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# Modern Slavery, Environmental Destruction and Climate Change: Fisheries, Field, Forests and Factories

A research report from the  
University of Nottingham's Rights Lab,  
Royal Holloway University of London,  
and the Independent  
Anti-Slavery Commissioner

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Kevin Hyland OBE was the United Kingdom's first Independent Anti-Slavery Commissioner, leading efforts to tackle modern slavery and human trafficking. The role of the Commissioner is to promote best practice and drive crucial improvement across the anti-slavery response, both in the UK and internationally.

## Photo credits

Figures 1 and 12: Kevin Bales.

Figures 3-6: From the Environmental Justice Foundation's investigation into human trafficking and slavery in the seafood industry in Thailand.

Figure 7: Kay Chernush – Free the Slaves.

Figures 8-10: Thomas Cristofolletti, taken as part of the 'Blood Bricks' project (funded by ESRC-DFID).

Figure 11: Peggy Callahan – Free the Slaves.

# Definition of Terms

## 'Brick belt'

An unofficial region of South Asia made up of Pakistan, Northern India, Nepal and Bangladesh that acts as the primary brick production zone globally<sup>1</sup>.

## 'Bull's Trench Kiln'

A traditional, oval-shaped brick kiln dug out in an open field<sup>2</sup>.

## 'Child labour'

"...work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development"<sup>3</sup>.

## 'Chattel slavery'

A hereditary form of slavery in which people are born, captured or sold into permanent slavery and are owned as 'property'. This is most commonly associated with historical forms of slavery. Today, it primarily exists in Northern and Western Africa<sup>4</sup>.

## 'Contract slavery'

A contemporary form of slavery that operates through irregular employment contracts designed to deceive workers and trap them in exploitative labour conditions<sup>5</sup>.

## 'Debt bondage'

"...a status or condition, where one person has pledged their labour or service (or that of someone under their control), in circumstances where the fair value of that labour or service is not reasonably applied to reducing the debt or length of debt, or the length and nature of the service is not limited or defined<sup>6</sup>."

## 'Fish-farming' (or 'aquaculture')

"Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated<sup>7</sup>."

## 'Forced labour'

"...all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself (or herself) voluntarily<sup>8</sup>".

## 'Human trafficking'

"...the recruitment, transportation, transfer, harbouring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation. Exploitation shall include, at a minimum, the exploitation of the prostitution of others or other forms of sexual exploitation, forced labour or services, slavery or practices similar to slavery, servitude or the removal of organs<sup>9</sup>".

## 'Overfishing'

The exploitative use of a fishery that exceeds its carrying capacity and leads to a decline in fish stocks<sup>10</sup>.

## 'Sustainable Development Goals' (SDGs)

These refer to a number of interconnected goals set out by the United Nations in 2015 that pertain to global sustainable development ambitions, encompassing aspects such as climate change, economic inequality, innovation, sustainable consumption, peace and social justice<sup>11</sup>.

# Glossary

## BTK

Bull's Trench Kiln

## EEZ

Exclusive Economic Zone

## EJF

Environmental Justice Foundation

## FAO

Food and Agriculture Organisation

## GHG emissions

Greenhouse gas emissions

## GSI

Global Slavery Index

## ILO

International Labour Organisation

## IOM

International Organisation for Migration

## ODI

Overseas Development Institute

## SDGs

Sustainable Development Goals

## UN

United Nations

## UNDP

United Nations Development Programme

## USDoS

United States Department of State

# Executive summary

**Modern slavery and climate change have emerged as concurrent crises in the contemporary world. While these phenomena have been well-established separately in recent academic and policy-based debates, little discussion has taken place on the interconnections between them. An emerging area of research has begun to interrogate aspects of the nexus between modern slavery, environmental destruction and climate change, but a review of the existing literature in the area remains lacking.**

As a result, this desk-based literature review was conducted on the nexus between modern slavery, environmental destruction and climate change that covered both academic and grey literature. The report aims to synthesise, review and assess the current state of research on the nexus and bring together previously disparate literature as part of a holistic framework. Such a review can offer insight into existing trends in the extant literature and highlight potential future research directions: timely and urgent in light of the relevant Sustainable Development Goals.

The review is based upon a conceptualisation of a cyclical, two-way nexus between modern slavery, climate change and environmental destruction. Here, on the one hand, it is proposed that modern slavery practices contribute to further multiscalar environmental destruction and perpetuate climate change, while, on the other hand, the increasing environmental pressures associated with climate change in the Global South (e.g. rising sea levels, increasing prevalence and severity of droughts) act to exacerbate existing vulnerabilities and inequalities of local populations that may render them susceptible to exploitative labour practices.

Overall, the review identified commonalities across the examined literature, despite the multiple scales and geographies at which the research has been carried out.

The nexus tends to emerge in the literature through forms of debt-bondage, illegal or informal channels of labour and the persistent and continued interests of consumers in the Global North. The nexus also emerged in the literature *sectorally* and in relation to specific *geographic* locations and the review was accordingly structured around four main sectors: (i) *Fisheries* (ii) *Fields* (iii) *Forests* and (iv) *Factories*.

Despite the sectoral form of the literature, the review suggests commonalities across geographic spaces as part of a two-way conceptualisation of the nexus that goes beyond the sectoral. Additionally, specific instances of the nexus are often systematically and geographically bound together, often intimately connected with flows of (climate-induced) migration.

This synthesis and assessment of extant literature on the relationship between modern slavery, environmental destruction and climate change acts as a starting point for research on the nexus. It can also open up space for dialogue and communication between practitioners, research clusters and policy bodies (e.g. NGOs, intergovernmental agencies) that have previously remained separate, as well engendering a movement beyond silos of knowledge and policy practices.

Figure 1: A fish camp, Bangladesh (Kevin Bales)





# Foreword by Kevin Hyland,

the first UK Independent  
Anti-Slavery Commissioner  
(2015-2018)

Modern slavery is a brutal abuse, denying people their dignity, safety and freedom. It affects millions worldwide and thousands here in the UK. If we want to see more victims rescued and more perpetrators behind bars, we need to know everything we can about the scale, causes, and consequences of modern slavery, and about strategies to combat it. As one of the major challenges facing us today, the fight against modern slavery needs to be supported by the best possible research and evidence.



A position of understanding will empower evidence-led action to improve prevention, justice and victim care. High quality research is therefore a crucial tool in the fight against this crime; to support its development, I have partnered with the University of Nottingham's Rights Lab and Royal Holloway's Blood Bricks research team to better understand existing evidence on the nexus between modern slavery, environmental destruction and climate change.

This report supports the aim expressed in my Strategic Plan of developing partnerships with academic and research institutions and promoting external high quality quantitative and qualitative research into modern slavery issues. It will also empower others to build upon its findings and recommendations, to fill the knowledge gap on the dynamic interaction between climate change and vulnerability to modern slavery. I am sure that its impact will be widely felt.

A handwritten signature in white ink, appearing to be 'KH'.

Kevin Hyland OBE  
First UK Independent Anti-Slavery  
Commissioner (2015-2018)

# Introduction

Persistent exploitative labour practices occur globally in the contemporary world in marginalised and 'hidden' spaces. These emerge primarily through debt-bondage and 'contract slavery', often in primary industries that involve back-breaking and hazardous manual labour<sup>12</sup>. For instance, in South-Asian brick-kilns or Thai fishery industries, labourers are forced to stay and work in abusive and exploitative conditions in order to pay off a debt that has been accrued and maintained strategically. Current estimates suggest that there are around 40.3 million people globally in modern slavery<sup>13</sup>. The distribution of modern slavery practices is uneven with the highest prevalence reported in South and Central Asia and Sub-Saharan Africa.

Simultaneously, a climate crisis is occurring whereby significant impacts upon natural and human systems are predicted over the following decades<sup>14</sup>. Although ambitious 1.5°C and 2°C targets were set at the 2016 Paris Agreement, increasing evidence suggests that we are not on course to reach these<sup>15</sup>. The most severe impacts of climate change are projected to occur in the Global South (e.g. increased frequency and severity of droughts, increased likelihood of fluvial and coastal flooding), in regions, communities and nations that already face multi-dimensional vulnerabilities and inequalities<sup>16</sup>. In other words, the multifarious impacts of climate change are likely to exacerbate currently existing vulnerabilities in marginalised areas.

Both modern slavery and climate change emerge as concurrent crises in the contemporary world. However, while these phenomena have been well-established separately in recent academic and policy-based debates, little discussion has taken place on the interconnections between them. An emerging branch of literature has begun to interrogate aspects of the nexus between modern slavery, environmental destruction and climate change<sup>17</sup>. Modern slavery activities may be further perpetuating climate change and contributing to significant Greenhouse Gas (GHG) emissions, while climate-induced vulnerabilities may act as a push factor for displaced migrants or those that face increasingly precarious or constrained livelihoods to engage in exploitative labour practices<sup>18</sup>.

Notably, Bales<sup>19</sup> estimates that slave-based deforestation is responsible for the emission of 2.54 billion tons of CO<sub>2</sub> each year, a lower amount globally than only China and the United States. Thus, it can be proposed that there is an inseparable nexus between modern slavery, climate change and environmental destruction.

## What is Modern Slavery?

Modern slavery is a serious crime in which individuals are exploited for little or no pay. Considerable debate has arisen in recent years around the definition of 'modern slavery' and what precisely it incorporates. Conceptualisations of modern slavery are varied, contested and sometimes contradictory. Nevertheless, a broad distinction can be made between 'historical slavery' and 'modern slavery': while the former was legal and institutionalised, the latter tends to emerge in illegal, marginalised and 'hidden' spaces, given that it is legally banned by all nations and international conventions<sup>20</sup>. The exploitation of modern slaves is often not easily identifiable, and enslaved individuals face a 'crisis of illegibility'<sup>21</sup>.

There are also divergences between the 'legal' definitions of slavery and the 'sociological' understandings of slavery. While the former is rooted in institutionalised forms of slavery and assumes 'ownership' of individuals (most notably the 1926 Slavery Convention which defines slavery as 'the status or condition of a person over whom any or all of the powers attaching to the right of ownership are exercised')<sup>22</sup>, some social scientists consider such an understanding to not accurately and adequately reflect the features and nature of 'modern slavery'. The latter defines modern slavery by the idea of 'control', rather than legal ownership. This refers to physical and psychological control or coercion. Allain and Bales<sup>23</sup> define modern slavery accordingly:

"The primary indicator of slavery is that of control; control that diminishes the agency of the slave, normally demonstrated by the physical control of the slave that prevents their escape from enslavement and forces them to work. The primacy of control is often additionally demonstrated by the sexual use of the body of the slave by the slaveholder in addition to other forms of exploitation."

Central to understandings of modern slavery are loss of free will, immobility, the use of violence (or the threat of violence) and economic exploitation<sup>24</sup>. In response to the difficulties surrounding the applicability of historical, institutionalised definitions of slavery to contemporary exploitation of labour, scholars have proposed a legal framework that aims to more accurately capture the realities of ‘modern slavery’, primarily by extending the concept of ‘ownership’ from the 1926 convention to encompass the powers attached to the rights of ownership (i.e. ‘de-facto’ cases of slavery) and ‘control’ more broadly, rather than legal ownership per se<sup>25</sup>. Accordingly, The Bellagio-Harvard Guidelines on the Legal Parameters of Slavery<sup>26</sup> define modern slavery as “constituting control over a person in such a way as to significantly deprive that person of his or her individual liberty, with the intent of exploitation through the use, management, purchase, sale, profit, transfer or disposal of that person”. We apply this definition of modern slavery in our report.

Understandings of modern slavery are also often based on the 1956 UN Supplementary convention that refers to debt bondage, serfdom, forced marriage and child labour as ‘slavery-like practices’.

While questions of which current exploitative labour practices can be defined as slavery are open to interpretation and disputed, Bales, Trodd and Williamson<sup>27</sup> suggest that there are three main forms of contemporary slavery: (1) *chattel slavery* (2) *debt-bondage* and (3) *contract slavery*. Debt bondage is indicated to be the most common form of contemporary slavery<sup>28</sup>.

Human trafficking has arisen prominently in the debates on modern slavery and has often acted as a focal point for a number of key policy actors and NGOs<sup>29</sup>. Notably, the UN’s ‘Palermo Protocol to Prevent, Suppress and Punish Trafficking in Persons’<sup>30</sup> is a key piece of legislation that understands trafficking as distinct from smuggling in that it leads to other forms of exploitation over time (e.g. forced labour). Essentially, the protocol aimed to combat modern slavery through a ‘human trafficking’ lens. However, it is argued that human trafficking should not be conflated with modern slavery itself and is instead a process through which slavery can thrive<sup>31</sup>. A focus on trafficking ignores the majority of slaves who were enslaved without being trafficked, e.g. the ILO states that only 29% of slaves crossed borders and 56% of slaves did not move at all<sup>32</sup>.

## The Scope of this Report

Recent research has begun to conceptualise linkages between modern slavery activities, climate change and environmental destruction on multiscalar levels<sup>33</sup>. Such literature has improved empirical and theoretical understandings of the nexus between the three of them. However, there has not been a review of the currently existing literature in the area. Accordingly, this report aims to synthesise, review and assess the current state of research<sup>34</sup> on the nexus. We bring together previously disparate literature and different strands of the nexus as part of a holistic framework. The report offers insights into existing trends and gaps in the extant literature and ultimately highlights potential future research directions.

The review proceeds upon an understanding that the relationship between modern slavery, environmental destruction and climate change is two-way in nature (see Figure 2 below).

Here, on the one hand, it is proposed that modern slavery practices contribute to further environmental destruction and perpetuate climate change. Notably, this includes the use of debt-bonded labour in brick-kilns, forest clearing and mineral mining, which damages local environments and ecosystems, while also contributing to climate change through increased levels of GHG emissions. On the other hand, the increasing environmental pressures associated with climate change in the Global South (e.g. rising sea levels, increasing prevalence and severity of droughts) act to exacerbate existing vulnerabilities and inequalities of local populations that may render them susceptible to exploitative labour practices. The nexus is not considered in isolation, but in relation to the relevant socio-political, institutional and economic factors that feed into this.

It is timely and urgent to better understand this nexus in light of the associated Sustainable Development Goals (SDGs) (see Table 1 below). Notably, one of the key elements of SDG 8 (‘Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all’) is to “Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms” (SDG 8.7)<sup>35</sup>. With the inclusion of target 8.7, the UN has placed significant and explicit attention on combatting modern slavery practices.

Concerns over environmental destruction and climate change can also be located in the SDGs<sup>36</sup>. In particular, the UN places emphasis on the following aspects: “to enhance the sustainability of production and consumption circuits, incorporating reductions in material footprints and material consumption” (SDG 12), “to

reduce greenhouse gas emissions and mitigate against climate change and to build resilience to climate-related impacts, in the context of the Paris Agreement” (SDG 13), “to enhance the conservation and sustainable management of the oceans and marine resources, in light of the increasingly adverse impacts of ocean acidification, overfishing and marine pollution” (SDG 14), and “to reduce deforestation and forest degradation and to conserve and protect terrestrial ecosystems” (SDG 15). It is evident that each of these environmentally-based SDGs intersect and overlap with one another. This desk-based review is carried out in light of possible linkages between these SDGs and SDG 8.7.

Our desk-based review of literature on the nexus covered both academic literature and grey literature (e.g. NGO and inter-governmental agency reports, media investigations). The review incorporates research that has explicitly assessed and investigated the relationship between modern slavery, environmental destruction and climate change, as well as that which has implicitly done so. Here, comprehensive searches were carried out on multiple search engines (e.g. Scopus, Science Direct) using relevant key words in an attempt to identify linkages between the multiple strands of the nexus. For instance, searches were conducted using terms such as “climate change and debt bondage” or “brick kilns and child labour”. Additionally, relevant material was probed for references to other texts. The texts were sifted through and selected based on their relevance to the multiple strands of the nexus.

In total, 19 papers were identified that explicitly made connections between modern slavery, environmental destruction and climate change in some form or other, while a large selection of other papers more implicitly touched

upon these elements. Such research is carried out at multiple scales and geographies, but a number of key trends can be initially identified. Notably, debt bondage was, by far, the most common form of slave labour to emerge in relation to environmental or climate damage, alongside human trafficking to a lesser extent. Other identified forms of modern slavery (e.g. contract slavery) were found to be less important in the examined literature on the nexus.

The research also tends to tie in the nexus (or aspects of the nexus) with the prevalence of illegal or informal channels in the Global South, e.g. illegal logging in Brazil, the informal nature of brick-kiln sector in South-Asia. The literature suggests that unregulated and informal industries are often connected with abuses of both environmental conditions and labour rights. Additionally, the literature suggests that much of the slave-based and environmentally-destructive activity is enacted to serve the interests of consumers in the Global North who seek cheap and abundant produce, tied up with associated economic pressures in the Global South.

With exceptions<sup>37</sup>, the nexus tends to emerge in the examined literature *sectorally* and in relation to specific geographic locations. For instance, the use of debt-bonded labour in deforestation and forest degradation practices has been primarily investigated in the contexts of Brazil and Indonesia, through focusing on industries such as charcoal, cattle and palm oil. Accordingly, the following review of literature is structured according to the four main sectors that emerged: (i) *Fisheries* (ii) *Fields* (iii) *Forests* and (iv) *Factories*. In terms of geography, there is a general focus on South-Asia, Sub-Saharan Africa and South America, in line with the above sectors. Each of these sectors align with multiple SDGs, as can be seen in Table 1.

Figure 2: The two-way relationship between Modern Slavery, Environmental Destruction and Climate Change

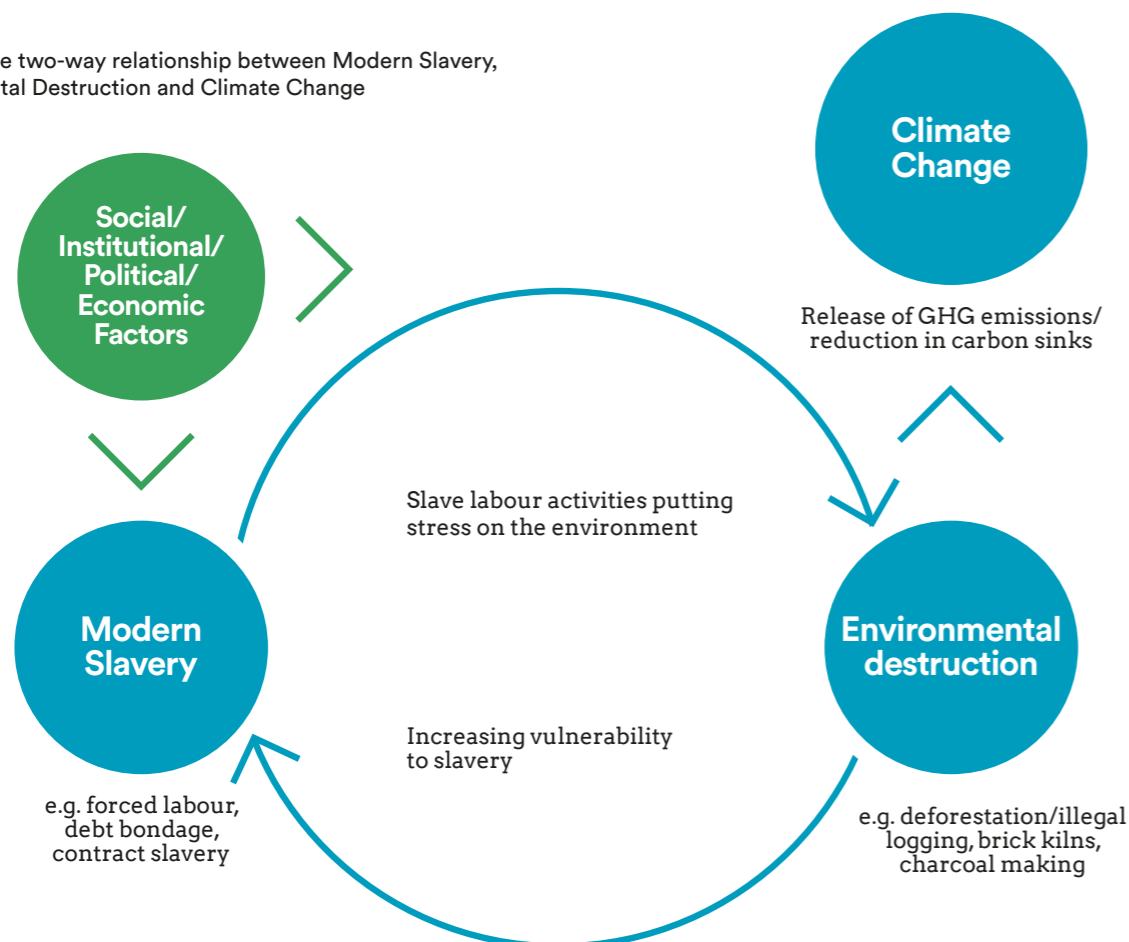


Table 1: Sustainable Development Goals (SDGs) and Relevant Sectors

SDG	Primary Aim	Relevant Sectors
SDG 12	‘Ensure sustainable consumption and production patterns’	Fisheries, Field, Forests, Factory
SDG 13	‘Take urgent action to combat climate change and its impacts’	Fisheries, Field, Forests, Factory
SDG 14	‘Conserve and sustainably use the oceans, seas and marine resources for sustainable development’	Fisheries
SDG 15	‘Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss’	Forests, Field



# Section 1: Fisheries

An emerging area of research has begun to critically examine overfishing and ecosystem decline in fisheries and to place the phenomenon in its broader socio-political and economic contexts, both on a global scale, as well as on regional and national scales. Notably, a number of researchers have highlighted the complex interrelationship between overfishing and labour exploitation, particularly in the context of the seafood industry in Thailand<sup>38</sup>. Such research has indicated interactions between prevalent debt-bonded labour in Thai fisheries and the persistent decline in fish stocks in the country.



Figure 3: Image from EJF's investigation into human trafficking and slavery in the seafood industry in Thailand (EJF 2015)

*Driven by unsustainable and intensified production practices, there is a global trend towards ecosystem decline in fisheries and reduction in fish stocks. Indeed, the FAO estimate that over 31% of global fish stocks are now unsustainably caught or overfished, while 58% of fish stocks are already fully exploited (i.e. near or at their 'maximum sustainable yield'). Climate change is predicted to further exacerbate pressures on fish stocks, as well as reducing the biodiversity of marine life, primarily through ocean acidification and increased prevalence and severity of storms.*

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An increasing global demand for cheap seafood has fuelled a drive towards large-scale, intensified fishing methods and production processes which has put significant pressures on fish populations that are simply unsustainable in the long-term. In response, aquaculture, or 'fish farming', has grown rapidly in recent years and now produces up to half of all seafood globally<sup>42</sup>. It is likely that the reliance on such practices in the seafood industry will increase in the decades to come. However, while aquaculture is viewed as a technological solution to the decline in wild fish stocks and as a more sustainable way of meeting demand for seafood, in practice it relies heavily on fishmeal, particularly for those species higher in the aquatic food web (e.g. salmon)<sup>43</sup>.

Research has highlighted the increasing economic pressures that are exerted on fisheries as a result of overfishing<sup>44</sup>.

Figure 4: Image from EJF's investigation into human trafficking and slavery in the seafood industry in Thailand (EJF 2015)



In response to the rising global demand for seafood and the simultaneous depletion in fish stocks in many coastal waters, fishing vessels are being forced to extend their operations, both geographically and temporally. The Environmental Justice Foundation (EJF)<sup>45</sup> have evidenced the exacerbated economic pressures faced by fisheries in Thailand, whereby fishing operations need to travel further afield and for longer periods "for ever diminishing returns" of fish catches. Indeed, fishing vessels in Thailand are now catching 14% of what they were in the mid-1960s, with approximately 40-50% of fish caught from Thai vessels coming from outside of the country's EEZ (Exclusive Economic Zone)<sup>46</sup>.

Subsequently, links between the economic pressures faced by fisheries from ecological depletion and overfishing to the increased prevalence of forced and debt-bonded labour in the fishing industry can be drawn. Intersecting with other social and economic issues, there is an evident global trend towards labour exploitation in the fishing sector<sup>47</sup>. Thus far, much of the scholarship in the area has overwhelmingly focused on the interrelationship between environmental degradation and forced and debt-bonded labour practices in the context of Thailand<sup>48</sup>.

Based on first-hand evidence, EJF<sup>49</sup> propose that the economic pressures associated with depleted fish stocks have fuelled the use of slave labour in the Thai fishing industry<sup>50</sup>.

In Thailand, fishing vessels were found to be making use of debt-bonded labour practices in their operations as a way of reducing labour costs and of remaining competitive in the industry. This is in line with the ILO's<sup>51</sup> conclusions that enhanced industry pressures and competitiveness can drive exploitative labour conditions and the use of forced labour. Relatedly, other authors<sup>52</sup> emphasise the need to examine forced labour practices in Thai fisheries within a broader socio-political and environmental context.

Driven by shortages in labour and a need to reduce costs, many of the workers exploited and coerced in the Thai fishing industry are often migrants from neighbouring countries, primarily Cambodia and Myanmar<sup>53</sup>. They have been found to be recruited by middlemen under false pretences and through fraudulent contracts. As has been well-documented, migrant workers are particularly vulnerable to abusive labour practices and may be forced to accept low-paid and dangerous work<sup>54</sup>. There is a further link here between the exploitative labour practices prevalent on Thai fishing vessels and environmental destruction: many of the migrants coerced to working on such vessels are from agrarian communities in Cambodia or Myanmar that have been displaced or face reduced incomes as a result of climate-induced natural disasters (e.g. typhoons or monsoons)<sup>55</sup>. Out of desperation, they often gain entry to Thailand through informal and dangerous migratory channels<sup>56</sup>.



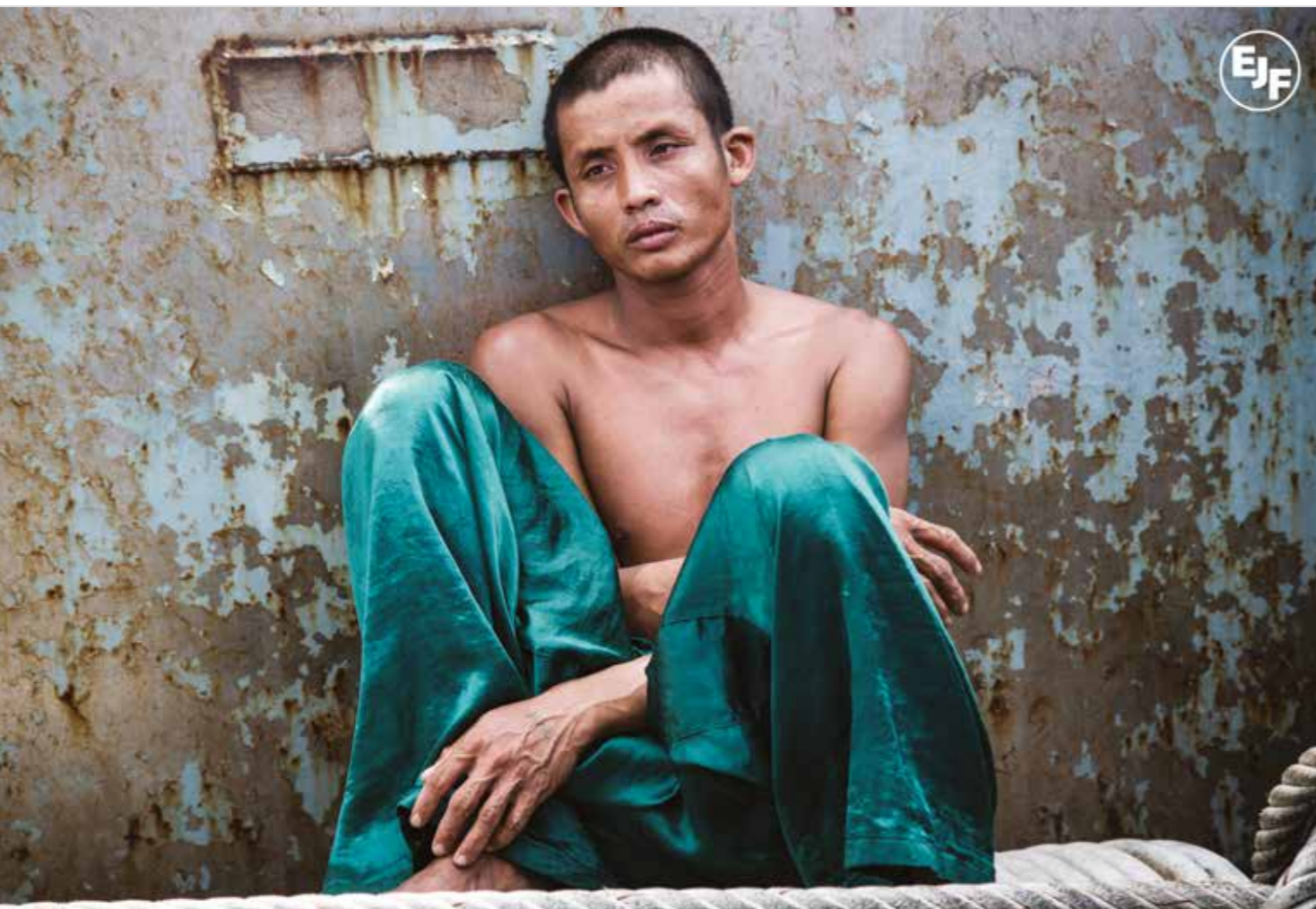


Figure 5: Image from EJF's investigation into human trafficking and slavery in the seafood industry in Thailand (EJF 2015)

It is detailed by Couper, Smith and Ciceri<sup>57</sup> that young men in Cambodia are often recruited by exploitative middlemen and are unaware that they will be working on a fishing vessel or for how long. Additionally, the workers incur an initial debt, used to pay recruitment fees or travel and documentation costs; in order to pay off their debt, costs are taken from the workers' earnings and often they cannot leave the job until the debt has been cleared, rendering the labourers 'immobile' in Thailand<sup>58</sup>. Through false accounting, extortionate levels of interest or encouragement to spend heavily while at the port, fishing vessel operatives ensure that workers build up further debts and make it almost impossible for these to be cleared<sup>59</sup>.

Subsequently, labourers become locked into debt bondage and are forced to work on the fishing vessels for months or even years. In many cases, workers do not receive payments as promised and are often coerced to work for little or no money<sup>60</sup>. Meanwhile, during the EJF<sup>61</sup> investigation, it was found that the labour conditions on the fishing vessels tend to be highly abusive, violent and exploitative, or "alarmingly substandard". Multiple recent studies have evidenced long working days (often up to 20 hours), physical and mental abuse and the confiscation of documentation in the Thai fishing sector<sup>62</sup>.

Workers face threats of violence or torture if they disobey orders or attempt to escape<sup>63</sup>. Sylwester<sup>64</sup> makes it clear that the labour abuses within the Thai fishing industry go beyond 'substandard labour conditions' and represent a form of 'labour trafficking' (comprising of both human trafficking and forced labour practices).

EJF<sup>65</sup> highlight the strong linkages between ecosystem decline, debt-bonded labour and illegal fishing, whereby the majority of fishing vessels that make use of exploitative labour practices tend to be illegal operations. It is proposed that the illegality of such vessels facilitates the use of debt-bonded labour<sup>66</sup>. Illegal fishing vessels in Thailand tend to operate at long distance and out of the EEZ, partly to increase the fish catch and partly to avoid regulation and monitoring. Lewis et al.<sup>67</sup> suggest that illegal fishing vessels "...take advantage of the low risk of being caught when committing human rights abuses...". Due to the illegal nature of such fishing operations, workers have few rights and could be abandoned without notice<sup>68</sup>.

As well as wild capture, the majority of illegal fishing vessels in Thailand are dependent on the fishstock required for the large-scale farming of shrimp<sup>69</sup>.

Indeed, research has highlighted the role that exploitative labour practices play in meeting the growing international demand for cheap seafood to the Global North, with Thailand acting as the largest supplier of shrimp to the US<sup>70</sup>. It can be proposed that illegal, debt-bonded labour practices in the Thai fishing industry allow the country to continue to export low-cost seafood. The importance of the seafood industry for the Thai economy has been proposed to underpin a lack of political will and action by the Thai government to address illegal fishing and abusive labour practices in the country<sup>71</sup>.

Accordingly, the EJF<sup>72</sup> investigation indicates a potential two-way relationship between environmental degradation and debt-bonded labour, whereby, driven by an international demand for cheap seafood, the use of slave labour on illegal fishing vessels has further driven overfishing and ecosystem collapse. Illegal fishing vessels depend on cheap and debt-bonded labour in order to survive by masking the true economic costs of ecosystem decline and of months-long long-haul fishing operations. In doing so, exploitative labour practices help to perpetuate the continued decline of fish stocks, both in and outside of Thailand's EEZ<sup>73</sup>.

The EJF<sup>74</sup> subsequently propose that without adequately tackling the growing numbers of illegal fishing activities and the use of debt-bonded labour, it will prove difficult to address the decline in fish stocks and overfishing in the Thai coastal waters.

Similar linkages between exploitative labour practices and environmental destruction have also been located in fish farms in the Sundarban forest, particularly in Bangladesh<sup>75</sup>. Despite being granted UNESCO protected status, due to its diverse and unique flora and fauna, and it being prohibited to undertake clearing of the mangrove forests, illegal deforestation has persisted in the area, primarily to serve the interests of dry fish and shrimp camps. Although there are strict laws in the area for fishing, fish camps have increasingly appeared in the Bangladeshi Sundarbans in recent years<sup>76</sup>.

As Bales<sup>77</sup> has noted, the clearing of the mangrove forests in the Sundarbans by fish camps has often been enabled through the use of forced labour and child labour. The workers, often children, are tasked with processing the shrimp and fish, without set working hours, fixed wages or contractual obligations. Typically, they are paid piece-rate and often work up to 80 hours per week. Additionally, it has been found that the fish farm labourers are made to wait weeks for any form of payment<sup>78</sup>. As a result, the employers often lend them money or give them food which accrues into a form of debt that needs to be repaid, bonding the worker to them, in similar ways to the practices that occur on the Thai fishing vessels.

Accordingly, it can be proposed that the slave labour activities carried out in the Bangladeshi fish camps are perpetuating environmental destruction locally<sup>79</sup>. These are acting to clear significant patches of the mangrove forests in the Sundarbans, which has a number of social and environmental implications. On a global level, the Sundarbans act as the largest carbon sink in South-east Asia (storing around 25.5 million tons of carbon in total). Mangrove forests tend to store as much as four times more carbon than other types of forests and, accordingly, the Sundarbans are key contributors to regulating the Earth's climate<sup>80</sup>.

On a local level, the destruction of the mangroves acts to render the local population more vulnerable to the frequent cyclones in the area, which are likely to increase in frequency as a result of climate change<sup>81</sup>. The forest-clearing associated with the fish camps also reduces space for local livelihoods<sup>82</sup>. Thus, the environmentally destructive nature of the fish farming in the Sundarbans potentially acts to exacerbate existing vulnerabilities for forested communities, which may ultimately render them susceptible to exploitative labour practices, suggesting a potentially cyclical nature to the nexus in the fish farms of the Bangladeshi Sundarbans<sup>83</sup>.



Figure 6: Image from EJF's investigation into human trafficking and slavery in the seafood industry in Thailand (EJF 2015)

## Summary and Discussion

Overall, the extant literature suggests strong interconnections between forced and debt-bonded labour practices and the continual decline of fish stocks and marine ecosystems, operating as part of a bi-directional nexus. These interconnections have been primarily observed thus far in the context of Thailand. Here, having been previously considered as separate issues, specific linkages have been made between overfishing, illegal fishing and debt-bonded labour in Thai fisheries<sup>84</sup>. Based on the examined literature, a nexus can be drawn up between environmental degradation, climate change and debt-bonded labour in the context of Thai fisheries, which exist in a vicious cyclical relationship.

The modern slavery-environmental degradation nexus in Thai fisheries exists within the context of an economy that depends on a thriving seafood industry. As media sources and research have suggested<sup>85</sup>, the international demand for cheap seafood in waters with declining fish stocks is often met through severe labour abuses and exploitation of the environment. Evidently, the interrelationship between environmental or ecological degradation and exploitative labour practices in Thailand intersect with a range of other social, political and economic challenges, e.g. illegal fishing, corruption, migrants' rights issues<sup>86</sup>. As EJF<sup>87</sup> has well-detailed, illegal fishing in Thailand perpetuates and facilitates further overfishing and ecosystem decline.

While research on the Thai fisheries and the Bangladeshi fish camps in the Sundarbans has highlighted the complex interactions between environmental destruction, climate change and debt-bonded labour, there remains limited empirical evidence of the nexus in the fishing sector outside of these contexts. Accordingly, it can be suggested that there is a need in future research to scale-up existing examinations to fisheries globally and in other contexts, considering the commonalities across geographies<sup>88</sup>. This could consider the identification and assessment of the continuities and discontinuities between the nature of the nexus in Thailand and the nexus in other fisheries.



## Section 2: Field

**The majority of the literature on the ‘field’<sup>89</sup> nexus has drawn from the exacerbated vulnerabilities of agrarian communities associated with the impacts of climate change<sup>90</sup>. Research has found that climate change is already significantly aggravating existing environmental stressors in farming-based regions in the Global South, notably South-Asia and Sub-Saharan Africa<sup>91</sup>. Given their dependence upon natural resources, the livelihoods of agrarian communities are particularly sensitive to climate variability and environmental shocks<sup>92</sup>. Climate vulnerabilities can be usefully divided into either sudden-onset or slow-onset climate change impacts.**

Concerning sudden-onset impacts, the increasing intensity and frequency of natural disasters (e.g. typhoons, flash floods, tsunamis) are likely to result in destroyed or submerged farmland, physically displacing agrarian communities<sup>93</sup>. Such displacement may be both temporary and permanent, during which it is likely that communities lose crops, property and other resources<sup>94</sup>. As research has noted<sup>95</sup>, natural disasters and environmental shocks pose a significant threat to agrarian communities, given the precarity and sensitivity of livelihoods based on natural resources. Vulnerabilities to natural disasters are contingent on the socio-political context and are highly uneven, both within and between societies, intersecting with economic, social, political and gender-based inequalities<sup>96</sup>. As Juran and Trivedi<sup>97</sup> comment, “...disasters of the same magnitude striking similar geographies may produce drastically different impacts due to varying degrees of vulnerability”.

The slow-onset impacts of climate change largely refer to the more long-term changes in the climate that are set to significantly affect agrarian livelihoods, often in the form of the increased prevalence, severity and unpredictability of droughts and floods, sea-level rise, as well as rising temperatures<sup>98</sup>. Much research has indicated the long-term threat posed to the agricultural sector by climate change<sup>99</sup>.

As well as loss of crop land, climate change is predicted to lead to reduced agricultural yields and incomes for farming communities. For instance, if floods become more persistent over time, this is likely to render agricultural livelihoods unsustainable. Accordingly, it is suggested that climate change may act to aggravate existing socio-ecological stresses among farming communities<sup>100</sup>. Additionally, poor, vulnerable and marginalised agrarian communities are less well-prepared to respond to shifts in the climate.

In line with these sudden-onset and slow-onset impacts, a significant body of research has examined the implications of climate change for rural-urban migration in the Global South<sup>101</sup>. It is proposed that the impacts of climate change will exacerbate existing pressures on the most vulnerable sections of the population to migrate away from their homes. For agrarian communities, these pressures are driven by natural disasters, which may forcibly displace local populations, as well as more long-term changes in the climate, whereby deteriorating local conditions and increasingly constrained farming-based livelihoods act as a significant ‘push’ factor for rural populations to move away from their homes to urban centres within their countries or internationally<sup>102</sup>.

Indeed, the ODI<sup>103</sup> notes that in the last 30 years, climate-induced migration has already begun, with the flows of migrants doubling from the 20 countries that are considered to be the most climate vulnerable. Geographically, climate-induced displacement and migration is predicted to be the most profound in South-east Asia and Sub-Saharan Africa, in line with the global distribution of climate change impacts<sup>104</sup>. Here, the impacts of climate change become entangled with other socio-political, economic and gender-based conditions that influence multiscalar migratory patterns<sup>105</sup>.

However, while climate-induced migration and vulnerabilities have been well-discussed in the extant literature, little research has thus far related this to its implications for human trafficking. Despite the human trafficking literature well demonstrating the increased vulnerability associated with forced migration and the climate change literature highlighting the increased vulnerability bound up with climate change impacts, particularly in marginalised agrarian communities and regions in the Global South, the two bodies of research have largely not connected the issues. Indeed, Molinari<sup>106</sup> proposes that scholars have tended to largely ignore climate change as an underlying driver behind vulnerability to trafficking.

Nevertheless, a significant body of literature has interrogated a human trafficking-natural disaster nexus<sup>107</sup>. Here, it is suggested that following natural disasters and environmental shocks, the exacerbated vulnerabilities of farming communities are likely to render them more susceptible to human trafficking practices. Empirical research has demonstrated increases in occurrences of trafficking following natural disasters, notably in the aftermath of the Indonesian tsunami, the typhoon Haiyan in the Philippines and Bangladeshi cyclones<sup>108</sup>. In response to environmental shocks, livelihood constraints or displacement, agrarian populations may be forced to migrate to urban centres or neighbouring countries, either permanently or temporarily<sup>109</sup>. However, with few rights, resources or support, vulnerable agrarian communities are likely to face significant constraints in migrating through safe or non-exploitative channels, leaving them easy targets for human trafficking rings<sup>110</sup>.

The riskier decisions taken by displaced and vulnerable populations are more likely to put them into contact with traffickers or exploitative middlemen<sup>111</sup>. As with conflicts or other crises, natural disasters exacerbate victims’ existing vulnerabilities and are taken advantage of by criminal traffickers<sup>112</sup>. As the ODI<sup>113</sup> comment, “...those who are forced into cities by adverse weather shocks may not be easily absorbed by the urban labour market – rural poverty can transform into urban poverty”. Notably, the IOM and Jasparro and Taylor<sup>114</sup> evidenced the exacerbated vulnerabilities of the rural communities affected by the Indonesian tsunami, where it was found that in the immediate aftermath of the tsunami, human trafficking instances grew significantly. Those who were already marginalised in Indonesian society were indicated to be most vulnerable to natural disasters and subsequently to be most at risk from exploitation by human trafficking rings<sup>115</sup>.

Additionally, research has highlighted the significant vulnerabilities faced by farming communities in Cambodia<sup>116</sup>. Due to a number of factors, the country has been indicated to be one of those most vulnerable to the impacts of climate change<sup>117</sup>. In recent years, shifting rainfall patterns, increased unpredictability of floods and droughts and a rising number of short-term environmental shocks have been recorded in Cambodia<sup>118</sup>. Strategies to mitigate the climate vulnerability faced by Cambodian farmers are financially and materially intensive and, accordingly, it is likely that some agrarian communities in the country will be forced to migrate elsewhere in seek of diversified income sources<sup>119</sup>.

Arguably, the migration of farming communities away from rural areas as a result of changes in the environment suggests failures of other forms of adaptation to climate change. There are immense challenges in the adaptation of vulnerable and marginalised agrarian communities to climate change, not least because of insufficient material and financial resources. Much of the adaptation to climate change requires significant and expensive technical inputs which can be out of reach to poor and vulnerable rural populations without sufficient support<sup>120</sup>. Thus, for such populations, migration through informal and illegitimate channels to urban centres may be the only option, in which they are vulnerable to trafficking and exploitative labour practices<sup>121</sup>.

Additionally, Jasparro and Taylor<sup>122</sup> suggest that, with the emergence of climate change-induced vulnerabilities and migration in coming years, the developed nations in the Global North are likely to increasingly fortify borders and limit inward migration. As a result, the use of criminal and illegal trafficking networks is likely to rise, as rural populations become increasingly desperate and vulnerable.

However, Molinari<sup>123</sup> stresses that human trafficking should not be framed in solely criminal justice terms, but instead conceptualised more holistically and contextually, as entangled within uneven and multiscalar power relations and in terms of underlying, broader vulnerabilities to climate change. In such a way, climate vulnerabilities are bound up with, and amplify, other existing socio-ecological pressures that are likely to feed into human trafficking activity and exploitative processes. Indeed, Molinari<sup>124</sup> argues: “climate change-related vulnerability, which entails uneven, uncertain, and complex processes contingent on myriad factors, does not fit neatly into dominant criminal justice-oriented anti-trafficking initiatives...”.

Relatedly, a number of researchers have examined the linkages between natural disasters and human trafficking in the context of existing and pervasive gender-based inequalities<sup>125</sup>. Gender-based vulnerabilities to natural disasters and environmental shocks manifest themselves in terms of preparedness and outcomes. On the one hand, females tend to have fewer resources, finances and networks to be able to sufficiently prepare for a coming natural disaster or to adapt to existing and predicted impacts of climate change<sup>126</sup>. On the other hand, multiple studies have found to women and girls to be most at risk from human trafficking and for sexual and gender-based violence to increase following natural disasters<sup>127</sup>. More broadly, it is proposed that existing gender-based discrimination and inequalities are likely to be intensified by climate change, leaving them more vulnerable to exploitative and trafficking practices<sup>128</sup>.



The literature also highlights, albeit to a much lesser extent, the exploitative labour practices that may be tied up with, or follow, the human trafficking vulnerabilities for agrarian communities in the Global South<sup>129</sup>. Middlemen or agents may exploit the vulnerable conditions of recent migrants, with researchers noting the rise in forced labour that tends to follow natural disasters and climate-induced migration, particularly for those leaving rural areas<sup>130</sup>. Notably, migration from Cambodia to Thailand has increased in recent years, likely driven, at least partially, by local and regional environmental stressors and changes in the climate<sup>131</sup>. As outlined in the previous section, it is this group of migrants that are being coerced, through illegal and unsafe migratory channels, to work on Thai fishing vessels under debt-bonded conditions and abusive labour conditions

However, there is also a risk of exploitative labour practices for those who remain in their farming communities, due to the exacerbated pressures and ecological precarity that they face in light of climate change impacts. Researchers have indicated that these practices have primarily emerged in agrarian populations in the form of debt bondage, notably in South Asia<sup>132</sup>. Here, traditional, caste-based forms of bondage tend to interact with modern, contract and intermediary-driven debt bonded labour in agrarian communities. In particular, Taylor<sup>133</sup> has highlighted the complex interactions between the water stress exacerbated by climate change and debt-bondage in Andhra Pradesh, India.

Repeated droughts are increasingly occurring in the semi-arid zone of Andhra Pradesh and are predicted to considerably increase as the impacts of climate change emerge. Given the significant expense needed for marginalised farming communities to adapt to climate change and to mitigate environmental stressors, it is offered that the impacts of climate change may exacerbate existing inequalities and vulnerabilities<sup>134</sup>.

Taylor<sup>135</sup> proposes that, in attempting to combat water stress, farmers in Andhra Pradesh are being pushed into 'debt traps' that intensifies their existing poverty.

The exacerbated challenges faced by vulnerable smallholder farmers in Andhra Pradesh can be placed in the broader context of agrarian change and the 'Green Revolution' in India, whereby liberalised agriculture requires external, intensive and expensive market-purchased inputs, leaving small-holder farmers facing significant financial constraints<sup>136</sup>. In semi-arid rural India, access to groundwater is key to survival and smallholder farmers in the region are forced to purchase the technical inputs (e.g. the equipment needed for drilling borewells) for doing so on credit from landed and merchant capital, often through informal channels and at exploitative rates of interest<sup>137</sup>.

Accordingly, 'debtscales' have formed in rural India, whereby smallholder farmers' survival is dependent on purchasing credit for necessary technical inputs and have become heavily indebted as a result<sup>138</sup>. Taylor's<sup>139</sup> argument here is that the impacts of climate change, in the form of increasingly frequent and severe droughts, is exacerbating previously existing inequalities relating to groundwater access. Additionally, it has been found that marginal smallholders in Andhra Pradesh, in response to their constrained livelihoods and indebtedness from the purchase of technical inputs, are driven to undertake debt-bonded labour (i.e. contracted farm labour whose wages are used to pay off an accrued 'debt', often used for the required technical inputs in agriculture)<sup>140</sup>.

In such a way, the dynamics of vulnerability become re-shaped and re-emerge in the context of climate change impacts in Andhra Pradesh. Accordingly, climate vulnerabilities are interwoven with uneven power relations and social hierarchies, whereby ecologically-driven debt bondage acts to further constrain the livelihoods and incomes of marginalised smallholder farmers in the region.

Taylor<sup>141</sup> suggests that 'debtscales' in Andhra Pradesh form "...a mattressing effect where, in the event of adverse economic or environmental change, rural elites are provided with a soft-landing courtesy of those below". In perpetuating indebtedness among marginal smallholders, the susceptibility of the merchant and landed class to climate change impacts is reduced, highlighting the relational nature of climate vulnerability.

Similar instances of debt bondage have been located in Cambodia, in which water shortages are also common. Research has highlighted the use of debt-bonded labour and the purchase of credit as a way for marginalised Cambodian smallholder farmers to combat the increasingly prevalent and severe droughts in the country<sup>142</sup>. As in Andhra Pradesh, 'debtscales' in rural Cambodia combine with the impacts of climate change to exacerbate the existing vulnerabilities of agrarian communities, whereby not all farmers are equally equipped to cope with shifts in climate.

Moreover, research<sup>143</sup> has highlighted the use of child labour to act as a coping mechanism for agrarian communities that are dealing with 'climate shocks' or climate-induced events. With depleted household earnings and crop failures resulting from repeated droughts or flooding, Boutin<sup>144</sup> suggests that child labour has been adopted by farming communities in Sub-Saharan Africa, as "an informal livelihood and insurance strategy" and as a way of absorbing climate-induced environmental shocks. Loss of income means that farming households are forced to make increased use of child labour<sup>145</sup>. However, the evidence for the relationship between child labour and environmental shocks remains currently limited in nature.

## Summary and Discussion

Overall, the extant research indicates that agrarian communities in the Global South are the most susceptible to current and future climate change impacts, given the precarity of their livelihoods and their dependence on natural resources. Subsequently, this renders them more vulnerable to the exploitative labour practices and human trafficking that may follow the natural disasters and environmental shocks bound up with climate change, as well as the more long-term, slow-onset impacts of climate change. The vulnerabilities that marginalised farming communities face more broadly become entangled with climate change and exacerbated environmental stressors.

In terms of the nexus, the research focus thus far has been upon linkages between human trafficking and natural disasters for agrarian communities that have been displaced or forced to migrate away to urban centres within the country or internationally. Here, it is suggested that following natural disasters and environmental shocks, the exacerbated vulnerabilities of farming communities is likely to render them more susceptible to human trafficking practices. However, despite the emergence of a human trafficking-natural disaster nexus, the current literature on climate-induced or climate vulnerability in agrarian communities has generally not spoken to the human trafficking or modern slavery literature, despite the clear linkages between these phenomena; as the IOM<sup>146</sup> have proposed, the abusive and exploitative practices that may be bound up with the enhanced climate-induced environmental stressors on agrarian livelihoods requires further assessment and exploration.

Furthermore, the literature has highlighted the other forms of exploitative labour practices that may be tied to climate-induced migration or vulnerabilities, including the presence of debt-bondage in India, but this is currently limited in nature. There needs to be enhanced focus in examining the other forms of exploitation that may be bound up with, or follow, human trafficking activity in climate vulnerable regions, as well as those who remain but face increasingly precarious and constrained farming-based livelihoods. Pertinently, the linkages between climate-induced environmental stressors in Cambodia and the prevalence of debt-bonded labour in Thai fisheries is inferred and touched upon in the extant literature but requires an explicit and empirical examination in future research, as we move towards a more holistic framing of the nexus.

Additionally, extant literature has suggested a one-way conceptualisation of the 'field' nexus thus far; with notable exceptions<sup>147</sup>, limited research has examined the extent to which forced or debt-bonded labour in agrarian communities may worsen local environmental conditions, degrade the environment or contribute to GHG emissions, in response to increased pressures to reduce costs.



# Section 3: Forest

**The primary focus of the extant literature on the ‘forest’ nexus has been the role that forced, exploitative and debt-bonded labour plays in accentuating deforestation practices, primarily in the Amazon rainforest<sup>148</sup>. It has been detailed that forced and debt-bonded labour is used in rural Brazil to clear forests for cattle farming, ethanol plantations and charcoal camps. In recent years, research has highlighted the simultaneous occurrence of illegal deforestation and exploitative labour practices in Brazil, as mutually destructive practices<sup>149</sup>.**

Deforestation in Brazil is persistent and pervasive, bound up with the broader political economy in the country. Forests at the isolated and outer limits of the Amazon are often cleared to meet the demands of the expansive cattle, soy and charcoal industries<sup>150</sup>. Notably, the cattle industry is identified as a key driver of deforestation and vital to the functioning of the Brazilian economy, with the country acting as the world’s leading exporter of beef<sup>151</sup>. Meanwhile, since the early 2000s, there has been investment in ‘green’ exporting in Brazil through the production of soybeans and ethanol (which act as key ingredients in biofuels) that has led to widespread incursions into the Amazon and large-scale forest clearing<sup>152</sup>.

Although the Brazilian government has put in place significant measures to curb deforestation, forest-clearing practices in the country have largely continued through illegal channels<sup>153</sup>. For instance, Greenpeace<sup>154</sup> found that in 2006-07, 90% of the Amazon had been illegally cleared. It has been noted that many ranches are often built on illegally occupied land (called ‘grilagens’, or ‘land grabs’) in physically isolated spaces at the frontier of the Amazon rainforest that proves difficult for the government to monitor and govern<sup>155</sup>. The illegality of deforestation practices in Brazil is bound up with exploitative forms of labour that emerge through debt-bondage and are subject to slave-like conditions.

In Brazil, around a quarter of a million people are in slave labour of some kind<sup>156</sup>. The charcoal camps, cattle ranches and ethanol producers in the country have depended upon and been built on exploitative and debt-bonded labour practices<sup>157</sup>. Research has suggested that economic pressures on small-scale agricultural producers have fuelled the continued prevalence of slave labour in rural Brazil<sup>158</sup>. In particular, the cattle industry is dominated by a small number of large agro-businesses, putting small-scale farmers at a disadvantage and forced to cut costs. As Francelino-Gonçalves-Dias and Mendonca<sup>159</sup> argue, “...the occupation of land, deforestation and slave labour practices are all responses to this process”.

Marginalised agricultural producers in Brazil are also required to meet the demands of consumers of low-cost beef in the US<sup>160</sup>. In other words, the low price of imported beef in the US is maintained through the use of slave labour in the cattle industry. Additionally, an Al Jazeera<sup>161</sup> investigation highlighted the links between slave-based charcoal production in Para, in the North of Brazil and a global, lucrative steel industry. Accordingly, the dynamics of global production networks and an increasingly constrained and competitive economic environment have laid the foundations for the use of slave labour in rural Brazil<sup>162</sup>.

The prevalence of slave labour in rural Brazil has also been fuelled in large part by the severe inequalities and concentrated land ownership in the country<sup>163</sup>. Landowners, descendants of slave-driven coffee and sugar plantation owners, exert a powerful control in Brazil’s political economy; meanwhile, there exists a vulnerable and impoverished landless population (primarily comprising of young men) which is desperate for work and tends to reside in slums or rural villages, particularly in the North-east region<sup>164</sup>. Such marginalised populations are often preyed upon by exploitative middlemen known as ‘gatos’<sup>165</sup>. As Bales<sup>166</sup> describes, these have become a ‘disposable’ people for the cattle ranches, charcoal camps and ethanol producers which can recruit them with minimal associated risks and costs.

The workers are often recruited by ‘gatos’ under false pretences, being enticed to work illegally and informally in distant charcoal camps and cattle ranches through up-front payments and on the assumption that they will be paid a regular salary<sup>167</sup>. However, when they arrive, it becomes soon apparent that the labour conditions they face are degrading and exploitative, with much evidence pointing to the non-payment or under-payment of salaries, inadequate sanitary conditions, lack of protective gear and clothing, and no running water or electricity in camps and plantations<sup>168</sup>.

It has been noted that many agri-businesses in Brazil use a piece rate system, whereby labourers are required to work long, intense hours to meet their needs and are often punished or suspended for not meeting quotas<sup>169</sup>.

As well as the degrading and exploitative conditions, modern slavery in rural Brazil also manifests itself through debt bondage. When they are recruited by the ‘gatos’, the workers accrue a debt for transportation and foodstuffs consumed en route to the ranches and farms<sup>170</sup>. They are often encouraged to take out an advance of wages upon arriving at their place of employment to cover initial personal costs, to pay for transport and to send money home to support families. The workers build up further debt by having to pay for any equipment or tools that they may need to use on the job, as well as food or other essential items on site.

The landowners’ or ‘gatos’ stores are often the only place in the area where such items can be bought, effectively forcing the workers to purchase these at extortionate prices and to become further locked into debt-bondage<sup>171</sup>. Accordingly, the accrued debt is almost impossible to be ever paid off through credit from labour<sup>172</sup>. In line with their debt bondage, the workers have restricted freedoms and immobilities in their daily lives: they are often prevented from leaving by armed guards and are constantly watched and threatened by foremen<sup>173</sup>. Debt bondage is the most common form of modern slavery in Brazil<sup>174</sup> and performs a similar function to the exploitative labour practices on fishing vessels in Thailand.

Thus, it can be proposed that the clearing of forests and other environmentally destructive activities in the Amazon are entangled with debt-bonded labour and degrading working conditions<sup>175</sup>.

The ILO<sup>176</sup> highlights a distinct and clear correlation between slave labour practices and forest-clearing in Brazil, primarily in the ‘deforestation arch’ in the North of the country, to serve the interests of the charcoal, cattle and soya industries. Although not explicitly tying the two together, Greenpeace<sup>177</sup> indicated that those companies engaging in environmentally destructive activities in the Amazon are also those which tend to operate using exploitative labour practices. Bales<sup>178</sup> calculates that, globally, deforestation activities that depend on slave labour are responsible for 2.54 billion tons of CO2 emissions per year. Given the size of the Amazon and its carbon stocks, as well as the pervasiveness of debt bondage in clearing forests in the country, many of these emissions can be attributed to slave-based deforestation. The charcoal camps and cattle ranches that make use of slave labour are also responsible for adding further GHG emissions and pollutants into the air<sup>179</sup>.

The close linkage between large-scale deforestation and debt-bonded labour in Brazil is underpinned by informal and illegal practices<sup>180</sup>. Many of the activities in the charcoal and cattle industries are dependent upon illegal logging and forest-clearing that would not be possible without informal, unregulated labour practices. The landowners and ‘gatos’ exploit the vulnerabilities of the landless migrants to illegally clear forests. The GSI<sup>181</sup> suggests that up to half of illegal deforestation globally is dependent on slave labour. Deep into the Amazon and out of sight of the authorities, these twinned and mutually destructive illegal practices can prevail, compromising both environmental sustainability and human rights<sup>182</sup>.

Overlapping findings have emerged in other locations and industries on the close linkages between slave labour and forest clearing. Notably, research has demonstrated the dependence of the palm oil industry in Indonesia on exploitative and coercive labour practices<sup>183</sup>. Indonesia is the world’s largest palm oil exporter and literature has detailed the environmental implications of expansive palm oil extraction in the country, including the clearing of the Bornean and Sumatran rainforests and associated loss of biodiversity and destruction of habitats for the Sumatran tiger and orangutans<sup>184</sup>.

Researchers and advocacy organisations have recently begun to investigate the exploitative labour practices in the Indonesian palm oil sector<sup>185</sup>. As with rural Brazil, these largely refer to debt-bonded labour and abusive working conditions. Indeed, in a recent investigation of Wilmar’s (the world’s largest palm oil processor and seller) supply chains in Indonesia, Amnesty International<sup>186</sup> identified ‘serious human rights abuses’ in its plantations, including, “...forced labour and child labour, gender discrimination, as well as exploitative and dangerous working practices that put the health of workers at risk”. Skinner<sup>187</sup> found that palm oil plantation labourers were often living in accommodation without running water, electricity or sufficient food.

Amnesty International’s<sup>188</sup> findings highlight that palm oil plantation workers tend to be employed casually, leaving them vulnerable to labour abuses, including being forced to work long hours, being let go without notice and not receiving payments or being punished if arbitrary targets had not been met, as part of a ‘piece rate’ system.



Relatedly, it was reported that, in many cases, child labour was used in the plantations, some from the age of eight years old, often as an informal way of helping their families meeting their piece rate targets<sup>189</sup>. As many as 1.5 million children are said to be working informally in Indonesia, many of whom on palm oil plantations.

Thus, in similar ways to what was found in rural Brazil, there are significant linkages between deforestation and exploitative labour practices in the Indonesian palm oil industry<sup>190</sup>. It can be suggested that the considerable rise in palm oil production and exports from Indonesia since the 1990s (producing around 35 million tonnes of the oil per year, according to Amnesty International<sup>191</sup>) and associated destruction of the Bornean and Sumatran rainforests has been enabled, at least in part, by an exploited and coerced workforce<sup>192</sup>.

Furthermore, there is evidence to suggest that forced and debt-bonded labour is being used to enable deforestation practices through artisanal and small-scale mining in Sub-Saharan Africa<sup>193</sup>. As Bales<sup>194</sup> details, the mining and extracting of minerals, including gold and those used for mobile phone components, has led to widespread clearing of forests in Democratic Republic of Congo (DRC) and Ghana, among other environmentally destructive practices. It is estimated that between 1990 and 2010, Ghana lost around 33.7% of its forests and woodland, of which illegal mining was a key contributing factor<sup>195</sup>. As with illegal logging in Brazil, illegal mining intersects with exploitative labour practices in Ghana.

In similar ways to the charcoal camps and cattle ranches in Brazil, the workers in small-scale mining camps in DRC and Ghana accrue initial and continual debt through the acquisition of food, tools and other provisions that they need to pay off before they can leave the camp<sup>196</sup>. Accordingly, the miners become locked into debt-bondage for an expansive and important gold export industry in Ghana. The 'hidden' nature of the small-scale mining camps in Ghana highlights the role that illegality plays in underpinning both slave labour and deforestation practices<sup>197</sup>.



## Case Study 1: A Freedom Dividend: The Sundarbans Forests

**The largest continuous mangrove forest in the world, the Sundarbans Reserved Forest (SRF) in Bangladesh, is one of the most ecologically diverse and important environmental features globally. The United Nations (UN) has recognised the benefits that Bangladesh and the rest of the world gain from the presence of this unique mangrove environment by naming the area as a UNESCO World Heritage Site in 1997.**

Yet despite this protection, contemporary slavery activities proliferate in the SRF. Within South Asia debt bondage is a common practice in the agricultural sector – which includes fish farming and processing. Fish-processing camps have been established and are being operated within the SRF. The use of child labour in these camps is common and they are typically forced to work long hours in hazardous conditions sorting through the catches, washing and then drying the fish. The slavers' exploitative child labour practices have facilitated the clearing of large swathes of the mangrove forests, with impacts on provisioning (e.g., production of

goods); cultural (e.g., recreational services); regulatory (e.g., natural hazard protection) and supporting ecosystem services (e.g., biodiversity).

While the extent of fish camps in the SRF had been previously under-estimated, the Rights Lab (a University of Nottingham Beacon of Excellence) has calculated the true scale of the presence of the fish-processing camps in the SRF and their impacts on the natural environment. By using a combination of remote sensing data, ecosystem services analysis and monetary valuation, a rounded-picture of this particular nexus between slavery and environmental change has been ascertained. The findings that emerged from this research are to be disseminated in the coming months. The study has provided insights into how abolishing slavery and saving the environment together can contribute to the Freedom Dividend, where a slavery-free world will be safer, greener, more prosperous, and more equal. This builds on previous work in the Rights Lab using remote sensing data where the environmental costs

of the brick-making industry in South Asia (across the so-called Brick Belt), in which debt-bondage labour is highly prevalent, were calculated with respect to atmospheric carbon dioxide emissions (a radiatively active gas which contributes to climate change).

The Rights Lab is home to the world's leading contemporary slavery experts and the first large-scale research platform for ending slavery. One research focus of the Lab is to compile, synthesise and integrate spatial data on the landscape changes that result from slavery activities and use these data to calculate the environmental costs of these activities, and the potential gains for all that stem from curtailing slavery. For more information see [nottingham.ac.uk/world/beacons/rights-lab/](https://nottingham.ac.uk/world/beacons/rights-lab/) and for updates follow us on Twitter (@rightsbeacon). Sources of support for our work in the Lab includes the Economic and Social Research Council (ESRC); Engineering and Physical Sciences Research Council (EPSRC); the Arts and Humanities Research Council (AHRC); and the British Academy (BA).

## Summary and Discussion

The examined literature highlights the mutually dependent and destructive nature of the relationship between slave labour and deforestation. Research on the forests nexus has primarily emerged in relation to the destruction of the Amazon rainforest, with Brazil's charcoal, cattle and soy industries indicated to depend to a significant extent on debt-bonded labour. Here, a strong correlation is highlighted between pervasive illegal deforestation and exploitative labour practices in Brazil. Debt-bondage in camps, ranches and plantations in rural Brazil is seen to be entangled with pervasive and continued forest-clearing practices in the outer limits of the Amazon.

Similar instances of slave labour-driven forest clearing have been found in the context of the palm oil industry in Indonesia and in the small-scale mining industry in Ghana. It makes sense that these areas have been explored in the literature on the nexus thus far, considering these make up the largest forests globally. Nevertheless, research on the forests nexus has tended to be strictly geographically-specific and connections have not generally been made between the different case studies, despite the evident commonalities. Continuities can be identified across and between the three cases, primarily in the use of

debt-bonded labour to fuel lucrative and expansive industries and to meet the global demand for cheap produce, whether this be mobile phones, charcoal, beef or palm oil. Thus, it can be suggested that future research is directed towards identifying and assessing connections in the forests nexus across and between contexts.

The extant literature highlights the binding and mutually dependent nature of the relationship between deforestation and exploitative labour practices and the need to tackle the two simultaneously. However, the research is yet to consider the possibility of the 'nexus' between slave labour and deforestation forming in the opposite direction. Here, the environmental destruction and deforestation caused by extractive industries and industrialised agricultural processes may result in the loss of livelihoods for rural communities. Around the world, many communities depend upon forests (and associated produce) for their everyday survival and livelihoods; without these, they may become more vulnerable, impoverished and be pushed towards engaging in exploitative labour practices.

Figure 7: A man climbing ladder at charcoal camp, Brazil (Kay Chernush – Free the Slaves)



# Section 4: Factory

Research on the nexus in the factory has largely concerned the prevalence of debt-bonded labour in the brick-kiln industry and the contribution of the brick-kilns to air pollution, GHG emissions and climate change in the Global South. In meeting countries' economic development and infrastructural needs, the production of bricks is most prevalent in South Asia, notably in India, Bangladesh, Pakistan (making up the 'brick belt') and Cambodia. The type of brick kilns varies, but the one that tends to dominate is the Bull's Trench brick kiln<sup>198</sup>.

It is well-established in the literature that Bull's Trench brick-kilns (BTKs) are damaging to local environments and contribute to climate change through significant GHG and black carbon emissions<sup>199</sup>. Making use of either coal (usually low-grade), firewood or other combustible materials (such as tyres) to fire the clay bricks, BTKs tend to be much more energy intensive and polluting than other types of brick-kilns<sup>200</sup>. While developed countries have moved away from BTKs to cleaner, modern and more energy-efficient brick-kilns, South-Asian countries, particularly those in the 'brick-belt' continue to make use of BTKs<sup>201</sup>.

Maheshwari and Jain<sup>202</sup> calculated the 'carbon footprint' of Bull's Trench brick kilns in India and found that they are among the largest consumers of coal in the country (responsible for approximately 35 million tonnes of coal annually), second only to the steel industry. Accordingly, the expansive brick-kiln industry in India (the second biggest producer of clay-fired bricks behind China) is responsible for significant CO<sub>2</sub> emissions<sup>203</sup>. BTKs tend to produce black carbon that, as well as contributing to climate change, has led to worsening local air quality and pollution levels<sup>204</sup>.

Furthermore, Tahir and Rafique<sup>205</sup> demonstrated the environmental destruction associated with the burning of biomass in brick kilns in Pakistan. Their analysis suggests that brick kilns in the Punjab region released approximately 525,440 tonnes of CO<sub>2</sub> each year.

As they depend on the burning of biomass, the brick kilns in Pakistan also contribute to significant deforestation in the region and thereby reduces space for carbon sequestration<sup>206</sup>. In line with these environmental impacts, a number of researchers have recommended a shift away from BTKs in South Asia towards cleaner, less polluting and more energy-efficient brick kilns, as a way of reducing GHG emissions and localised air pollution<sup>207</sup>. Indeed, Rajarathnam<sup>208</sup> found that transitioning away from traditional brick kilns such as BTKs could reduce CO<sub>2</sub> emissions by up to 70%.

However, there are numerous challenges facing governments in the Global South in shifting away from BTKs and other traditional brick-kilns, not least of which is the informality of the brick-kiln sector<sup>209</sup>. The most polluting and energy-intensive brick-kilns tend to set up on the outskirts of large cities in South Asia and are generally unregulated, run informally and geographically dispersed<sup>210</sup>. Thus, it proves difficult for governments to regulate and control the processes occurring in the brick kilns, including associated pollution. Indeed, there appear to be strong links between the informal sector and pollution-intensive activities, particularly in brick production<sup>211</sup>.

However, while the environmental degradation associated with brick-kilns in South Asia has been well-assessed and outlined, less has been written about how this is entangled with debt-bonded labour in the factories.

This linkage is strongly bound to the informality of the brick-kiln sector, which lends itself to both environmentally destructive and exploitative labour practices<sup>212</sup>. The lack of regulations in the informal sector can include weak labour protections, inadequate working conditions and lack of secure income, as well as limited environmental regulations<sup>213</sup>. As the informal brick-kilns are difficult to monitor and regulate for environmental purposes, it suggests that there are similar challenges in monitoring and regulating for ensuring labour protections. It is also offered that the more labour-intensive nature of BTKs lends itself to the use of exploitative labour practices in comparison to the more efficient and mechanised brick kilns<sup>214</sup>.

A significant body of literature has outlined and detailed the debt-bonded forms of labour that are occurring in brick kilns, particularly in India, Pakistan and Cambodia<sup>215</sup>. Debt-bondage in brick kilns tends to involve the exploitation of seasonal migrants (with brick-making usually taking place during summer months only), whereby labourers incur an initial debt that is perpetuated during their time working at the brick-kiln. Such labourers are forced to work at the brick kiln over numerous seasons until the debt is repaid. As with debt-bondage in other sectors, it is unlikely that the workers can reach a point at which this can be re-paid<sup>216</sup>.



Figure 8: A Cambodian brick-kiln (Thomas Cristofolletti, taken as part of the 'Blood Bricks' project)



Figure 9: A Cambodian brick-kiln (Thomas Cristofolletti, taken as part of the 'Blood Bricks' project).

Following recruitment, the brick-kiln labourers become indebted from an initial advance payment given for food and other essentials. Wages are used to pay off the debt and the labourers are forced to work each season in the brick-kilns until the debt is re-paid. In such a way, the brick-kilns can secure an underpaid workforce each season<sup>220</sup>. The workers tend to receive small payments for food and other necessities that is added to their debt. Research has found that brick-kiln labourers are usually paid piece rate (i.e. per brick)<sup>221</sup>. Thus, to help them fire more bricks and to repay the debt, labourers often enlist the help of their family members, including children. Indeed, the literature has noted the significant and persistent use of child labour in Indian brick-kilns<sup>222</sup>.

Similar findings on the prevalence of debt-bonded labour in brick-kilns in South-Asia have emerged in the context of Pakistan<sup>223</sup> and Cambodia<sup>224</sup>. In Cambodia, it has been proposed that the 'boom' in construction and large-scale infrastructural development in the country, particularly in Phnom Penh, has been fuelled in large-part by an exploited and debt-bonded workforce in the production of bricks. Licadho<sup>225</sup> identified prevalent inter-generational systems of debt-bondage occurring in brick-kilns north of Phnom Penh, with many of the workers reporting that they did not earn enough to live on or to significantly reduce their debt. As in India, debt-bonded labour in Cambodian brick-kilns has been generated in part by pressures in agriculture in the country that leaves a significant body of labour in search of employment and vulnerable to trafficking and exploitative practices in urban centres.

Researchers have found debt-bonded and forced labour to be particularly common in the brick-kiln sector of India<sup>217</sup>. Debt-bondage emerges in a specific form in India's brick-kilns, with the neo-bonded labourers who work there comprising primarily of migrants from surrounding agrarian communities. As detailed in Section 2, the persistent and severe pressures facing smallholder farmers in rural India has led to significant out-migration into nearby urban centres in search for alternative sources of income.

Driven by climate change-induced environmental stressors, often in the form of persistent droughts, displaced farmers arrive into nearby cities indebted, landless, vulnerable and with little income or support<sup>218</sup>. Here, migrants are likely to fall into debt-bonded and exploitative labour traps, including in brick-kilns. Additionally, contractors often arrive into impoverished and marginalised villages to recruit labourers in the off-season, enticing them to work in the brick-kilns through the offer of advances<sup>219</sup>.



## Case Study 2: Blood Bricks: the Modern Slavery-Climate Change nexus in Cambodia

**Debt-bonded labour – one of the most common forms of modern slavery – continues to proliferate in the brick kilns serving Phnom Penh, Cambodia’s rapidly expanding capital city. Workers are forced to work long hours, exposed to incredibly high temperatures from kiln fires, and are required to craft bricks using highly unsafe manual equipment which can trap limbs and result in amputations.**

Kiln owners severely restrict the mobility of debt-bonded labourers such that they cannot seek work in other places when kiln work dies down during the rainy season, and they cannot even leave to visit relatives without leaving a family member as collateral, often a child. Moreover, the familial nature of debt bondage means that children commonly work in the kilns in order to help their parents repay debts. As such, the kiln represents a form of intergenerational incarceration for workers.

The ‘Blood Bricks’ project explores the lives of debt-bonded workers on kilns, and the trajectory that led them there from rural villages across Cambodia. Research methods comprise two stages, firstly: semi-structured interviews with 51 brick kiln workers, and 31 further qualitative interviews with kiln owners, union leaders, former kiln workers, residents around the kilns and Buddhist monks to provide additional perspectives.

Secondly, a total of 308 quantitative surveys were conducted in three villages that comprise high levels of out-migration to brick kilns. These surveys were further supplemented by qualitative interviews with a sample of labour-sending households and other figures in the three villages.

The ‘Blood Bricks’ research is currently developing its findings, with clear links emerging for example between irrigated farmers and indebtedness in villages. Broadly, the project has shown that in the majority of cases, debt-bonded brick workers, representing modern slavery in a *factory setting*, originate as farmers in the *field*, who became indebted through taking on loans from local microfinance institutions (MFIs). Their debt was generally accrued either through medical expenses or investments in agriculture, where despite small farmers investing in fertilisers, high-yielding seed varieties, pesticides, and irrigation, Cambodia’s increasing vulnerability to floods and droughts has led to rising numbers of failed harvests and indebtedness. Cambodia has been repeatedly named one of the most vulnerable countries in the world to the impacts of climate change, and this is driven both by an increase in climactic events, and a lack of adaptation and mitigation strategies within the country. As such, climate change is shown here to *deepen* the income insecurity of small farmers, leading them to acute indebtedness.

Unable to keep up with the high-interest repayments of the MFI loans taken out to boost productivity, farmers are forced to ‘sell’ their debt to brick kiln owners, who offer interest-free loans, but require small farmers to *move from field to factory*, often with their entire families, to work on kilns full-time as debt-bonded workers. In this way, modern slavery in the factory is shown to have its roots in the *field*. Furthermore, once on the kilns, workers are forced to burn timber sourced from environmentally-destructive and often illegal logging that takes place across Cambodia. Thus environmental destruction of the *forest* literally fuels debt bondage in the *factory*. This project therefore highlights how modern slavery is constituted across and by different spaces, in this case: field, factory, and forest.

For more information see our research report (Brickell et al 2018), [projectbloodbricks.org](http://projectbloodbricks.org) and for updates follow us on Twitter (@blood\_bricks). The project is led by the Department of Geography, Royal Holloway, University of London and is a 18-month research project (2017-2019) entitled ‘Blood Bricks: Examining the Climate Change-Modern Slavery Nexus in the Cambodian Construction Industry’. The research is supported by our project funders, the Economic and Social Research Council (ESRC) and Department for International Development (DFID).

## Summary and Discussion

A review of research on the factory nexus suggests significant and on-going linkages between prevalent debt-bonded labour in brick kilns and environmental destruction in South-Asia. Evidence from India, Pakistan and Cambodia highlights the role that BTBs play in generating localised air pollution and contributing to significant black carbon and GHG emissions. Thus, more traditional brick-kilns are tied up with both local and global environmental destruction. Simultaneously, it is well-established that the brick-kiln industries in South-Asia are often driven by debt-bonded labour. However, while the two trends have been well-discussed, with exceptions<sup>226</sup>, connections have not generally been made between them. Considering their close interrelatedness, it can be proposed that these should be both conceptualised and tackled as mutually-destructive practices.

The research suggests the prevalence of debt-bonded labour and environmental destruction in South-Asian brick-kilns emerge in the context of an unregulated, informal brick-building sector and large-scale infrastructural and economic development.

The informal brick production sector tends to make use of more energy-intensive and traditional brick-kilns that contribute significant GHG and black carbon emissions, while also being dependent upon a large, cheap and exploited workforce. The significant infrastructural and economic development in cities such as Phnom Penh and Mumbai has been enabled to some extent by the cheap and large-scale production of bricks and therefore debt-bonded and exploited labour, as well as environmentally-harmful production activities. As the brick-kilns tend to be serving local markets, there is less international scrutiny into the processes that go into producing the bricks<sup>227</sup>.

Additionally, it can be suggested that the linkages between debt-bondage and environmental destruction in South-Asian brick-kilns should be placed within the context of climate-induced rural-urban migration that is occurring within the region, given that the brick-kiln labourers often tend to be displaced smallholder farmers.

Much of the research on brick-kiln labour in India has indicated the vulnerability of migrants, who are experiencing a decline in agrarian livelihoods, exacerbated by climate-induced environmental stressors, and are seeking new sources of income in nearby urban centres.

However, explicit linkages have not been made between rural-based climate vulnerabilities and urban-based labour exploitation in South-Asia. Considered more holistically, it can be proposed that there is perhaps a two-way nexus between environmental destruction and debt-bondage in brick-kilns, whereby the rural populations are displaced or pushed to migrate away as a result of enhanced environmental stressors that renders them vulnerable to precarious and exploitative forms of labour; following this, the use of debt-bonded labour in brick-kilns leads to further environmental degradation in the form of increased air pollution and GHG emissions.

Figure 10: Unloading of wood at a Cambodian brick kiln.

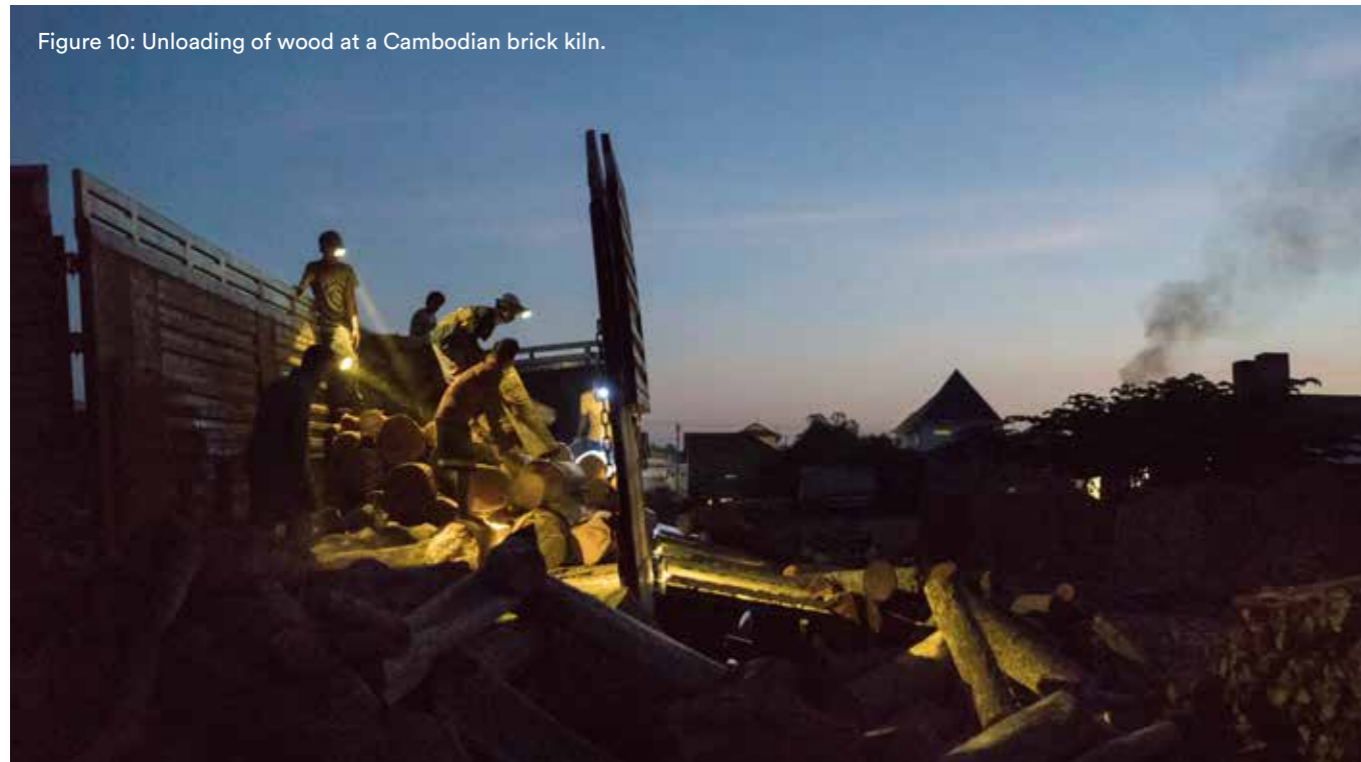


Figure 11: A family at brick-kiln, India (Peggy Callahan – Free the Slaves)



Figure 12: A brick-kiln in Rajasthan, India (Kevin Bales)



# Conclusion and Recommendations

**The review suggests that the nexus between modern slavery, environmental destruction and climate change has been understood as primarily sectorally and geographically-specific in nature thus far. Accordingly, in this report, the review of the literature was structured around four key sectors: (i) Fisheries (ii) Field (iii) Forests and (iv) Factories.**

First, in fisheries, research in Thailand has highlighted specific linkages between over-fishing, the environmental decline of fish stocks and the exploitative labour practices on fishing vessels<sup>228</sup>. Here, a complex, cyclical and two-way relationship can be conceptualised: increasing decline of fish stocks in Thai waters and the international demand for cheap seafood is leading to worsening abusive and exploitative conditions for fishing labourers, often in the form of debt-bondage, which later perpetuates and enables further overfishing and ecosystem decline in fisheries, often as part of illegal fishing networks.

Second, in the field, the current literature emphasises the exacerbated vulnerability faced by agrarian communities in the Global South given current and future climate change impacts, including the increased prevalence and severity of droughts and flooding, as well as rising temperatures and sea levels. Accordingly, precarious smallholder farming communities, without sufficient support and income, are rendered more susceptible to exploitative labour practices and human trafficking that may follow both the slow-onset and sudden-onset impacts of climate change<sup>229</sup>. There is a focus on India and Cambodia in this literature, in which the broader vulnerabilities faced by marginalised agrarian communities in the Global South are exacerbated by climate-induced environmental stressors.

Third, with the forest, research has demonstrated the mutually destructive nature of debt-bonded labour and deforestation, notably in the contexts of Brazil and Indonesia<sup>230</sup>. Here, empirical studies have highlighted the dependency of the expansive charcoal, cattle and palm oil industries upon a debt-bonded labour force. In these contexts, debt-bonded labour forms part of the story of deforestation, entangled with the large-scale clearing of the Amazon, Sumatran and Bornean forests, which has both local and global environmentally-destructive consequences.

Fourth, in factories, the research suggests that debt-bonded labour in brick kilns in South-Asia has fuelled environmental destruction through increasing levels of localised air pollution and GHG emissions<sup>231</sup>. The production of bricks in Bull's Trench Kilns (BTKs) has driven the large-scale economic and infrastructural development in urban centres in India, Pakistan and Cambodia. These tend to be more energy-intensive, polluting and contribute significant GHG emissions, as well as making use of a cheap and exploited workforce, in comparison to the smaller, mechanised brick-moulders.

Thus, research on the nexus has largely tended to emerge sectorally or in geographically-specific locations, with each of the sectors indicating the dominance of particular aspects of the nexus or direction of the nexus, in line with broader socio-political, institutional and economic factors.

Nevertheless, there exist commonalities across these sectors and a broad, two-way conceptualisation of the relationship between modern slavery, environmental destruction and climate change can be proposed, whereby the nexus goes beyond the sectoral. Accordingly, as the impacts of climate change and exacerbated environmental stressors become clearer, this may lead to a vicious cycle of perpetuating degradation of both environmental sustainability and human rights.

Additionally, the review suggests that the nexus at the sectoral levels is largely systematically and geographically bound together. This means that what is happening in one sector is, directly or indirectly, influencing what is happening in another sector, often intimately connected with flows of (climate-induced) migration. Notably, there are linkages between the migratory patterns that are bound up with climate change-induced environmental stressors in the agricultural sector and the exploitation of debt-bonded labour in brick-kilns in India, Pakistan and Cambodia and in the fisheries in Thailand.

However, the linkages between different geographic spaces and economic sectors have not been sufficiently made in the extant literature and the review suggests it would be beneficial to bring the sectoral strands together and to conceptualise these geographically-specific issues as part of a broader, multiscalar framework. This review acts as a starting point for research on the nexus. In moving beyond the sectoral and considering the relationship between modern slavery, climate change and environmental destruction more holistically, research can examine the connections and interactions between 'instances' of the nexus. Additionally, while the nexus has begun to be theorised and interrogated, little empirical research has been conducted on the interconnections between the three. There is a need for robust, empirical and in-depth examinations of the relationship between modern slavery, climate change and environmental destruction.

Moreover, researchers can consider how the two-way nexus framework maps onto particular instances of modern slavery that may have previously been conceptualised as uni-directional in the literature. For instance, in the forest, research has tended to focus almost exclusively on the extent to which debt-bonded labour enables increased levels of (illegal) deforestation. There is a lack of literature that considers the implications of the greater vulnerabilities of forested communities which are likely to result from forest loss in Brazil and Indonesia.

An improved understanding of the two-way relationship between modern slavery, environmental destruction and climate change can engender a movement beyond silos of knowledge and policy practices. Notably, this could involve bringing the SDGs in conversation with each other, i.e. SDG 8.7 on modern slavery in conversation with the environmentally-driven SDGs (12-15). A conceptualisation of a relationship between modern slavery, climate change and environmental destruction can also open up space for dialogue and communication between practitioners, research clusters and policy bodies (e.g. NGOs, intergovernmental agencies) that have previously remained separate. Accordingly, the nexus can bring together those who work on particular issues to re-consider how these align with other relevant forces and what implications these relationships may have for future interventions.



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<sup>18</sup> GSI, 2016. See note 6; Bales 2016. See note 17.

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<sup>24</sup> Allain and Bales, 2012. See note 22; Bales, Trodd and Williamson, 2009. See note 4; ILO, 2017. See note 8.

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<sup>26</sup> Bellagio-Harvard Guidelines, 2012. *Bellagio-Harvard guidelines on the legal parameters of slavery*. Available at: [law.qub.ac.uk/schools/SchoolofLaw/Research/HumanRightsCentre/Resources/Bellagio-HarvardGuidelinesontheLegalParametersofSlavery/](https://www.law.qub.ac.uk/schools/SchoolofLaw/Research/HumanRightsCentre/Resources/Bellagio-HarvardGuidelinesontheLegalParametersofSlavery/) (Accessed 3 February 2018). P.2.

<sup>27</sup> Bales, Trodd and Williamson, 2009. See note 4.

<sup>28</sup> Bales, Trodd and Williamson, 2009. See note 4; ILO, 2017. See note 8; Manzo, 2005. See note 20.

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- <sup>34</sup> For clarity, the following review of literature is an assessment, summary and synthesis of the existing literature on the nexus, in relation to trends and gaps in the literature, i.e. the 'state' of current literature, rather than an evaluation of the quality, credibility or success of such existing research. Accordingly, it does not seek to advice on the extent to which extant research has effectively responded to the need to empirically or theoretically interrogate the nexus.
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- <sup>39</sup> T. Clark, S. Longo, B. Clark and A. Jorgenson, 2018. Socio-structural drivers, fisheries footprints, and seafood consumption: A comparative international study, 1961-2012. *Journal of Rural Studies*, 57, pp.140-146; Couper, Smith and Ciceri, 2015. See note 10.
- <sup>40</sup> Food and Agriculture Organization of the United Nations (FAO), 2016. *State of the World Fisheries and Aquaculture*. Rome: Food and Agriculture Program of the United Nations.
- <sup>41</sup> Couper, Smith and Ciceri, 2015. See note 10.
- <sup>42</sup> Clark et al, 2018. See note 39; Couper, Smith and Ciceri, 2015. See note 10.
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- <sup>44</sup> S. Lewis, A. Alifano, M. Boyle and M. Mangel, 2017. Human Rights and the Sustainability of Fisheries. In: P. Levin and M. Poe, ed. *Conservation for the Anthropocene Ocean*. London: Academic Press. Pp. 379-396; Marschke and Vandergeest, 2016. See note 38; Sylwester, 2014. See note 38.
- <sup>45</sup> EJF, 2015. See note 10, p.5.
- <sup>46</sup> Ibid.
- <sup>47</sup> Clark et al, 2018. See note 39; Couper, Smith and Ciceri, 2015. See note 39; Lewis et al, 2017. See note 44.
- <sup>48</sup> EJF, 2015. See note 10; Sylwester, 2014. See note 38; Marschke and Vandergeest, 2016. See note 38.
- <sup>49</sup> EJF, 2015. See note 10.
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- <sup>53</sup> Derks, 2010. See note 50. EJF, 2015. See note 50; Marschke and Vandergeest, 2016. See note 38.
- <sup>54</sup> ILO, 2017. See note 8. Lewis et al, 2017. See note 44.
- <sup>55</sup> EJF, 2015. See note 10.
- <sup>56</sup> Derks, 2010. See note 50.
- <sup>57</sup> Couper, Smith and Ciceri, 2015. See note 10.
- <sup>58</sup> EJF, 2015. See note 10. Derks, 2010. See note 50. Couper, Smith and Ciceri, 2015. See note 10.
- <sup>59</sup> EJF, 2015. See note 10.
- <sup>60</sup> EJF, 2015. See note 10; Marschke and Vandergeest, 2016. See note 38; Couper, Smith and Ciceri, 2015. See note 10.
- <sup>61</sup> EJF, 2015. See note 10, p.29.
- <sup>62</sup> Lewis et al, 2017. See note 44. Derks, 2010. See note 50.
- <sup>63</sup> Couper, Smith and Ciceri, 2015. See note 10.
- <sup>64</sup> Sylwester, 2014. See note 38.
- <sup>65</sup> EJF, 2015. See note 10.
- <sup>66</sup> Ibid.
- <sup>67</sup> Lewis et al, 2017. See note 44, p.381.
- <sup>68</sup> Lewis et al, 2017. See note 44; ILO, 2017. See note 8.
- <sup>69</sup> EJF, 2015. See note 10; Couper, Smith and Ciceri, 2015. See note 10; Marschke and Vandergeest, 2016. See note 38.
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- <sup>71</sup> Hodal, Kelly and Lawrence, 2014. See note 70; EJF, 2015. See note 10.
- <sup>72</sup> EJF, 2015. See note 10.
- <sup>73</sup> Ibid.
- <sup>74</sup> Ibid.
- <sup>75</sup> ILO, 2017. See note 8; Bales, 2016. See note 17.
- <sup>76</sup> Bales, 2016. See note 17.
- <sup>77</sup> Ibid.
- <sup>78</sup> Ibid.
- <sup>79</sup> Ibid.
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- <sup>83</sup> Bales, 2016. See note 17.
- <sup>84</sup> EJF, 2015. See note 10; Marschke and Vandergeest, 2016. See note 38; Sylwester, 2014. See note 38; Lewis et al, 2017. See note 44.
- <sup>85</sup> Marschke and Vandergeest, 2016. See note 38; Hodal, Kelly and Lawrence, 2014. See note 70; EJF, 2015. See note 10.
- <sup>86</sup> EJF, 2015. See note 10. Sylwester, 2014. See note 38.
- <sup>87</sup> EJF, 2015. See note 10.
- <sup>88</sup> Marschke and Vandergeest, 2016. See note 38. Couper, Smith and Ciceri, 2015. See note 10.
- <sup>89</sup> It is necessary here to qualify the field as pertaining to the agricultural sector, given that the field is not a sector in and of itself. As a number of scholars have highlighted in recent decades (Ellis, 2000, Reardon, 1997) rural income sources are increasingly diversified away from traditional agricultural labour as a form of livelihood strategy. Income generation in rural landscapes in the contemporary Global South now depends on multiple sources, comprising of both farm and off-farm activities. Nevertheless, what we refer to in this section of the report relates specifically to agricultural and farm-based livelihoods.
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- <sup>93</sup> Jasparro and Taylor, 2008. See note 90; ODI, 2016. See note 90.
- <sup>94</sup> ODI, 2016. See note 90.
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- <sup>100</sup> Taylor, M., 2013. Climate change, relational vulnerability and human security: rethinking sustainable adaptation in agrarian environments. *Climate and Development*, 5(4), pp.318-327; Molinari, 2017. See note 17.
- <sup>101</sup> A. Poncelet, F. Gemenne, M. Martiniello and H. Bousetta, 2010. A country made for disasters: environmental vulnerability and forced migration in Bangladesh. In *Environment, forced migration and social vulnerability*. Berlin: Springer. Pp. 211-222; G. Oudry, K. Pak and C. Chea, 2016. *Assessing Vulnerabilities and Responses to Environmental Changes in Cambodia*. Phnom Penh: International Organisation for Migration; M. Bylander, 2015. Depending on the sky: Environmental distress, migration, and coping in rural Cambodia. *International Migration*, 53(5), pp.135-147; ODI, 2016. See note 90.
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- <sup>103</sup> ODI, 2016. See note 90.
- <sup>104</sup> IOM, 2016. See note 17.
- <sup>105</sup> Juran and Trivedi, 2015. See note 86.
- <sup>106</sup> Molinari, 2017. See note 17.
- <sup>107</sup> International Organisation for Migration (IOM), 2015. *Addressing Human Trafficking and Exploitation in Times of Crisis*. Geneva: IOM; IOM, 2016. See note 17; Molinari, 2017. See note 17; Jasparro and Taylor, 2008. See note 90; Bowersox, 2018. See note 37; Gerrard, 2016. See note 37.
- <sup>108</sup> IOM, 2015. See note 107; Bowersox, 2018. See note 37.
- <sup>109</sup> IOM, 2016. See note 17; ODI, 2016. See note 90; Bylander, 2015. See note 101.
- <sup>110</sup> IOM, 2016. See note 17; ODI, 2016. See note 90; Molinari, 2017. See note 17.
- <sup>111</sup> Molinari, 2017. See note 17; Bowersox, 2018. See note 37.
- <sup>112</sup> IOM, 2015. See note 107; IOM, 2016. See note 17.
- <sup>113</sup> ODI, 2016, p. 5. See note 90.
- <sup>114</sup> IOM, 2016. See note 17; Jasparro and Taylor, 2008. See note 90.
- <sup>115</sup> Ibid.
- <sup>116</sup> Bylander, 2015. See note 101; Touch et al, 2016. See note 80; Oudry, Pak and Chea, 2016. See note 101.
- <sup>117</sup> Touch et al, 2016. See note 91; Oudry, Pak and Chea, 2016. See note 101.
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- <sup>127</sup> Khan, 2016. See note 115. IOM, 2015. See note 96. Juran and Trivedi, 2015. See note 97.
- <sup>128</sup> Alam and Rahman, 2016. See note 99; Demetriades and Esplen, 2008. See note 96.
- <sup>129</sup> IOM, 2016. See note 17. Molinari, 2017. See note 17.
- <sup>130</sup> Ibid.



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- <sup>132</sup> M. Taylor, 2013. Liquid debts: Credit, groundwater and the social ecology of agrarian distress in Andhra Pradesh, India. *Third World Quarterly*, 34(4), pp.691-709; ILO, 2017. See note 8.
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