

Diverse more-than-human approaches to climate change adaptation in Thai Binh, Vietnam

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Abstract: *Climate change adaptation is a key shared endeavour of our time. In Thai Binh Province of Vietnam, rice farmers have been adapting to environmental change for generations and have developed sophisticated strategies of paying attention to non-human entities. Such strategies stand in stark contrast to modernist, developmentalist climate change adaptation interventions prioritising mastery and control over the environment. In this article, we think about farmers and other species 'surviving well' in the context of climate change adaptation in Thai Binh. We examine the strategies for adaptation already present and the implications of such strategies for climate change adaptation approaches in Vietnam and further afield. We argue that local practices of listening to non-human entities and imagining them as kin can challenge modernist developmentalist approaches to adaptation, providing innovative locally appropriate adaptations. Beyond this, such practices can lead the way in developing non-exploitative and mutually beneficial relationships in 'more-than-human' ecological communities for long-term survival.*

Keywords: *climate change adaptation, diverse economies, local embodied knowledge, more-than-human, place-based adaptation*

Introduction

Climate change adaptation has been a somewhat disappointing endeavour. As young women beginning to learn about climate change in our university degrees in the early 2000s, we imagined that climate change would force humanity to rethink our problematic exploitative relationship with the environment. Like Pelling, we felt that climate change adaptation should be 'an opportunity for social reform, for the questioning of values that drive inequality in development and our unsustainable relationship with the environment' (2011: 1). We thought that local ecological knowledge and place-based livelihood strategies could and should be at the centre of such adaptation. Instead, what we have seen is that climate change adaptation has involved the application of the same problematic ways of thinking about 'natural resources', governance, and the economy that got the world into this mess in the first place (see also Cameron, 2012). In this article, we engage with 'more-than-human' diverse economies thinking to interpret

climate change adaptation interventions in Vietnam, where local ecological knowledges show us viable place-based adaptation strategies. We review diverse economic approaches to climate change adaptation that go beyond the modernist developmentalist approaches that have thus far dominated adaptation interventions.

In places all over the world, climate change adaptation has become something of a repackaged version of modernist development thinking, using the same vulnerability assessments, log frames, the same funding streams, the same poorly-adapted indicators, and the same kinds of concrete-based infrastructure that development critics have been problematizing for decades. Climate change adaptation approaches often begin by 'rendering climatic change a field of technical intervention, and by excluding from its frame of reference the broader colonial and political-economic context' (Cameron, 2012: 11). Many places in the Majority World face climate change adaptation interventions designed by powerful donor organisations, perpetuating colonial dynamics (Cameron, 2012; Bordner

et al., 2020). Like modernist development thinking and colonialism, much climate change adaptation has been built on cultural assumptions that humans need to control the environment and *can* control the environment (Plumwood, 2002), where adaptation has become primarily about adapting infrastructure to increased frequency and intensity of disaster events (O'Brien, 2011). In short, climate change adaptation seems to have been primarily about continuing business as usual, where business as usual is serving the grandiose visions of global institutions deeply implicated in capitalist, neo-liberal and neo-colonial modes of economic decision-making (Hickel, 2020), and where climate change is just another risk to manage in a portfolio of investments.

In this article, we put aside our disappointment and look back on that naïveté for inspiration. What if there *were* a different model for climate change adaptation? What if climate change adaptation *could* be the opportunity for humans to rethink their problematic assumptions about the environment? And indeed, what if such adaptations are already happening out there in the world and we merely had to look around with new eyes to find climate change adaptation initiatives that perform different relationships with non-human entities and systems? These questions frame our exploration of climate change adaptation interventions in Thai Binh Province of Vietnam. We draw on approaches to climate change adaptation that see adaptation as 'less about "fixing" the environment as re-imagining it' (Robin, 2018: 2), but we add the important corrective that some people and places are already well ahead of such 're-imaginings'. Diverse traditional ecological knowledge-holders such as those we find in rural Vietnam *already* have a range of skills used to maintain relationships with non-human entities in wider ecological communities. It is, perhaps, the climate change adaptation literature and technocratic planning regimes that need to participate in such environmental re-imaginings.

Such re-imaginings were the goal and result of fieldwork in rural Thai Binh province in Vietnam (see Fig. 1), carried out for 6 months in 2016 and 2017 by first author Huong Thi Do.ⁱ The research investigated the outcomes of both formal and informal climate change adaptation

interventions related to water in two different farming communities, with particular attention to the effects of climate change adaptation interventions (CCAs) on livelihoods. I (Huong) deployed both conventional social research methods including transect walks, focus group meetings, individual semi-structured interviews, and also forms of embodied ethnography (Dombroski, 2011; McKinnon and Dombroski, 2019), spending my time living in and experiencing the site through participating in work and staying with local families. We then consolidated and analysed data based on my embodied experiences and those gathered from my research participants. In this article, we focus mainly on the embodied knowledges gleaned, particularly from the locally-led adaptations (rather than the central and regional government adaptations). We draw on several years of conversations and our shared reading, thinking and writing on the role of human and non-human partnerships in livelihoods and climate change adaptation (Do, 2019; Dombroski and Do, 2019).

In what follows, we examine the kinds of relational processes that inform human livelihood adaptation to non-human entities and place. We examine local farmers' accumulated local embodied knowledges and the use they put them to in making sense of changes and adapting their livelihood practices accordingly. We argue that the CCAs thus produced are entanglements of exchange and negotiation between local farmers and soil, water, pest, fish, rice plant, sediment, belief, customs and more. We ask how wider communities of humans and non-humans might seek a form of 'surviving well' even in the face of intensive climate change induced ecological disruption. We begin to imagine a future where climate change adaptation is an opportunity for humans to listen better to more than just humans, to pay attention to the 'more-than-human',ⁱⁱ and to even push back against modernist developmentalist interventions.

Surviving well: More-than-human diverse economies

What does it mean for humans and non-human entities and ecologies to survive well in times of rapid climate disruption? Like Gibson-Graham *et al.* (2013), we understand the concept of

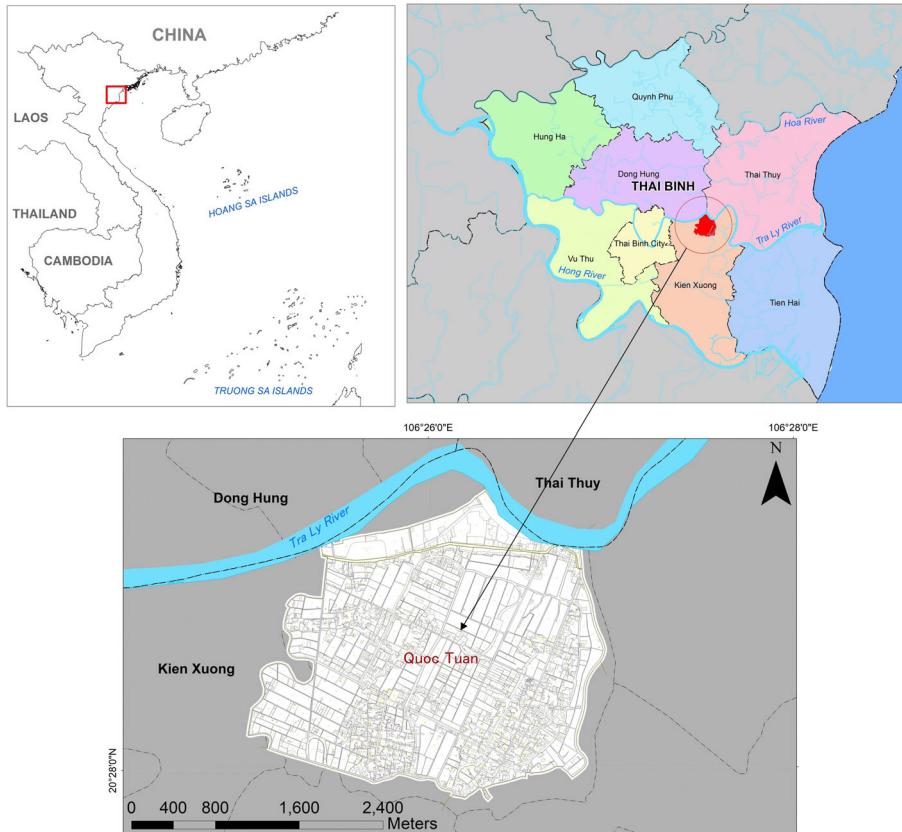


Figure 1. The map of Thai Binh (the top-right corner) and Quoc Tuan commune (below) [Colour figure can be viewed at wileyonlinelibrary.com]

‘surviving well’ to be about the ways in which livelihood decisions are made to secure material, occupational, social, community and physical wellbeing for communities, households and individuals. Surviving well, however, is not just about the wellbeing of humans but is also about the wellbeing of the wider ecological communities in which humans are embedded (Yates, 2021). Surviving well in climate disruption requires us to recognise that the wellbeing of the planet itself is under duress. Our start point is that some ways of doing economy are more responsible for the decline in planetary wellbeing, and surviving well for *all* requires a rethinking of the modernist, separatist tendencies that have been cultivated under economic systems that treat the planet as a resource to be exploited for unending economic growth. If climate change is an opportunity for humans to learn and adapt to forms of livelihood that are less destructive, we must expand our

understanding of surviving well to include our more-than-human kin. For too long, modernisation approaches to the economy have pitted humans against nature, as if we were not already intricately entangled in an ecological and economic web of interdependency.

Such ecological and economic wellbeing interdependencies are not new to people who work the land for their livelihoods. It should also be relatively clear to those designing climate change adaptation interventions. Climate change adaptation interventions are activities carried out to reduce vulnerability to climate change (Ireland and McKinnon, 2013), but are inherently theoretical and political. This is because they rely on a theory of change and a theory of vulnerability. *How* the activities reduce vulnerability to climate change requires activity designers to have some idea of what causes vulnerability in climate disrupted times and what might reduce it. Understandings of

vulnerability are embedded in theoretical and political narratives: in our work, examining government-led CCAIs in Vietnam, for example, climate change vulnerability is understood to be related to a lack of modernization in the farming methods of Vietnamese rice farmers. The CCAI is therefore designed to introduce and enable modern farming methods in more regions of the country, in much the same way that we might see Green Revolution technocratic extensions applied under what was previously understood as ‘development’ (Do, 2019). In that case, CCAIs are based on a modernization theory of change and vulnerability.

What would CCAIs look like if based on a different understanding of what causes vulnerability and how to reduce it in light of climate change? To get a sense of this, we reviewed climate change adaptation examples in the body of work known as diverse economies. For diverse economies thinkers, activists and theorists, cultivating diversity in economies reduce vulnerability to shocks in much the same way biodiversity does in an ecological system (Gibson-Graham *et al.*, 2013). As Gibson-Graham and Dombroski note,

empowering and supporting these differences can promote ethical and solidaristic modes of interdependence and help mitigate some of the key challenges of our time (such as environmental destruction and increasing inequality) (Gibson-Graham and Dombroski, 2020: 1).

Gibson-Graham *et al.* (2013) imagine the economy as a garden to be cultivated, rather than a machine to be manipulated. An economy as a community garden involves beginning with what is already present and adapting to the environment. Vulnerability is reduced by paying attention, increasing diversity and nurturing emergences rather than pulling levers and manipulating inputs and outputs. For diverse economic scholars then, a simplistic modernization account of vulnerability and change is rejected, and thus any climate change adaptation interventions will be built on quite different understandings of how the vulnerability is reduced in the face of climate disruption.

We have picked out four key contributions to climate change adaptation from diverse economic scholars who carefully examine how humans

and non-humans might survive well together in times of changing climate. First, Ireland and McKinnon make the point that climate change adaptations (understood as activities carried out to reduce vulnerability to climate change) are always embedded in political agendas and we must somehow *learn to work with the political* in our climate change adaptation scholarship (Ireland and McKinnon, 2013). Second, for Lopes *et al.* (2018), climate change adaptation is absolutely not about hard infrastructure or modernist developmentalism, but about *inventorying and building on a diverse range of strategies* already there. They describe a variety of strategies used by marginalised groups to cope with the heat in urban Australia, many of which do not rely on air-conditioning infrastructure. Hill, Cameron and others have worked with post-humanist framings to think about how people are *learning to be bodily affected* by climate difference, particularly in gardening (Cameron *et al.*, 2011; Cameron *et al.*, 2012; Hill, 2015). Finally, Gibson-Graham *et al.* (2016) outline a *hopeful approach to collective action*, tracing intergenerational changes made in climate emissions through a series of related social developments in Australia and globally that seek to ‘common’ the atmosphere. These four key principles guide our own thinking on CCAIs in Vietnam: (i) start with the fact that politics are everywhere, (ii) begin by inventorying current strategies, (iii) pay attention to bodily learning and (iv) cultivate a hopeful approach to collective action. We use these four key principles to structure the remainder of the article, applying them to the context of Thai Binh and our sustained attention to the work of the more-than-human in climate change adaptation.

Politics are everywhere: Understanding CCAIs in Vietnam

In Vietnam, climate change response is considered as an opportunity to ‘increase competitiveness and strengthen national power ... and to enhance the management role of the State (Prime Minister of Vietnam, 2011: 4). Climate change adaptation is mainstreamed into development programmes, or, development programmes have been adapted and framed as CCAIs as outlined above. Some might put it bluntly: climate change adaptation in Vietnam is not

only based on some kind of neutral scientific evidence, but, like many places, primarily on national political concerns (Lindegaard, 2018). We examine such responses in the province of Thai Binh.

Thai Binh province is a rural and coastal area considered the ‘hometown of rice farming’ (*Quê Lúa*) in the north of Vietnam (see Fig. 1). Rice farming is the most important livelihood activity for locals, making up approximately 60% of the agricultural GDP for the province (DARD, 2011b). Because of the geographical characteristics of Thai Binh, climate change has serious impacts on both rice production and the domestic lives of locals, especially water-related issues such as salt intrusion, flood and water scarcity. While natural flooding cycles and water levels have traditionally been important for rice cultivation, if sea levels rise up to the predicted 1m, the low terrain in Thai Binh would be drastically affected. It would inundate land by more than 30% (DONRE, 2012). Up to 50% of the province could be under water if dykes were to break during flood season in the rivers, as the water levels are usually 3–5 m higher than the land elevation (DARD, 2011a). The uneven topography has also limited drainage capacity during the flood peak time. In the Red River, saltwater currently penetrates more than 15 km above the provincial average. Saltwater intrusion is likely to become more serious in the future due to the combination of decreasing dry-season flows, rising sea levels and increasing water demand. Along with saltwater intrusion, the province has been also affected by water scarcity, especially during irrigation time for spring crops.

Many government-led CCAs have been implemented to adapt rice production to these particular water-related issues in Thai Binh, with a particular concern for food security. There are two main approaches to developing and implementing water-related CCAs: infrastructure improvement and management plans and policies. The first approach emphasises irrigation infrastructure, including concreting rice field irrigation canals, riverbanks and pathways, and upgrading or building new pump stations and other irrigation facilities. The latter approach involves changing farming scales, using direct seeding rather than transplanting, adopting cultivation calendars according to seasonal

climate forecasts and applying strictly hierarchical schemes in managing the closed irrigation system. This strict management involves government control of water, through the centralised operation of irrigation facilities such as dykes, sluices, gates, dams, pump stations and so on (Fontenelle *et al.*, 2008; Devienne, 2013). These CCAs have brought improvements in physical assets and affect farming activities, which rural residents have praised. The big trucks, tractors, ploughs and motorbikes on the new, wide concrete pathways crossing the paddy fields have been welcome in Thai Binh. Farmers can now cultivate two main rice crops (spring rice and summer rice) and one cash crop, with less manual farming activities and more economic benefits. As may be clear from these examples, at the local level, CCAs are inseparable from modernist development interventions.

While appreciated in terms of labour saving, such interventions have increased risk through increasing vulnerability to salt intrusion and disease. For example, local farmers no longer control when their fields will be irrigated, and, because delicate seedlings are grown directly in the soil rather than transplanted from nurseries, any failure in sluice gate operation or irrigation schedule that accidentally lets in salt water may damage an entire crop. The shorter time periods between crops can increase the incidence of disease, as discussed in an example later in the article. For now, the point is that relying on a theory of vulnerability informed by modernization is a political matter. Indeed, it is well known that CCAs have taken the place of ‘development projects’, especially in Majority of World countries such as Vietnam (Downing *et al.*, 2003). What remains are the same problematic politics of development described by critical development thinker Arturo Escobar some decades ago (Escobar, 1995, 2004). Development and modernization come to dominate and co-opt even this, the climate adaptation we must undertake because of the effects of such maladapted development and modernization globally.

So is it possible to find CCAs that take us back to Pelling’s (2010) sense that climate change adaptation might provide an opportunity to question the developmentalist values that drive inequality and unsustainable relationships with the environment? The opportunity here

could be to ‘imagine and practice’ not just *development* differently (Gibson-Graham, 2005), but also adaptation. Indeed, if we start with the fact that politics are ubiquitous (Ireland and McKinnon, 2013) and that adaptation is thus always tied up with all kinds of political processes, we can also remember that politics are not just determined by governments and development organisations. The politics of climate change adaptation include the micro-politics of local reworkings of CCAIs, and the micro-politics of farmer relationships with non-human entities. We thus move now to inventory several modes of CCAI, including some which are not government-led. In doing so, we start to go beyond the technocratic and human-centred frameworks of CCAIs in Vietnam and internationally.

Inventorying strategies: Diverse CCAIs in Thai Binh

What kinds of climate change adaptation strategies are already present in Thai Binh? Government-led strategies have included an intervention that attempts to avoid the economic problems posed by storms and floods, particularly when they hit the rice plants at its ripe stage. This intervention also aims to offer an extra winter cash crop known as *Vụ Đông* in the North of Vietnam. For implementing this government-led intervention, locals had to shorten the interval for preparing and ‘cleaning’ their land for the summer rice crop. Previously, farmers would apply the technique of packed soil (*đất dậm*) for 2–3 weeks to prepare their land (Nguyễn Đình Giao *et al.*, 2001). Under the current water-related CCAI in Thai Binh, it is less than 2 weeks (and even for some households who could only manage to 2-days interval). In the most appropriate climate scenario in the North of Vietnam, for which this intervention was designed, the weather would be quite hot. Under those conditions, the intervention seems to work and still ensures a good yield for farmers. However, in the worst case, the weather is not hot enough, and the plant residues, potential pests and insects of the previous crop do not properly compost in the shortened interval between harvest and planting. This creates inhabitable and even poisonous conditions for the next round of rice plants,

which are not vigorous enough to resist disease. For example, in 2017, an epidemic of southern rice black-streaked dwarf virus hit the summer rice crop. In this epidemic, some farmers in Thai Binh lost around 70% of their rice yield. One farmer communicated her frustrated feelings about this strategy as follows:

It was too *short*! They [earthworms, bacteria, and others] are like us. They need time and appropriate conditions to do their jobs. You know, at that time, it was raining a lot; the weather was not warm enough for them to work properly. That is the reason why only some of those [who inhabit] at the top [soil surface] could work properly. ... Our rice grew well till the phase of *Đặng cái/Nghén* (early pregnancy) phase. The rice only began to deteriorate significantly when the plants started rooting into the deeper layer where the soil was not good enough due to the short land preparation period. ... [the officials] then tried to blame the weather conditions for the development of this epidemic, but we don’t think so... If our rice plants could grow well, they could perhaps better resist the southern rice black-streaked dwarf virus (interview, Nov 2017).

When questioned further as to what she thought about the potential floods and storms that this government intervention meant to avoid in shortening the interval, she reluctantly answered:

Well, they [officials] based it on weather forecast; it was just a forecast, and forecasts are uncertain. Also you know that *Trời sinh voi, trời sinh cò* (gods create elephants, gods will create grass). We cannot control *Ông trời* (gods), so we should do our best and then we will work out ongoing incidents when the time comes (interview, Nov 2017).

One may claim this perspective as a defeatist attitude of submitting passively to the gods. However, her message here is not about giving up on doing any further adaptation, but rather aspiring to more attentive and responsive practices. Attentiveness and responsiveness is not about exploiting nature according to a productionist agricultural logic based on models and forecasts. Rather, it is about respecting the needs of other species and ecological processes, and then working out how best to survive together. This participant would rather ensure

that the time for earthworms and other natural processes are respected. Her explanation and wish manifest her Buddhist spiritual belief and approach in working with other entities in farming. In this understanding, farmers and officials are not the ones who hold the power to adapt; other entities must be accounted for and empowered to do their work in order for all to survive well together in a climate disrupted times.

A second adaptation strategy that builds on such an understanding of surviving well together is riparian rice cultivation. In the riparian communities at low elevation, such as Quoc Tuan in the province of Thai Binh, farmers cultivate rice plants on the riverbanks. This emerges from their excellent understanding of the cycles of the hydrologic regime of the river, the riverbank, sediments, rice plants and so on, particularly farmers whose fields are located next to the river. Cultivating the riverbanks requires much more intensive labour than it does in normal paddy fields. Nowadays, locals engage in this farming practice mainly to protect riverbanks from erosion, to ensure smooth river flow and to protect their fields rather than because they need or want the extra rice yield. This traditional practice is a local climate-related intervention, since it reduces vulnerability to flooding and waterlogs in a time of increased floods and storms (see Figs 2 and 3).

A third strategy is to actively engage with and prepare for floods as a normal part of life. For example, almost all private aquaculture ponds

in Quoc Tuan have been fenced off with wire mesh. This mesh will then be equipped with fine fish nets when flood alerts are released. As can be seen in Figure 4, such mesh does not prevent locals' ponds from flooding, but it does prevent their fish from escaping during a flood. Many families also keep cement boats, which are used during flooding to support farming and domestic activities. In the wet season, this is also a transportation measure for delivering rice straw after harvesting (Fig. 5). This adaptation is unique and totally different from other communities in Thai Binh province.

These strategies for climate change adaptation are part of a long history of adaptive practices in this part of the world. As such, local farmers in Quoc Tuan have long been fluent in the approach of *sống chung với lũ* / 'Living with the flood' (Miller, 2018). This concept is well-known livelihood strategy for the people in the Mekong delta, which prefers a relationship with nature based on adaptation to floods, rather than attempting water control in a closed irrigation system. Locals in Quoc Tuan therefore already have strategies for living with high flood risks due to the geographical characteristics of their area. Quoc Tuan locals have also 'learned to live with loss' (Miller, 2020b) due to the adverse impacts of floods, relinquishing controlling behaviours and seeking open, adaptive and diverse livelihood strategies. This prefigures our next section, where we move from thinking about how one might inventory current



Figure 2. Riverbank with rice cultivation in Quoc Tuan (Photo taken 20th June 2016) [Colour figure can be viewed at wileyonlinelibrary.com]



Figure 3. Riverbank without rice cultivation in other community in Thai Binh province (photo taken 23rd November 2017) [Colour figure can be viewed at wileyonlinelibrary.com]



Figure 4. Private pond surrounded by high wire mesh in Quoc Tuan (Photo taken 20th June 2016) [Colour figure can be viewed at wileyonlinelibrary.com]



Figure 5. Using boat for delivery rice straw in wet season and transportation mean in the case of flood in Quoc Tuan (Photo taken 20th June 2016) [Colour figure can be viewed at wileyonlinelibrary.com]

CCAs and move towards what other knowledges are available to local peoples who seek to further adapt to climate change within more-than-human communities.

Paying attention: Local embodied knowledges for adaptation

‘Living with the floods’ is not only a rational action built on analysis of a long history of adaptation predating concrete. It also builds on embodied knowledge of the river that individual farmers and fisherfolk develop during their lifetimes. Huong lived with a family of fisherfolk while researching in Quoc Tuan. This family spoke of how their bodily engagement with the river, floods, water ebb and their sense of the tide calendar enabled them to get a feel for the lag time between flood alerts and the flooding incidents in Quoc Tuan commune. Relying on their embodied knowledges of the signs of flood and the lag time, they go out for extra fishing, getting more fish and shrimp than usual to tide them over during times of floods, where changes in the hydraulic condition result in fish somehow getting lost in this environment. Similarly, in previous work, we have described the embodied strategies of the part-time sluice controller who assessed salinity by ‘reading’ the water: slapping it and watching the light reflect, noticing fish in the river, feeling the winds and intuiting the tide calendar. He used this embodied knowledge to judge the timing for

opening the sluice for irrigation (Dombroski and Do, 2019).

Similarly, rice farmers are also listening through their bodies to adapt to climate change. While farming activities are less manual than in the past because of irrigation infrastructure and agricultural machinery, they still remain primarily manual. In this context, local farmers are embedded in processes of learning by doing and doing by learning via their ordinary senses and their embodied knowledges, particularly while manually preparing and cleaning up the land, sowing the seeds, transplanting seedlings, weeding, spraying pesticides and drying rice after harvesting. They notice the unwanted changes in the growth progress and the subtle differentiation in the appearance of rice plants, other species and environmental processes. For example, at particular times of the year they can conclude that the paddy fields might have become too acidic by noticing unusually slow growth in rice, or noticing when leaves are looking ‘stunted’ or not ‘smooth and beautiful’, and the rice roots have become dark yellow. Similarly, if they notice that in a particular paddy field the rice plants are longer and bigger and have darker green leaves and more shoots than usual in the late vegetative phase, it is a sign of overgrowth, caused by an excess of particular nutrients, which leads to ineffective production of panicles in the productive phase and ultimately reduces crop productivity. Farmers are thus already sensitive to the subtle changes of rice plants, and have their own well-developed theories as to the emergences of all these changes.

Local farmers, thus, not only pay attention to their rice plants, they also carefully listen to other entities, all of which are influencing rice growth. Despite the fact that rice production is very complicated and complex, with many actors and factors involved in and influencing rice growth phases, yield, farming activities and other needs and supports (Nguyễn Đình Giao *et al.*, 2001: 41), the farmers are still able to interact with these actors to test and assess the situation through a form of embodied listening. In the case of acidic paddy fields, they not only pay attention to the changes in rice plant growth, but they may also see a thin scum on the water surface, bubbles or algae in the corners of their fields. Farmers working in these

fields may also notice their nails yellowing or yellow stains on their work clothing. They may also perceive changes in the soil by their bare hands and feet. Many local farmers emphasised that they can assess changes in soil texture, structure and fertility through touch. Other communications they ‘listen’ to are visual: when particular butterflies appear, farmers can predict the kind of pest epidemics that are imminent. There are many more ways that the rice farmers listened to the more-than-human relational networks in which they are embedded (Do, 2019).

Farmers responded to such communications by adjusting their actions. For example, the yellow nails remind them of the acid levels in their fields, a phenomenon they cannot ignore. They respond by draining out current water then irrigating fresh water and adding particular fertilisers. Similarly, the discomfort of touching hard-setting soil have provoked more manual efforts to increase soil quality. This listening and responding to other entities in the surrounding environment, however, is not a form of mastery over the environment: rather it is two-way and mutual adaptation. Just as farmers adapt their actions to the things they ‘hear’ from around them, the plants and processes of growth, decomposition, flow and more are responding to the actions of the farmers. In fact, these entities could be understood to *actively approach* locals. They communicate actively, and effectively *demand* locals to respond in particular ways, or at least, that is how it is experienced by farmers.

This mutual communication and relationship are further embedded and manifested in local customs and spiritual beliefs in Thai Binh. Locals believe in and follow the *Đạo lý Duyên khởi* or ‘Dependent co-arising’, – one of core principles of Buddhism, where:

The wellbeing of humans depends on the wellbeing of animal, vegetables and mineral. Humans are made of nonhuman elements, and these nonhuman elements are animal, vegetables and minerals. [...] if you destroy this nonhuman being elements [*sic*] you destroy yourself, this is the teaching of inter-being (quoted from Thich Nhat Hanh’s teachings in Sieber, 2015: 5).

Such a two-way understanding is embedded in the local ritual of *lễ cúng cơm gạo mới*, where

locals offer the first bowl of fresh rice to their ancestors and their gods, acknowledging all the ‘others’ who have contributed to rice production. Similarly, they commonly humanise other entities in their daily language, using human acts and states to describe the different growth phases for rice, for example, *mộng ngồi* (new germinated seed is sitting), *mạ đứng chân* (seedling is standing firmly), *Đ nhánh* (tillering newborns), *Lúa con gái* (young teenage) and *ngهن* (pregnant) rice plant. In this way, local farmers perceive non-human elements as participating in human relational communities. Humankind and rice are just two of the actors in the inter-being relationships *Thầy* mentioned above. Elsewhere we have described how farmers perceived the call of the strong waves in the rivers as *Ông Sóng* (wave grandpa) (Dombroski and Do, 2019). In these, and other examples, we can see that locals perceive and respond to changes in other entities as kin.

Thus, in the case of Thai Binh farmers’ climate adaptation, we must begin with familiar strategies of embodied recognition and response. Such approaches to adaptation must recognise the ways in which bodies are ‘instruments’ for farmers to communicate and experiment with other entities. Such adaptations can build on the ways in which farmers understand the different contexts of their own farming practices, weather conditions and other involved entities. CCAs must build on and reiterate the kinds of experimentation and refinement that have gradually produced the embodied knowledges of local farmers. CCAs cannot only be top-down control activities, but must build on the embodied knowledges accumulated by those who have thus far been engaging in and registering Earth others in complex relational networks. While such strategies for climate change adaptation may not be explicitly recognised by farmers as such, any intervention would do well to build on what is already present.

How can CCAs build on what is already present? How can the embodied adaptive knowledges of local communities be proliferated and expanded into CCAs that are further reaching than what is already in place? How can this be done in ways that resist the ‘mastery and control’ narratives of many engineering based CCAs, and instead pay attention to adaptive

learning and accumulated local and embodied knowledges? In the next section, we seek to cultivate a hopeful approach to climate change adaptation by exploring the reciprocal nature of climate change adaptation labour that involves more-than-human communities.

Hopeful approaches: More-than-human reciprocity

There is a lot to learn from paying attention to what is present in farming communities in Thai Binh. The kinds of theories of change that support climate change adaptation in these communities do not blindly adhere to separatist, modernist and developmentalist approaches where it is assumed that the modernization of farming will necessarily reduce vulnerability. There are glimpses, instead, of other logics where reducing vulnerability will come from local strategies. These include living with the flood, acknowledging the power and kinship of non-human entities (such as plants, rivers, soil, salt and insect populations), paying attention to what such entities are saying through embodied knowing, and finally, acting in response to such entities in flux. The resistance to mastery and control narratives are already here, present in the knowledges accumulated and adapted in lived experiences of farming. But is such embodied learning *enough*, and what does it mean for *collective* responses in reducing vulnerability to climate change? Can we use such examples to develop a hopeful, ‘surviving well’ approach to climate change adaptation that goes beyond Thai Binh? In this section, we return to the hopeful approaches to climate change adaptation exemplified in diverse economies approaches to livelihoods to reflect on Thai Binh’s current and future climate adaptation strategies. We connect climate change adaptation – activities undertaken to reduce vulnerability – to more diverse understandings of more-than-human economies.

Diverse economies approaches to surviving well have already noted the importance of bodily learning in climate change adaptation (Cameron *et al.*, 2011). Other thinking that could help is the diverse economies adaptation of hybrid collectives, which shows how such embodied learning can go beyond the individual into wider human and non-human

collectives (Roelvink, 2008; Cameron *et al.*, 2014; Dombroski, 2016). Gibson-Graham *et al.* (2016) provide examples of how collective change with regards to the protection of the ozone layer was enacted through hybrid assemblages comprising social movements, technologies, institutional arrangements and other non-human others. Roelvink has written of how we might nurture post-humanist diverse economies that acknowledge the rights of particular non-human entities to a life or livelihood of their own, that is, to survive well (Roelvink, 2015). For diverse economies scholars, the agency of the non-human requires relational forms of economy, rather than thinking of the non-human as always resources to be exploited. As demonstrated by the farmers in Thai Binh, such agential non-human entities require and invite collaboration rather than exploitation. For example, one Thai Binh farmer Ms. L noted the unpleasant odours of multiple applications of pesticide, and noticed the disappearance of native species such as small crabs, grasshopper and leeches, which stirred up her nostalgia for the aroma of rice flowers without pesticides and the previously abundant species life of the farm. She thus came to refuse to use as much pesticide as her neighbours, despite her yield being affected (Do, 2019). These are economic and livelihood decisions that choose collaboration with the more-than-human in surviving well together.

Sometimes, people write off such small examples as a lack of competence in dealing with the threats of climate change and natural disasters to local livelihoods. Non-farmers and younger people sometimes think that the belief in gods, the refusal of pesticides, or the local ritual of *lễ cúng cơm gạo mới* all stem from fear of the consequences of Mother Nature’s anger. They think that it reduces the agency of the farmers, who tell and retell stories where humans are small and lacking power against a great and powerful Nature. But it is also possible to read this as an emphasis on the agency of the non-human, which invites humans into respectful relationships, economic, spiritual or otherwise. By engaging and registering attentively and bodily into more-than-human worlds, respecting more-than-human power and adapting to the land and climate and water, Thai Binh farmers have been collaborating in ways that are hopeful for adaptive and place-based CCAIs. We see in this ‘superstitious’ behaviour a real acknowledgement

of collaboration and a refusal of the mastery and control narratives that dominate modernist developmentalist programmes.

Collaboration is a word we have deliberately chosen. It refers to reciprocal partnerships, not the extractive exploitation of one partner over the other, a 'resource'. The contribution and exchanges between local farmers and non-human others in Thai Binh can be seen as mutual responses and reciprocal labour within a more-than-human diverse economy. Such a more-than-human diverse economy includes more than just extractive modes of relating, as evidenced by Barron and Hess's discussion of mutual economies of reciprocal labour between fungi and ants (2020). In our research, we also note the human response to the requests and demands made by non-human partners in the more-than-human collaboration. Ms. L, mentioned above, discusses the 'rice-babies' 'calling' for care and attention. Here, the labour of the farmer in adjusting the environment to suit the plants is reciprocated through abundant yields to be shared beyond the plant itself and contribute to human sustenance. Miller (2019, 2020a) would express the work of such non-human entities assisting farmers to adapt to climate change in Thai Binh as 'ecological livelihoods' within local economies. Similarly, Gibson-Graham and Miller (2015: 12) imagine the contribution and efforts of such collaborations within an economy, where 'economy' is not imagined as 'a unified system or a domain of being but as diverse processes and interrelations through which we (human and more-than-human) constitute livelihoods'.

This approach to understanding farming relations as a diverse 'economy' of ecological livelihoods, where different human and non-human entities collaborate to share surplus and sustain life, offers us much to think with when we come back to reimagining climate change adaptation in hopeful ways. As Robin quips, 'before adaptation...there is a need for imagination' (Robin, 2018: 2). First, re-imagining the relations between farmers and the more-than-human as a diverse economy of ecological livelihoods helps us understand that CCAs cannot just be about human sustenance and human needs. When we seek out reciprocal economies of ecological livelihood rather than extractive industrialised economies focused on human

supply chain demands, humans increase their capacity to adapt in place. Second – and here is where the hope lies – humans *can* learn to be affected by the more-than-human world, as shown in our small study and many other places where human traditional and ecological knowledges are ongoing. The challenge is to move away from technocratic interventions that continue modernist developmentalist approaches to economy, and to re-engage in place with a listening stance, learning to be affected and increasing capacity to act in the interests of ecological livelihoods for all. Such an increased capacity to adapt reduces vulnerability by allowing humans to participate in collective adaptive action with non-humans. It can bring into acknowledgement the reciprocal labour of human and more-than-human partnerships, where ecological services are rendered not just *to* humans but *between* different nonhuman entities for their own mutual survival (Barron and Hess, 2020). We humans are one form of Earth entity among many, and we must work with others rather than seeking to control and dominate ecological processes. The most hopeful CCAs are the ones that intervene in the problematic extractive behaviours of humans.

Conclusion

This article began with the intention of exploring how to re-imagine climate change adaptation through the lens of diverse economies and surviving well. Our explorations have noted that there are many local CCAs that do not align with government-led, technocratic, modernist and developmentalist responses privileging concrete-based infrastructure. It is in these diverse adaptive responses in place that we might glean some insight into how climate change adaptation might be re-imagined as a relational more-than-human collaboration. In our view, CCAs that promote extractive relationships with the more-than-human are not adaptive, as they are built on the same problematic assumptions that got humans into this climate change mess in the first place. Of course, none of this is new to communities who have already been adapting to disaster, risk, environmental flux and more for generations. The more we – the authors – engage with climate change

adaptation, the more we see that the problem is not so much with the traditions in the delta communities of Vietnam, but with the extractive, hyperconsumptive, industrialised, neo-colonial modes of economy and planning that have spread throughout the world (Plumwood, 2002).

This could be a depressing point to end on, echoing our disappointment with climate change adaptation that we started with in this article. Yet, we cannot leave it there. There are spaces for hope in adaptation, it is just not in the climate change adaptation planning technocracy. There is a need to re-think the relationship between human and more-than-human. Indeed, it is not just *re-thinking* that is required, since those humans who have lost their capacity to adapt also need to *re-imagine* and *re-embed* them/ourselves in place and in more-than-human communities built on collaboration and ethical interdependencies. We find hope in the elaboration of the shared roles of the more-than-human community in the emergence of diverse farming CCAIs in Vietnam. This reciprocity reiterates that non-human entities are always as central as human entities in CCAIs.

The importance of such adaptation interventions emerging from local practice and knowledge is that they might have relevance beyond the local level. Their very existence, inventoried here and elsewhere, provides challenges back up through the system and out through the world. These more-than-human CCAIs exemplify less extractive relations with Earth others, and they invite us, and others, to learn to be affected by place and more-than-human communities. This is not to say that technocratic interventions should *never* be used, or that all CCAIs of the state are *necessarily* problematic, but it does mean we must pay attention to how the vulnerability is being addressed, and by what theory of change. In the end, such more-than-human CCAIs invite us, and others, to proliferate practices of adaptation that begin with listening to the more-than-human and the places in which we might survive well with our more-than-human kin.

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Notes

- ⁱ This paper is based on fieldwork carried out for a PhD degree at the University of Canterbury, see Do (2019) Second author Kelly Dombroski was the senior supervisor for the PhD and has written 50% of this paper. Ethical approval was granted by the University of Canterbury Human Ethics Committee 2016-2115-LR-PS.
- ⁱⁱ Like Puig de la Bellacasa (2017), we use the term 'more-than-human' to emphasise that there is not a simple binary between humans and non-humans. Indeed, humans themselves are made up of non-human cells, and many non-human technologies and entities are made by humans. The term can include both animate and inanimate, 'natural' and human-made, large systems of ecology and particular individuals or communities, human and non-human.

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