful to research participants for the sharing of their time, energy, and life experiences with the research team. Thanks are also due to Mr Monin Nong from the Cambodia Development Resource Institute (CDRI) for undertaking the village-level stakeholder research. We would also like to thank Dr Sopheak Chann from the Royal University of Phnom Penh for carrying out the environmental profiling of the three study villages.

Endnotes

[1] Key promoters of climate-adapted microfinance include: international organisations like the Consultative Group to Assist the Poor (CGAP), the World Bank, and the International Fund for Agricultural Development (IFAD); bilateral donors; and philanthropies (e.g. the Gates Foundation).

[2] First among those is the idea of "climate proofing" existing financial products. For loan products, for instance, this entails modifying the terms and delivery methods of credit, or loans that commit borrowers to make active steps towards some forms of climate change adaptation (e.g. building a house that is less prone to floods or turning to crop varieties that are more tolerant to droughts). Micro-insurance products, as well as weather warning messages coupled with broader dissemination of climate-change knowledge, are also deemed important to reduce the socio-economic impacts of adverse climate events (Helwig et al. 2020). Second, and alongside the climate proofing of existing financial products, new products, especially index-based agricultural insurance, have been developed and are now sold by many microfinance institutions across the world. Index-based insurance is heralded as promising products for reducing agrarian vulnerability, improving climate risk management and resilience, and boosting food security among smallholder farmers in developing countries (Müller et al. 2017).

[3] While these studies have been largely ignored or disavowed by lenders and the Cambodian government, there have been some recent efforts to address over-indebtedness. Most immediately, the microfinance industry adopted a new self-regulatory code of conduct in March 2022, which sought to integrate international client protection principles into institutions' lending practices. This new code of conduct has been pushed by so-called impact investors, both public and private, who have grown increasingly concerned about abuses within the sector following a three-year-long human rights campaign, led by LICADHO and Equitable Cambodia, to hold investors accountable to their own investment principles. However, despite these growing concerns, the self-regulatory measures taken by the industry are largely insufficient to address the scale of the over-indebtedness problem in Cambodia. First, the code of conduct is entirely voluntary, with no legal mechanism to enforce compliance. Second, the client protection principles outlined in the code of conduct do not address the underlying causes of debt stress, such as a warming climate, precarious employment, fiscal austerity, or strong agricultural competition in domestic and regional commodity markets.

[4] With regard to new adapted products, Chamroeun and AMK are probably the most active MFIs in Cambodia. For instance, Chamroeun works in partnership with UN-Habitat on a programme which aims to make vulnerable housing more resilient to climate events.

[5] Here, rice-farming households include both households for which rice agriculture is the only livelihood strategy and households involved in agriculture alongside other income-generating activities in various sectors including transport, construction, and manufacturing.

[6] As Aiba et al. (2021) show, the average size of microfinance loans significantly increased after the implementation of the interest rate cap policy in 2017. Smaller-sized loans, group loans, and non-collateral loans were particularly affected as microfinance institutions sought to maintain their profits per loan in response to a decrease in the interest rate.

[7] To calculate households' annual income, we multiplied the income for each occupation by the number of pay periods per year. For example, if an individual has worked as construction worker for three months and earned $300 per worked month, the annual income for this occupation would be $900. If individuals have several occupations, all incomes are summed up in order to calculate individuals' total annual income. Note that households' annual income refers only to income from permanent household members' occupations. Thus, remittances, rent, and other financial resources are not included. As for the total debt, it is calculated at the household level as the sum of outstanding loans from any sources (including both interested-based and non-interested-based loans) for permanent household members.

[8] Developed by the USAID's Food and Nutrition Technical Assistance (FANTA) Project, HFIAS method is based on the notion that the experience of food insecurity (access) causes predictable reactions and responses that can be captured and quantified through a survey and summarized in a scale. For more information, see Coates et al. (2007).

[9] As Green and Bylander (2021) clearly demonstrate, these land sales take place largely through informal channels rather than the court system. Households tend to sell their land to neighbours, kin, or other buyers they know.

[10] See also Li (2009), who provides a scathing critique of World Bank's 2008 "Agriculture for Development" report, based on research on Asia's rural poor. Li cogently examines how farmers across Asia are exiting from agriculture as a result of neoliberal agricultural policies.

References

Adkins L (2017) Speculative futures in the time of debt. *The Sociological Review* 65(3):448–462

Agrawala S and Carraro M (2010) "Assessing the Role of Microfinance in Fostering Adaptation to Climate Change." OECD Environmental Working Paper No. 15 https://www.oecd.org/environment/cc/44844835.pdf (last accessed 28 April 2022)

Aiba D, Samreth S, Oeur S and Vat V (2021) "Impact of Interest Rate Cap Policies on the Lending Behavior of Microfinance Institutions: Evidence from Millions of Observations in the Credit Registry Database." JICA Ogata Research Institute Working Paper No.224

https://www.jica.go.jp/Resource/jica-ri/publication/workingpaper/wp_224.html (last accessed 4 July 2023)
Bee B A, Rice J and Trauger A (2015) A feminist approach to climate change governance: Everyday and intimate politics. *Geography Compass* 9(6):339–350
Bevacqua R (2017) *Building an Inclusive Financial Sector: Microfinance and Market-Led Development in Cambodia—A History*. Phnom Penh: National Bank of Cambodia
Bliss F (2022) "'Micro' Finance in Cambodia: Development, Challenges, and Recommendations." AVE Study 30/2022, Institute for Development and Peace (INEF), University of Duisburg-Essen https://www.uni-due.de/imperia/md/content/inef/cambodia-inef-bmz-research_report.pdf (last accessed 4 July 2023)
Bracking S (2018) Financialisation, climate finance, and the calculative challenges of managing environmental change. *Antipode* 51(3):709–729
Brickell K (2020) *Home SOS: Gender, Violence, and Survival in Crisis Ordinary Cambodia*. Oxford: John Wiley & Sons
Brickell K, Parsons L, Natarajan N and Chann S (2018) "Blood Bricks: Untold Stories of Modern Slavery and Climate Change from Cambodia." Royal Holloway, University of London https://static1.squarespace.com/static/596df9f8d1758e3b451e0fb2/t/5bc4d7cdc83025e41e7b10a0/1539627177544/Blood+bricks+high+res+v2.pdf (last accessed 4 July 2023)
Brickell K, Picchioni P, Natarajan N, Guermond V, Parsons L, Zanello G and Bateman M (2020) Compounding crises of social reproduction: Microfinance, over-indebtedness, and the COVID-19 pandemic. *World Development* 136 https://doi.org/10.1016/j.worlddev.2020.105087
Bridge G, Bulkeley H, Langley P and van Veelen B (2020) Pluralizing and problematizing carbon finance. *Progress in Human Geography* 44(4):724–742
Buller A (2022) *The Value of a Whale: On the Illusions of Green Capitalism*. Manchester: Manchester University Press
Bylander M (2014) Borrowing across borders: Migration and microcredit in rural Cambodia. *Development and Change* 45(2):284–307
Bylander M (2015) Credit as coping: Rethinking microcredit in the Cambodian context. *Oxford Development Studies* 43(4):533–553
Chhinh N and Millington A (2015) Drought monitoring for rice production in Cambodia. *Climate* 3(4):792–811
CIF (2018) "Microfinance for Climate Adaptation: From Readiness to Resilience." PPCR Knowledge for Resilience Research Brief, Climate Investment Funds https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/micro-finance_research_brief.pdf (last accessed 28 April 2022)
CMA-NIX (2022) "Quarter 2, 2022 Dataset." Cambodia Microfinance Association
Coates J, Swindale A and Bilinsky P (2007) "Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access: Indicator Guide, Version 3, August 2007." Food and Nutrition Technical Assistance (FANTA) Project, USAID https://www.fantaproject.org/sites/default/files/resources/HFIAS_ENG_v3_Aug07.pdf (last accessed 4 July 2023)
Diepart J C (ed) (2015) *Learning for Resilience: Insights from Cambodia's Rural Communities*. Phnom Penh: The Learning Institute
Dowla A (2017) Climate change and microfinance. *Business Strategy and Development* 1 (2):78–87
Equitable Cambodia and LICADHO (2021) "Right to Relief: Indebted Land Communities Speak Out." Equitable Cambodia and Cambodian League for the Promotion and Defense of Human Rights (LICADHO) https://www.licadho-cambodia.org/reports.php?perm=234 (last accessed 4 July 2023)
Federici S (2014) From commoning to debt: Financialization, microcredit, and the changing architecture of capital accumulation. *South Atlantic Quarterly* 113(2):231–244
Felli R (2021) *The Great Adaptation: Climate, Capitalism, and Catastrophe*. London: Verso
Fenton A, Paavola J and Tallontire A (2017) The role of microfinance in household livelihood adaptation in Satkhira District, Southwest Bangladesh. *World Development* 92:192–202

Green W N (2022a) Financing agrarian change: Geographies of credit and debt in the global South. *Progress in Human Geography* 46(3):849–869
Green W N (2022b) Financial landscapes of agrarian change in Cambodia. *Geoforum* 137:185–193
Green W N (2022c) Placing Cambodia's agrarian transition in an emerging Chinese food regime. *Journal of Peasant Studies* 49(6):1249–1272
Green W N and Bylander M (2021) The exclusionary power of microfinance: Over-indebtedness and land dispossession in Cambodia. *Sociology of Development* 7(2):202–229
Green W N, Chhom T, Mony R and Estes J (2023) The underside of microfinance: Performance indicators and informal debt in Cambodia. *Development and Change* https://doi.org/10.1111/dech.12778
Green W N and Estes J (2019) Precarious debt: Microfinance subjects and intergenerational dependency in Cambodia. *Antipode* 51(1):129–147
Green W N and Estes J (2022) Translocal precarity: Labor and social reproduction in Cambodia. *Annals of the American Association of Geographers* 112(6):1726–1740
Guérin I, Morvant-Roux S and Villarreal M (eds) (2013) *Microfinance, Debt, and Over-Indebtedness: Juggling with Money*. New York: Routledge
Guermond V, Parsons L, Ly Vouch L, Brickell K, Michiels S, Fay G, Bateman M, Zanello G, Natarajan N, Iskander D and Picchioni F (2022) "Microfinance, Over-Indebtedness, and Climate Adaptation: New Evidence from Rural Cambodia." Royal Holloway, University of London https://static1.squarespace.com/static/62f2cf0e5c1d785dc4090f66/t/6327baac4be25f1d0d3ec013/1663548086338/Microfinance-over-indebtedness-and-climate-adaptation_English.pdf (last accessed 28 June 2023)
Hammill A, Matthew R and McCarter E (2008) Microfinance and climate change adaptation. *IDS Bulletin* 39(4):113–122
Helwig K, Hill-O'Connor C, Mikulewicz M, Mugiraneza P and Christensen E (2020) "The Role of Microfinance in Climate Change Adaptation: Evidence from Rural Rwanda." Glasgow Caledonian University https://researchonline.gcu.ac.uk/ws/portalfiles/portal/39929625/Microfinance_and_Climate_Change_in_Rwanda_Final_report_April_2020.pdf (last accessed 28 April 2022)
Hulme D, Moore K and Shepherd A (2001) "Chronic Poverty: Meanings and Analytical Frameworks." Chronic Poverty Research Centre Working Paper 2, University of Manchester https://www.chronicpoverty.org/uploads/publication_files/WP02_Hulme_et_al.pdf (last accessed 4 July 2023)
ILO (2018) "Cambodia Garment and Footwear Sector Bulletin, December 2018." International Labour Organization https://www.ilo.org/asia/publications/issue-briefs/WCMS_663043/lang--en/index.htm (last accessed 4 July 2023)
ILO (2019) "Towards Universal Social Protection and Achieving SDG 1.3." International Labour Organization https://www.ilo.org/global/about-the-ilo/how-the-ilo-works/multilateral-system/g7/2019/WCMS_732720/lang--en/index.htm (last accessed 4 July 2023)
Iskander D, Picchioni F, Ly Vouch L, Parsons L, Guermond V, Michiels S, Brickell K, Zanello G and Natarajan N (2022) "Trapped in the Service of Debt: How the Burdens of Repayment are Fuelling the Health Poverty Trap in Rural Cambodia." Royal Holloway, University of London https://static1.squarespace.com/static/62f2cf0e5c1d785dc4090f66/t/634fbde0990cbc59bf35d4f3/1666170348858/Trapped-in-the-service-of-debt_English.pdf (last accessed 28 June 2023)
Johnson L (2013) Index insurance and the articulation of risk-bearing subjects. *Environment and Planning A: Economy and Space* 45(11):2663–2681
Jordan J C (2020) Climate shocks and adaptation strategies in coastal Bangladesh: Does microcredit have a part to play? *Climate and Development* 13(5):454–466
Joseph J (2013) Resilience as embedded neoliberalism: A governmentality approach. *Resilience* 1(1):38–52
Lawreniuk S and Parsons L (2020) *Going Nowhere Fast: Inequality in the Age of Translocality*. Oxford: Oxford University Press

Li T M (2009) Exit from agriculture: A step forward or a step backward for the rural poor? *Journal of Peasant Studies* 36(3):629–636
Li T M (2014) *Land's End: Capitalist Relations on an Indigenous Frontier*. Durham: Duke University Press
Liese B, Isvilanonda S, Tri K N, Ngoc L N, Pananurak P, Pech R, Shwe T M, Sombounkhanh K, Möllmann T and Zimmer Y (2014) "Economics of Southeast Asian Rice Production." Report 2014/1, Agri Benchmark http://www.agribenchmark.org/fileadmin/Dateiablage/B-Cash-Crop/Reports/Report-2014-1-rice-FAO.pdf (last accessed 4 July 2023)
Liv D (2013) "Study of the Drivers of Over-Indebtedness of Microfinance Borrowers in Cambodia: An In-Depth Investigation of Saturated Areas." Final Report, Cambodia Institute of Development Study
Marschke M (2017) Exploring rural livelihoods through the lens of coastal fishers. In K Brickell and S Springer (eds) *The Handbook of Contemporary Cambodia* (pp101–111). Abingdon: Routledge
MFC and Good Return (2017) "Over-Indebtedness Study Cambodia II: Final Report." Microfinance Centre (MFC) and Good Return
MIMOSA (2020) "Cambodia." Microfinance Index of Market Outreach and Saturation
Mitchell K, Marston S A and Katz C (2003) Life's work: An introduction, review, and critique. *Antipode* 35(3):415–442
Müller B, Johnson L and Kreuer D (2017) Maladaptive outcomes of climate insurance in agriculture. *Global Environmental Change* 46:23–33
Natarajan N and Brickell K (2022) Credit, land, and survival work in rural Cambodia: Rethinking rural autonomy through a feminist lens. *Journal of Agrarian Change* 22 (3):473–488
Natarajan N, Brickell K and Parsons L (2019) Climate change adaptation and precarity across the rural–urban divide in Cambodia: Towards a "climate precarity" approach. *Environment and Planning E: Nature and Space* 2(4):899–921
Natarajan N, Brickell K and Parsons L (2021) Diffuse drivers of modern slavery: From microfinance to unfree labour in Cambodia. *Development and Change* 52(2):241–264
Nguyen T P L and Sean C (2021) Do climate uncertainties trigger farmers' out-migration in the Lower Mekong region? *Current Research in Environmental Sustainability* 3 https://doi.org/10.1016/j.crsust.2021.100087
NIS (2020) "Report of Cambodia Socio-Economic Survey 2019/20." National Institute of Statistics (Ministry of Planning), Kingdom of Cambodia https://www.nis.gov.kh/nis/CSES/Final%20Report%20of%20Cambodia%20Socio-Economic%20Survey%202019-20_EN.pdf (last accessed 28 April 2022)
NIS and MAFF (2015) "Census of Agriculture in Cambodia, 2013." National Institute of Statistics (Ministry of Planning) and Ministry of Agriculture, Forestry and Fisheries, Kingdom of Cambodia https://www.fao.org/3/I9465EN/i9465en.pdf (last accessed 4 July 2023)
Ovesen J and Trankell I (2014) Symbiosis of microcredit and private moneylending in Cambodia. *Asia Pacific Journal of Anthropology* 15(2):178–196
Parsons L (2023) *Carbon Colonialism: How Rich Nations Export Climate Breakdown*. Manchester: Manchester University Press
Rai S and Goldblatt B (2020) Law, harm, and depletion through social reproduction. *European Journal of Politics and Gender* 3(2):171–184
Rai S, Hoskyns C and Thomas D (2011) "Depletion and Social Reproduction." Centre for the Study of Globalisation and Regionalisation Working Paper 274/11, University of Warwick http://wrap.warwick.ac.uk/49070/ (last accessed 4 July 2023)
Rai S, Hoskyns C and Thomas D (2014) Depletion: The cost of social reproduction. *International Feminist Journal of Politics* 16(1):86–105
Res P (2021) "Microfinance in Times of COVID-19: Consumer Protection and the Loan Restructuring Process in Cambodia." https://www.researchgate.net/publication/352192242_MICROFINANCE_IN_TIMES_OF_COVID_19_Consumer_Protection_and_the_Loan_Restructuring_Process_in_Cambodia (last accessed 27 March 2023)

RGC (2013) "Cambodia Climate Change Strategic Plan 2014-2023." Royal Government of Cambodia https://ncsd.moe.gov.kh/resources/document/cambodia-climate-change-strategic-plan-2014-2023-cccsp-2014-2023en (last accessed 4 July 2023)
Rippey P (2009) Microfinance and climate change: Threats and opportunities. In D Köhn (eds) *Greening the Financial Sector: How to Mainstream Environmental Finance in Developing Countries* (pp. 215–239). Heidelberg: Springer
Roberts A (2013) Financing social reproduction: The gendered relations of debt and mortgage finance in 21st century America. *New Political Economy* 18(1):21–42
Roy A (2010) *Poverty Capital: Microfinance and the Making of Development*. New York: Routledge
Save the Children (2016) "El Niño-Induced Drought in Cambodia: Rapid Assessment Report." https://resourcecentre.savethechildren.net/document/el-nino-induced-drought-cambodia-rapid-assessment-report/#:~:text=The%20Prime%20Minister%2C%20Hun%20Sen,950%2C000%20of%20whom%20are%20children (last accessed 23 April 2023)
Scheyvens H (2015) "The Role of Microfinance and Microfinance Institutions in Climate Change Adaptation: Learning from Experiences in Bangladesh." IGES Research Report 2014-06, Institute for Global Environmental Strategies https://www.jstor.org/stable/resrep00725 (last accessed 28 April 2022)
Schicks J (2013) The sacrifices of micro-borrowers in Ghana: A customer protection perspective on measuring over-indebtedness. *Journal of Development Studies* 49(9):1238–1255
Sealey-Huggins L (2017) "1.5°C to stay alive": Climate change, imperialism, and justice for the Caribbean. *Third World Quarterly* 38(11):2444–2463
Seng K (2018) Revisiting microcredit's poverty-reducing promise: Evidence from Cambodia. *Journal of International Development* 30(4):615–642
Soederberg S (2014) *Debtfare States and the Poverty Industry: Money, Discipline, and the Surplus Population*. London: Routledge
Sok S, Chhinh N, Hor S and Nguonphan P (2021) Climate change impacts on rice cultivation: A comparative study of the Tonle Sap and Mekong River. *Sustainability* 13(16) https://doi.org/10.3390/su13168979
Sultana F (2021) Climate change, COVID-19, and the co-production of injustices: A feminist reading of overlapping crises. *Social and Cultural Geography* 22(4):447–460
Symbiotics (2017) "2017 Symbiotics MIV Survey: Market Data & Peer Group Analysis—11th Edition, September 2017." https://www.findevgateway.org/paper/2017/09/2017-symbiotics-miv-survey-market-data-peer-group-analysis (last accessed 4 July 2023)
Taylor T (2015) *The Political Ecology of Climate Change Adaptation: Livelihoods, Agrarian Change, and the Conflicts of Development*. Abingdon: Routledge
Tolzmann M (2022) "CGAP Funder Survey 2020: Trends in International Funding for Financial Inclusion." Focus Note, Consultative Group to Assist the Poor (CGAP) https://www.cgap.org/sites/default/files/publications/2022_01_Focus_Note_2020_Funder_Survey.pdf (last accessed 28 April 2022)
Weber H (2006) The global political economy of microfinance and poverty reduction: Locating local "livelihoods" in political analysis. In J L Fernando (eds) *Microfinance: Perils and Prospects* (pp. 43–63). London: Routledge
World Bank (2009) "Microfinance in Cambodia: Taking the Sector to the Next Level." Business Issues Bulletin Cambodia No. 17, World Bank https://documents.worldbank.org/en/publication/documents-reports/documentdetail/161321468222892683/microfinance-in-cambodia-taking-the-sector-to-the-next-level (last accessed 4 July 2023)
World Bank (2022) "Climate Knowledge Portal: Cambodia." https://climateknowledgeportal.worldbank.org/country/cambodia (last accessed 28 September 2022)
Zanello G, Srinivasan C S and Nkegbe P (2017) Piloting the use of accelerometry devices to capture energy expenditure in agricultural and rural livelihoods: Protocols and findings from northern Ghana. *Development Engineering* 2:114–131