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PROBLEM SOLVED OR PROBLEMATIC? NEW ZEALAND AID AND DAIRY DEVELOPMENT IN SRI LANKA

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Abstract

Dairy development in Asia is seen, on the one hand, as a means to improve economic, health and food security issues. Further, New Zealand's aid investment in dairy development in Asia is linked to trade interests and supports market growth. On the other hand, it is argued that dairy consumption and production should be reduced to respond to global climate change and potential negative health impacts in countries with traditionally low dairy consumption. This paper explores the perceptions and implications of a New Zealand-funded aid project in Sri Lanka, which is increasing dairy production to improve rural livelihoods. Data was collected during five weeks of qualitative, case study research with female, conflict-affected farmers in Sri Lanka. I argue that better understandings of the impacts of dairy development should be informed by local perspectives, and, I draw attention to the potentially problematic implications of increasing reliance on dairy production for livelihoods, such as environmental degradation and gender inequalities. I highlight areas of dissonance between local understandings of the impacts of dairy development and global discourse on sustainable development. This research, therefore, contributes to robust information upon which development policy-makers and practitioners – government and development organisations – can base effective, sustainable development in Asia.

Keywords: aid; dairy development; gender and agriculture; sustainable development

Introduction

The pressing need to meet food demand and provide livelihood opportunities for a growing population are complex global issues, and are among the most significant development challenges in Asia (Ahuja *et al*., 2014). Dairy development contributes to potential solutions to these challenges. As world leaders in dairy production, it is suggested that New Zealand's dairying expertise can be used to improve efficiency in other countries. Dairy development projects, funded by New Zealand's Aid Programme, have been established with the goal to increase productivity and production which improves economic livelihoods and provides food security.

In Asia at the time of this research in 2018, the New Zealand Aid Programme (NZAP) was runnning dairy projects in Indonesia, Sri Lanka, Myanmar and the Philippines. The NZAP sees its involvement in dairy development as a way to contribute to the Sustainable Development Goals, the overarching framework for global development

efforts. Dairy development is recognised for its potential to improve economic, health and food security issues in these countries, where farmers can increase dairy production and sell milk to increase their incomes. While the economic objectives and impacts of dairy development projects are clear, there are other aspects of their implementation that need to be addressed, notably their environmental and social impacts. This paper, therefore, highlights areas of tension relating to environmental factors in a case study of a dairy project in Sri Lanka, and it, further, considers the relevance of these issues with regard to gender.

New Zealand's involvement in dairy development through the Aid Programme is directly linked to New Zealand's trade interests. Trade tensions, including global recalls of Fonterra products, contamination scares and protests against Fonterra (which widely affected Fonterra's international markets, and especially Sri Lanka), preceded a bilateral agreement in 2013 for New Zealand to support dairy development in Sri Lanka to build the domestic dairy industry.[1] The agreement created a more favourable trade environment between New Zealand and Sri Lanka by supporting both governments' priorities to expand the Sri Lankan dairy market (MFAT, 2013). One dairy development project through the NZAP Partnerships Fund, the Wanni Dairy Project, had already begun in 2012 and a further two complementary activities followed.

Fonterra, New Zealand's largest company and the world's largest dairy exporter, formed an official partnership with the New Zealand government in 2014 to support dairy development projects in developing countries under the rubric of aid (so far, dairy projects have been established in 10 developing countries). Dairy growth potential in New Zealand and Western markets is constrained due to environmental limitations of production and already high consumption, whereas developing countries are targeted for both market and production expansion potential (Fonterra, n.d.; Gerosa & Skoet, 2013: 30). More broadly, therefore, dairy development projects support Fonterra's strategy to increase dairy production and consumption in developing countries.

It is widely agreed that it is necessary to adapt today's food production systems to address the environmental limitations of production and additional climate change impacts, which if unmitigated, will exacerbate the already formidable food security needs of the population on the planet (Amjath-Babu *et al.*, 2017; Meadu *et al.*, 2015). Effective strategies that meet such complex issues have real potential to contribute to sustainable development. Dairy development projects, however, have the potential to produce complex and contradictory outcomes; increasing dairy production can provide economic opportunities and improve food security, but issues of environmental degradation, climate change, and health impacts in the context of increasing consumption may emerge (Braimoh *et al.*, 2016; Gerber *et al.*, 2013; Muehlhoff *et al.*, 2013; Steinfield *et al.*, 2006). It is important, therefore, for effective and sustainable development practice to be informed by an understanding of the multiple impacts of any intervention, and by the perspectives of recipient communities.

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1 New Zealand exports 95% of its dairy production, which contributes 3.5% to GDP (NZIER, 2017). In other words, Fonterra's performance, and its contribution to the domestic economy, is highly dependent on international trade.

The dairy development project selected as a case study for this research, the Wanni Dairy Project, originated in the post-conflict zone in Sri Lanka to address the needs of the community in rebuilding their livelihoods. Nearly three decades of ethnic conflict between 1983–2009 devastated the people, environment and economy, and the additional impact of the 2004 Boxing Day tsunami along the east and south coasts affected worst those already afflicted by conflict. The specific location selected for this research, the Mullaitivu District, has been intensely affected. As one participant in this research said, "There is not anyone here who has not experienced trauma" (Mullaitivu local, personal communication, October 2018). Moreover, it has been argued that women in the north and east have been affected by the war and its aftermath more than any other group in Sri Lanka (ICG, 2017b). Access to Mullaitivu was restricted to foreigners by the Sri Lankan government until 2015, thus, scarce academic research has been done in this area.

Methodology

The acknowledgement that livelihoods are underpinned by a range of social, environmental and economic factors necessitates a holistic approach. This research, therefore, adopts a sustainable livelihoods approach and gender lens that integrates social, environmental and economic contributors to sustainable livelihoods in its investigation of locally-embedded experiences of dairy development. This qualitative approach is "inherently responsive to people's own interpretation of and priorities for their livelihoods" (Carney, 1998: 4), and it recognises the importance of micro-level research to inform deeper understandings of attitudes and perceptions, which affect behaviour and thus development outcomes (Ellis, 2000; Morse & McNamara, 2013; Scoones, 1998). Moreover, understandings of dairy development (and development as a discipline) tend to be male-centric (Kishwar, 2014). It is important that gender approaches in dairy development receive attention, particularly in the vulnerability contexts of rural livelihoods, as interventions that are aimed at improving women's welfare but fail to also address broader gender issues can have unintended consequences.

Understandings of the issues (and potential issues) of dairy development are predominantly represented by agricultural actors, governments, scientists and academics; are typically focused at the macro- and meso-level; and are reliant on quantitative data. This research, therefore, employs a qualitative methodology using interviews, observation and photovoice methods, which addresses a gap in the literature on subjective, lived experiences of participants in dairy development projects. I carried out field research over a five-week period in October and November 2018. I collected data from two categories of participants; female dairy farmers located in Mullaitivu District who are involved in the Wanni Dairy Project – who I refer to as the primary participants; and other informants who were involved in dairy development in Sri Lanka, including non-governmental organisation (NGO) staff, Ministry of Foreign Affairs and Trade (MFAT), academics and local dairy farmers. I used purposive sampling to identify the primary participants for this research, with support from the local partner development organisation. The primary participants provided in-depth data for this research and other participants were interviewed to provide additional information on the project and to add depth and context to the understandings derived from this research.

I held seventeen semi-structured interviews, five of which involved in-depth interviews, photovoice and observation with the primary participants, and the rest of which involved semi-structured interviews and observation with various project stakeholders and local dairy farmers. Photovoice is a qualitative method that asks participants to take photos that highlight their experiences to reflect research themes (Aitken & Craine, 2005). I asked the five primary participants to take photos of things that were important to them on their farms and on a later day we discussed these photos and what they meant during a photo review that formed part of the semi-structured interviews. Thus, photos provided valuable stimuli for in-depth semi-structured interviews. Narrative helped to define the imagery and add depth. Using a combined approach that draws on interview and photovoice as well as personal reflection and literature enables researchers to gradually interpret the meaning of phenomenon (Creswell, 2013).

An interpreter was required for most interviews and all primary participant interviews. The language barrier was a challenge for data collection and subjected participant's experiences to another layer of interpretation. One of the major benefits of the interviews being held via an interpreter, however, was that it allowed me to formulate more thoughtful responses to questions while participants were speaking (and often participants would also add further detail after the interpreter relayed their answers). This slower rhythm enabled me to explore questions in greater depth than in interviews carried out in English that were often fast-moving. I found that observation and written reflection on interviews and interactions proved instrumental in shaping the overall picture and analyses because of the language limitations and the unsuitability of using an audio recorder for all interviews.

Findings

Environmental factors

Dairy expansion by major Western dairy producers and governments has exhausted environmental resources in many developed countries. Dairy development in developing countries – both in aid and trade contexts – utilises developing countries' resources to continue global dairy industry expansion (de Alwis, 2018). In the Wanni Dairy Project, this is seen by growing the role of dairy production, processing and consumption in a previously isolated region that, notwithstanding the current prevalence of poverty, represents more broadly the market potential in Sri Lanka's growing economy. A major component of Fonterra's global expansion strategy is focused on managing the supply chain and processing milk into powder and a range of dairy products. As a development partner, Fonterra can strengthen relationships, build supply for processing, and promote consumption in its priority markets to support its expansion strategy. Investment in dairy development, even in impoverished regions, can influence longer-term shifts that support global dairy expansion. Notwithstanding the benefits for recipient communities, it has been argued that dairy development can also be understood to disproportionately benefit developed countries' interests (Mawdsley *et al.*, 2018).

The New Zealand Government describes dairy development initiatives as a 'triple win': they produce food, reduce emissions and build resilience to climate change (MFAT, 2018a). Intensifying dairy production in Sri Lanka has economic potential for farmers, however, the environmental impacts, especially in the long-term, are less clear-cut. Donaghy (2015 cited in MFAT, 2016: 15) notes that "Government and milk processors appear in agreement that upscaling smaller farms is the solution to meeting the demand for milk" and MFAT (2016: 18) states that "farmers will be encouraged to undertake operational expansion". Industry stakeholders are working together to promote this expansion in the Wanni Dairy Project.

One of the most important environmental questions that this research on the Wanni Dairy Project raises is the extent to which dairy development will increase the scale of dairying and overall livestock numbers. Farmers described the acquisition of the high-yield cow as the key factor affecting practice and livelihoods. "Because of the jersey cow, that is why I am doing this [dairying] and it is good because I am selling the milk, I can buy my children's things and soon I want to grow [my farming practice] […] it is possible because of this cow," (Farmer, personal communication, October 2018). As farmers are focused on maximising their livelihoods, all farmers in this research planned to acquire more high-yield cows and they continued to keep indigenous breeds in addition. This common thread was captured well by one farmer's comment: "If I have more money, then I can buy more cows – I want to increase the number of cows," (Farmer, personal communication, October 2018).

Despite ambitions to acquire more cows, farmers I spoke to believed that they have a shortage of land for the number of cows being farmed, in order to achieve optimal farm sustainability. Paradoxically perhaps, only one farmer wanted to acquire more land. "I have a shortage of land. If I have five cows then I need five acres of land. Then I can plant the grasses and everything and I can keep it in a good position. My aim is to buy land and do farming very well before I die. It's my dream. I want to make it real,"(Farmer, personal communication, October 2018). It is clear that economic and environmental bottom lines are often in direct competition with each other, as they often are in Western contexts. The environmental impacts of herd growth and intensification are often not well understood in developing countries, however, as dairying knowledge is typically situated within small-scale production (Tarawali *et al.*, 2011). Nonetheless, these farmers considered environmental sustainability highly important and some expressed a desire for more support to improve farm sustainability (for example, some farmer's wanted to know how to develop biogas production – a process that turns manure into energy).

Some farmers reported that they have changed their practices to care for the high-yield cow but not adopted these changes for indigenous breeds because of the high labour demands. "I have to keep this cow tied up all the time, and I am spending every afternoon foraging for food. I can't collect enough food for all, so the [other cows] will roam." Another farmer shared her frustration: "I have been spending all morning today just caring for this calf. The jersey calf requires a lot of extra care because it is not suited to this climate." The productivity gains achieved by the high-yield calf are accompanied by the increasing challenges of labour intensity.

It was unclear in this research how farmers planned to adapt to increasing labour demands that came with larger herds, but investment – for example, in milking automation or hired labour to collect feed – would be necessary to enable feasible scale increases. It seems plausible then, that farmers may increasingly look to commercialise aspects of dairy production. Some experts believed that there would be an increase in medium-scale farms and commercial processes, however, others believed that commercial dairying would be no more viable than the current system (NGO representative, personal communication, October 2018). Commercialisation of dairy production – far from a clear trajectory for the Wanni Dairy Project, but a possibility – involves private sector actors, who provide technology, infrastructure, training and access to market activities. Fonterra, as a private sector stakeholder in NZAP dairy development initiatives, has a vested interest in the Wanni Dairy Project.[2] Fonterra staff had visited the Wanni Dairy Project model dairy farm, processing plant and offices the week prior to my field research and regular communication and exchange of ideas occurs between Fonterra and development actors with the view to potentially working together in future.

Expansion and intensification of dairy production may replace other less profitable livelihood strategies – prompting transition, rather than diversification, in the long-term – thus increasing reliance on dairying for livelihoods, which raises potential economic and environmental vulnerabilities (Tarawali *et al.*, 2011). Although farmers and project staff had plans for intensifying production and diversifying livelihood strategies to increase resilience, many of the farmers I interviewed said their land is unsuitable for diverse crops because it has poor drainage. Cultivation is therefore limited to very few vegetable or legume crops, rice (usually for home consumption), and grasses for animal feed. Some farmers must forage for animal feed. Further, because the unpredictable climate and rainy season, and prolonged droughts come at a significant cost to crops and livelihoods, farmers' focus is on increasing their livestock and dairy production for income rather than strengthening an integrated farming system per se.

The integrated nature of farmers' livelihood strategies is central to maintaining an environment in which resources are in balance as production increases – as has been the case for over a thousand years of dairying in Sri Lanka – but this appears to be in potential conflict with farmers' priority to intensify livestock farming (de Alwis, 2018). Scholars have noted that the displacement of traditional values, which include the interdependence between livelihoods, agriculture and the environment, has occurred in Sri Lanka as farmers increasingly look to the economic benefits of commercialising farming systems (de Alwis, 2018; Tarawali *et al.*, 2011). Despite a focus on integrative farming practices in the Wanni Dairy Project, the impacts of dairy farming on environmental factors – particularly with regard to plans for intensified production –

2 Fonterra also runs their own model farms in Sri Lanka, and Sri Lanka is a major trade market for dairy products.

appear to be only partially understood by farmers and project staff in this research.[3] Farmers and local project staff in this research described only positive environmental impacts and did not identify any risks. "We have CO_3 grass also. We are giving calcium supplements and cattle feed. We buy it from outside. It's an integrated system. Cows have a positive impact on the land. We are also using manure as fertiliser. There is no negative impact on the land. I am happy," (Farmer, personal communication, October 2018). Yet potential adverse environmental impacts of dairy development in Sri Lanka are identified as: declining soil and water quality and biodiversity due to intensification, increasing farm size and establishment of new farms; pollution of waterways; loss of forest and habitat due to land conversion; and increased pollution from processing plants (MFAT, 2015b: 48).

Cross-cutting environment and climate change impacts of the Wanni Dairy Project at the end of phase one are evaluated as 'good'. However, phase one did not target the mitigation of environmental impacts (MFAT, 2017b: 28). Phase two activity design documents for the Wanni Dairy Project note that, "there is insufficient weather, soil and water data and benchmarking. This has resulted in a lack of knowledge of land use optimisation, disaster risk reduction, water management, environmentally-friendly land management, and climate change adaptation" (MFAT, 2016: 8). It is, therefore, important that baseline monitoring occurs in the Wanni Dairy Project to measure environmental impacts over time. Policy documents for phase two indicate that this is an area that should be developed, and an informant indicated there were plans to establish soil baselines (MFAT, 2016).

In this research, I observed what appears to be a disconnect between the planned expansion of smallholder dairying and its inherent environmental impacts because they are considered relatively small. Integrated, smallholder farming systems in Sri Lanka are considered to be "generally benign" for the environment and so it is claimed that "the contribution of smallholder dairying to climate change in Sri Lanka is insignificant" (MFAT, 2015b: 48, 49). This is despite acknowledgement of the inherent environmental impacts of dairy production, processing and distribution and that those in poverty depend most on the ecosystem (MFAT, 2016: 36). It is argued that the 'utmost care' in which the environment in Sri Lanka was traditionally utilised is in 'complete contrast' to New Zealand where the dairy (and meat) industry's focus on profit has resulted in environmental destruction (de Alwis, 2018). It can be seen as paradoxical, then, that powerful New Zealand development actors are in a position of expertise on

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3 In the Wanni Dairy Project these include: introducing high-yield breeds; educating farmers on practices that increase milk yields such as better feed varieties and utilising cattle shelters; promotion of an integrated farming system (combining crop production and animals) to enhance soil and biodiversity; and utilising existing farm resources such as manure and composting systems to reduce reliance on industrial chemical fertilisers, among other strategies.

WCDO identified communicative challenges with farmers around the importance of reducing dependence on external outputs. The economic result of environmental factors is key, and the Government subsidises industrially-produced fertiliser, for example, so farmers still want to use it to maximise crop yields.

environmental factors of dairy farming, when New Zealand's farming has been to the considerable detriment of the environment (MFE & Statistics NZ, 2018).

This research suggests that the farmers I interviewed have a low understanding of climate change. Climate change is understood by these farmers to refer to weather changes that are experienced in the local context, rather than global processes that relate to rising global temperature. Asked about climate change, one farmer said, "The rainy season came too early and ruined my crop preparation, and the drought is a big problem. Last year I lost a lot of crops," (Farmer, personal communication, October 2018). Farmers recognised that extreme and unpredictable weather events are becoming more regular and affecting their livelihoods, particularly through crop losses, and anticipate that these are going to continue and worsen, but did not discuss these in relation to climate change. When asked whether they thought the weather problems are worsening due to climate change, one farmer said, "These problems have been happening since the tsunami." Agricultural production is seen to be affected by impacts of climate change (even though climate change is not attributed as the cause), for which livestock increases farmers' resilience, but livestock's role in contributing to climate change was not considered.

The New Zealand Government's claims that dairy development will reduce emissions are largely based on the assumption that, because high-yield breeds and better practices improve dairy production efficiency, farmers can produce the same amount of milk as they are currently producing with lower emissions by using high-yield breeds and adopting better practices. This is true to an extent. However, neither dairy development initiatives nor the New Zealand or Sri Lankan governments intend to maintain current production levels. Dairy development initiatives are explicitly aligned with goals to *increase* production. This research, moreover, identifies farmers' intentions to increase livestock numbers in order to further increase production, which will increase emissions. If farmers do indeed shift away from integrated farming systems, which often complement jungle production (foraging), the loss of carbon sequestration is a further potential negative environmental impact (Geiger, 2014 cited in de Alwis, 2018).[4] Despite the production efficiency gains that are possible, it appears unlikely that the Wanni Dairy Project will contribute to emission reductions over the medium- to long-term. As dairy development projects can be an important first step towards mitigating the negative environmental impacts of dairying (Parikesit *et al.*, 2005), there is an opportunity for the Wanni Dairy Project to provide better support and information about environmental issues of dairying to farmers.

In sum, there are, on one hand, limited understandings of climate change and livestock's contribution to greenhouse gas emissions in the Wanni Dairy Project. On the other hand, dairy development is seen to increase farmer's resilience to the impacts of climate change. The implications of increased and intensified dairy farming on climate change are little considered in the Wanni Dairy Project despite a large literature on the

4 The expansion of larger, intensified farms contributes to deforestation of jungle that reduces carbon.

negative environmental impacts of dairying and an ongoing focus on global commitments to sustainable development. The environmental destruction caused by Western dairy production for economic gain and the findings of this research, which indicated farmers' desires to expand dairy production and livestock numbers, raise the issue of increasing scale and expansion of dairy farming. The role of private sector actors, and commercialisation processes, which play a key role in global dairy development, may increase in the Wanni Dairy Project as they increasingly support opportunities to expand dairy production in developing countries. Importantly, farmers in this research highly valued environmental factors. Consideration of the full environmental impacts of dairy development initiatives is a fundamental responsibility of macro-level development actors who are supporting livelihood changes. It is critical that the impact of dairy development projects in developing countries on environmental factors – both local and global – receives adequate attention to ensure that short- to medium-term development outcomes are not at the expense of the environment and long-term livelihoods.

Considerable concerns over environmental issues of dairying in New Zealand, include water and soil quality, and climate change.[5] Dairy expansion in the north and east of Sri Lanka, however, is primarily seen by the governments of New Zealand and Sri Lanka as an effective way to achieve economic growth and address poverty. There is relatively limited consideration of environmental impacts of dairying in this context, despite the role of dairy development initiatives in increasing the number of and reliance on livestock for livelihoods, which is inherently connected to natural resource use. In particular, climate change is at the forefront of global environmental concerns, the impacts of which affect social, equity and livelihood factors (Steinfield *et al.*, 2006; Braimoh *et al.*, 2016). Impacts of climate change, such as rising sea levels, temperatures, and the intensity and frequency of weather events, are already being experienced around the world but exceedingly greater challenges are anticipated (*Ibid.*; IPCC, 2019). Sri Lanka and New Zealand, as island nations and as largely reliant on agricultural production, are particularly vulnerable to climate change impacts. Farmers' livelihoods will be disproportionately affected in the coming decades, increasingly so in developing countries with additional vulnerability factors (Raney *et al.*, 2009). Women (and children), moreover, bear the burden of environmental deterioration (Goebel, 2003) and natural disasters (Gaard, 2015) as they have fewer resources as a result of inequities.

Gender impacts

Women play a key role in small-scale dairy production (Boros & McLeod, 2015). Dairy development can contribute to outcomes that support gender equality, and thus gender equality is a target of the NZAP's dairy development. Agricultural research often focuses on and generalises men's experiences, yet, many aspects of women's

5 Livestock are a major contributor to total agricultural greenhouse gas emissions. Livestock produce methane (CH_4) that is mainly created by cattle respiration (enteric fermentation) (39%) and excretion (manure) (25%), as well as nitrous oxide (N_2O) (14%) that is mainly due to nitrogen fertiliser in agricultural soils (Braimoh *et al.*, 2016: xiv).

experiences are distinct (Mosse, 1995). Further, the reliance on quantitative data in research is argued to be inadequate for analysing feminist concerns (Jayasinghe & Lakshman, 2011). Jayasinghe and Lakshamn (2011) demonstrate that qualitative understandings to explore connections between market and non-market household activities reveal the burdens and impacts of economic and social inequality for women in Sri Lanka. Another study in Sri Lanka shows that women tend to farm differently to men, using more progressive approaches, which means they often have smaller herd sizes but higher productivity (Tharsinithevy & Sivarajah, 2011). Women, however, tend to make less profit than men for various reasons including the need for women to spend more on labour to meet the physical demands of farming, and women engaging in more non-market activities than men (*Ibid.*).

The legacy of war continues to impose hardships on Tamil-speaking women in the north and east of Sri Lanka, in a highly patriarchal context that is shaped by ingrained social and cultural practices (ICG, 2017b). Development initiatives, therefore, face the limitations of often operating within societal systems that perpetuate inequalities. Class and gender biases, and issues of patriarchal subordination, land reform and agrarian production restrict the potential for change in the status of women through dairy projects in many places (Sharma & Vanjani, 1993). There are now a number of female-headed households in Sri Lanka as women, who are widowed or whose husbands are disabled, have been compelled to take on new roles and social engagements as household structures change. These household structures, however, are assumed to be relatively more vulnerable than traditional male-led household structures (Vasudevan, 2013). This sense of vulnerability is exacerbated by the severe emotional and physical trauma that these households have experienced during the war; adverse political, social and economic factors; and that single women have an added burden of responsibility to balance income-generating work and other important household work.

Women's involvement in dairy farming can nonetheless contribute to improved gender equality through improved livelihoods and social status (Boros & McCleod, 2015). Whether or not livestock is owned by women, dairying income is mostly received and used by females in Sri Lanka (Tharsinithevy & Sivarajah, 2011). Improved rural livelihoods as a result of dairying are usually because of increased diversification of livelihood strategies or because women who were previously not earning began dairying to support their households (*Ibid.*). Women in households with a higher degree of poverty often have more equal opportunity to participate in income-generating activities due to necessity (MFAT, 2016: 35). Women in this research have experienced empowerment, financial independence and improved wellbeing as a result of extra income earned by increasing dairy production. These factors contribute to reducing the significant economic vulnerability and deprivation experienced by conflict-affected women.

Paradoxically, while dairying can increase women's economic and social resources, potential negative environmental impacts of dairying (including environmental degradation and climate change impacts) will disproportionately affect women as they continue to have fewer resources than men to deal with these challenges. Marriage institutions, socially constructed responsibilities, and patriarchal ideologies of domination, colonialism and exploitation limit women's access to natural resources,

mobility, participation in decision-making, and knowledge and power (Gaard, 2015). Women in developing countries may often be the ones who face more work to collect water, fuel and fodder; are majority of the world's hungry; and may experience additional workloads due to male urbanisation (when environmental deterioration limits rural work).

Furthermore, women – whose household roles often remain constant despite increased workloads as a result of dairy development – are far more likely to die in natural disasters (which due to climate change will increase in frequency and intensity) than men due to a lack of warning, being confined to homes and trying to protect children (Gaard, 2015). If women survive, they face increased likelihood of sexual assault, and if they die, the loss of mothers leads to increased infant mortality, early marriage of girls, neglect of girls' education, sexual assaults, trafficking and child prostitution (*Ibid.*). It is, therefore, important to understand that the specific environmental risks identified in the Wanni Dairy Project, of which it appears there have thus far been insufficient mitigation and monitoring activities, raise additional concerns about cross-cutting issues of gender inequality.

In sum, gendered understandings of the impacts of dairy development are essential. This research provided insights into women's experiences of improved access to resources but also considered how the potential negative environmental impacts of the Project may disproportionately affect women. These forms of tension between economic, social and environmental resources and risks require attention in order to fully understand the interconnected impacts of dairy development.

Conclusion

The Wanni Dairy Project in Sri Lanka aims to solve the livelihood problems of conflict-affected farmers by increasing dairy production and efficiency, and to improve New Zealand's trade relations with Sri Lanka by growing the dairy market in Sri Lanka, and Asia more broadly. However, there are problematic aspects of the impacts of dairy development due to their interconnections and complexities. This research explored nuanced, local perspectives, which have been largely absent from the discourse on dairy development and aid, and offer a valuable lens through which to consider New Zealand's development impact in Sri Lanka as an aid donor for the Wanni Dairy Project.

By offering an insight into the lived experiences of female farmers, this research contributes to the representation of local development stakeholders and the information upon which development policy and practice can be based. This research allows us to critically consider how local perspectives on development and livelihoods intersect with global development concerns. It is vital that local experiences are understood by global development actors, such as donors and private sector actors, but also that local development practice is rooted in an awareness of global issues of sustainable development. Evidence of farmers' low understandings of climate change, for example, demonstrated the tensions between local and global knowledge and priorities, which may become increasingly problematic as the Wanni Dairy Project expands and increases reliance on dairy production for livelihoods.

A focus on the positive livelihood impacts of dairy development shows the Project's important contribution to solutions to the development issues faced in Northern Sri Lanka. However, the areas of tension between environmental and gender aspects of this research and the expansion of dairying in the Wanni Dairy Project addressed in this paper demonstrated the need for more complete understandings of the interconnected impacts of dairy development. Low understandings of environmental risks of the Project both by farmers and in the Project's implementation combined with farmers' priorities for dairying expansion highlighted the contradictory nature of dairy development, which can address some development issues but potentially exacerbate others. A gendered understanding underscored that women, moreover, will be disproportionately affected by such issues. These environmental and gender issues require closer attention than they have previously received as part of a holistic approach to development to ensure effective outcomes. Dairy development, and indeed sustainable development, is laden with tensions and trade-offs. Strong links that promote shared understandings between local and global development actors in New Zealand and Sri Lanka encourage positive development impacts and mitigation of potential negative impacts.

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References

Ahuja, V., J. Otte & H. Makkar, 2014. *Dairy Asia: Towards Sustainability. Elements of a regional strategy for sustainable dairy development in Asia*. Bangkok: FAO.

Aitken, S.C. & J. Craine, 2005. Visual methodologies: what you see is not always what you get. In R. Flowerdew & D. Martin (eds.), *Methods in Human Geography* (pp. 250–269). Essex: Pearson Education.

Amjath-Babu, T., P. Aggarwal & S. Vermeulen, 2018. Climate action for food security in South Asia? Analyzing the role of agriculture in nationally determined contributions to the Paris agreement. *Climate Policy*, 1–16.

Boros, R. & A. McCleod, 2015. *Empowering women in Afghanistan: Reducing gender gaps through Integrated Dairy Schemes*. Rome: FAO.

Braimoh, A., X. Hou, C. Heumesser & Y. Zhao, 2016. *Greenhouse Gas Mitigation Opportunities in Agricultural Landscapes: A Practitioner's Guide to Agricultural and Land Resources Management.* World Bank.

Carney, D., 1998. Implementing the sustainable rural livelihoods approach. In D. Carney (ed.), *Sustainable rural livelihoods: What contribution can we make?* London: DFID.

Creswell, J.W., 2013. *Qualitative Inquiry & Research Design: Choosing among Five Approaches* (3rd ed.). Thousand Oaks, CA: Sage.

de Alwis, C., 2018. Right Effort for Right Livelihood: Historical Model of Sustainable Development from Sri Lanka. In K. Prasad (ed.), *Communication, Culture and Ecology. Communication, Culture and Change in Asia*. Vol. 6. Singapore: Springer.

Ellis, F., 2000. *Mixing It: Rural livelihoods and diversity in developing countries*. Oxford: Oxford University Press.

Fonterra. (n.d.). *Fonterra and MFAT partner to advance dairy in developing countries.* https://www.fonterra.com/nz/en/our-stories/media/fonterra_and_mfat_partner_to_ advance_dairy_in_developing_countries.html

Gaard, G., 2015. Ecofeminism and climate change. *Women's Studies International Forum*, 49, 20–33.

Gerber, P., H. Steinfeld, B. Henderson, A. Mottet, C. Opio, J. Dijkman, A. Falcucci & G. Tempio, 2013. *Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities.* Rome: FAO. http://www.fao.org/3/a-i3437e.pdf

Gerosa, S. & J. Skoet, 2013. Milk availability: Current production and demand and medium-term outlook. In E. Muehlhoff, A. Bennet & D. McMahon (eds.), *Milk and Dairy Products in Human Nutrition* (pp. 11–37). Rome: FAO.

Goebel, A., 2003. Women and sustainability: What kind of theory do we need? *Canadian Woman Studies*, 23 (1), 77–84.

Intergovernmental Panel on Climate Change (IPCC), 2019. *Climate Change and Land*. [Draft report]. https://www.ipcc.ch/report/srccl/

ICG, 2017 (28 July). *Sri Lanka's Conflict-Affected Women: Dealing with the Legacy of War.* [Asia Report No. 289] Brussels, Belgium.

Jayasinghe, M. & R. Lakshman, 2011. Gendered Impact of Rural Livelihood Development Interventions—a Case Study from Sri Lanka through a Longitudinal Lens. *Sri Lanka Economic Journal*, 12, 82–116.

Kishwar, M.P., 2014. Feminism and feminist issues in the South: A critique of the "development" paradigm. In V. Desai & R. Potter (eds.), *The Companion to Development Studies* (3rd ed.) (p. 402). Routledge.

Mawdsley, E., W. Murray, J. Overton, R. Scheyvens & G. Banks, 2018. Exporting stimulus and "shared prosperity": Reinventing foreign aid for a retroliberal era. *Development Policy Review*, 36 (S1), O25–O43.

Meadu, V., I. Coche, S. Vermeulen & A. Engelund Friis, 2015. *Info Note: The Paris Climate Agreement: What it means for food and farming*. [Information sheet]. CCAFS. https://cgspace.cgiar.org/bitstream/handle/10568/69225/CCAFS%20info%20note%20AgCop21.pdf?sequence=1&isAllowed=y

Ministry for the Environment (MFE) & Statistics NZ, 2018. *New Zealand's Environmental Reporting Series: Our land 2018*. [Report]. https://www.mfe.govt.nz

MFAT, 2013. *Arrangement on Dairy Cooperation between the Government of New Zealand and the Government of the Democratic Socialist Republic of Sri Lanka (2013)*. [Bilateral arrangement document]. Wellington, New Zealand: Author.

——2015. *Activity Design Document: Sri Lanka Dairy Excellence Training Initiative.* [Activity design document]. Wellington, New Zealand: Author.

——2016. *New Zealand Partnerships for International Development Fund: Activity Design Document PF 7–519: Dry Zone Smallholder Dairying Expansion Programme (Sri Lanka).* [Activity design document]. Wellington, New Zealand: Author.

——2017. *Sustainable Development Fund Activity Completion Report: Wanni Dairy Regeneration Programme (March 2012 – June 2016)*. [Activity completion report]. Wellington, New Zealand: Author.

——2018. *COP24: Act!on Agriculture: It's time for more act!on.* Proceedings from Katowice Climate Change Conference, Katowice, Poland, 10–12 December, 2018.

Mosse, D., 1995. Authority, Gender and Knowledge: Theoretical Reflections on Participatory Rural Appraisal. *Economic and Political Weekly*, 30 (11), 569–578.

Morse, S. & N. McNamara, 2013. *Sustainable Livelihood Approach a Critique of Theory and Practice.* Dordrecht: Springer Netherlands.

Muehlhoff, E., A. Bennet & D. McMahon, 2013. *Milk and Dairy Products in Human Nutrition*. Rome: FAO. http://www.fao.org/3/i3396e/i3396e.pdf

New Zealand Institute of Economic Research (NZIER), 2017. *Dairy Trade's Economic Contribution to New Zealand*. https://nzier.org.nz/static/media/filer_public/29/33/29336237-3350-40ce-9933-a5a59d25bd31/dairy_economic_contribution_update_final_21_february_2017.pdf

Raney, T., S. Gerosa, Y. Khwaja, J. Skoet, H. Steinfield, A. McLeod, C. Opio & M. Cluff, 2009. *The state of food and agriculture 2009: livestock in the balance.* Rome: FAO. http://www.fao.org/docrep/012/i0680e/i0680e00.htm

Scoones, I., 1998. *Sustainable rural livelihoods: A framework for analysis*. [IDS Working Paper No. 72]. Brighton: IDS.

Sharma, M. & U. Vanjani, 1993. When more means less: Assessing the impact of dairy 'development' on the lives and health of women in rural Rajasthan (India). *Social Science & Medicine*, 37 (11), 1377–89.

Steinfeld, H., P. Gerber, T. Wassenaar, V. Castel, M. Rosales & C. de Haan, 2006. *Livestock's long shadow: Environmental issues and options*. Rome: FAO.

Tharsinithevy, K. & P. Sivarajah, 2011. *Gender aspects of dairying in Eastern Province, Sri Lanka.* International Conference on building Resilience, Kandalama, Sri Lanka, 19–21 July, 2011.

Vasudevan, R., 2013. *Everyday Resistance: Female Headed Households in Northern Sri Lanka.* Geneva: Graduate Institute Publications.

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