



# Cross-species emotional political ecology in rural Pakistan

Kathryn Gomersall<sup>a,\*</sup>, Anam Afzal<sup>b</sup>, Sobia Majeed<sup>b</sup>, Humera Iqbal<sup>b</sup>, David McGill<sup>c</sup>

<sup>a</sup> Nossal Institute for Global Health, University of Melbourne, Level 2, 32 Lincoln Square North, Carlton, Vic 3053, Australia

<sup>b</sup> University of Veterinary and Animal Sciences, Lahore, Pakistan

<sup>c</sup> Faculty of Veterinary and Agricultural Sciences, University of Melbourne, Melbourne, Australia

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## ABSTRACT

This article engages cross-species intersectionality and emotional political ecology to evaluate a dairy extension service that ran in Punjab and Sindh, Pakistan, between 2012 and 2017. The project aimed to mitigate potential negative impacts of implementation, such as the exacerbation of pre-existing social inequality, by applying principles of women's agency and empowerment in project design. Evidence from the two case study villages reveals how social difference (caste and class) shape women's access to extension meetings and the resources to implement practices. The evidence also reveals that through cattle work women cultivate an emotional bond with their animals, given the multiple instrumental and sociocultural values they represent for households. Singh (2013) provides a definition of the agentic potential of this emotional bond as the 'ability to affect and be affected.' The higher socioeconomic classes that had good access to the extension service were able to improve animal welfare and milk production through which they cultivated satisfaction, pride and independence. Alternatively, women expressed feelings of longing or boredom in the absence of this invaluable resource in their lives. This article confirms the importance of intersectionality for designing interventions that are sensitive to inter and intra household dynamics and that cross-species relations form pivotal axes for social difference. These cross-species relations cultivate emotions/affect during engagement with the extension service.

## 1. Introduction

Livestock herding is a popular livelihood strategy in many countries including Pakistan. It promises benefits from consumption of meat or milk, sale of offspring or by-products and use in farming systems. The attraction of livestock is confirmed by their appeal to vulnerable groups, such as women and the landless that frequently engage in livestock production despite being resource poor (Njuki and Sanginga, 2013). However, literature on gender in the global South identifies several social, economic and cultural factors that hamper women's equitable participation in and benefit from livestock systems. Unequal power relations in the family undermine equitable asset ownership and access to the resources needed for animal management (Kristjanson et al., 2014; Njuki et al., 2013; Quisumbing et al., 2015). These social norms that bias men's position in the family have implications for the efficacy of extension services to provide livelihood benefits to all household members.

Extension services are interventions that support learning and capacity building through agricultural knowledge and skill transfer of new technologies, management systems or marketing skills. The aim is to

innovate rural systems to improve efficiency and productivity and increase incomes and livelihood opportunities. A common critique of extension is that inappropriate targeting and design of interventions can lead to negative economic, social or environmental consequences for participating households (Davis, 2008). There are gendered dimensions to this critique. One argument is that social norms can prevent women from receiving information on subjects such as animal husbandry, veterinary care, marketing or use of technologies, due to restrictions on women's mobility (Distefano, 2013). As a result, men disproportionately capitalize on income earning opportunities (Thomas-Slayter and Bhatt, 1994) and benefits do not necessarily flow through to the rest of the family, as is commonly believed (Agarwal, 1997). Likewise, neglect of women's needs and circumstances when targeting extension material, such as the labour required to adopt practices, hamper participation and uptake (Kristjanson et al., 2014). It was this line of thinking that led the extension service in Pakistan to include gender in their project design.

The case study presented in this article is a dairy extension service that aimed to mitigate negative impacts of interventions commonly stated in the literature by engaging women's agency and empowerment in project design. The project developed a Whole Family Extension

\* Corresponding author.

E-mail address: [gomersall.k@unimelb.edu.au](mailto:gomersall.k@unimelb.edu.au) (K. Gomersall).

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Approach (WFEA) by tailoring extension information to the roles and responsibilities of men, women and youth that participate in livestock rearing. The program ran in Punjab and Sindh between 2012 and 2017. Commonly applied definitions of women's empowerment aim at economic enrichment by integrating women into various market driven enterprises. The current program applied [Kabeer's \(1999\)](#) definition by situating empowerment within culturally defined parameters and defining agency in terms of the meanings and motivations behind women's goals. Goals may include any number of more nuanced outcomes of extension such as social interaction ([Bullock and Tegbaru, 2019](#)), cultural activity ([Mitra and Rao, 2019](#)) or status and pride ([Agarwal, 2019](#)). In this article, we explore agency as the power to affect and be affected ([Singh, 2013](#)). Through extension practices women affect cattle welfare and cultivate emotion/affect such as attachment and independence in return.

Emotions signal women's agency in confronting their social reality, especially with respect to resource access and use ([Sultana, 2011](#)). Previous work in emotional political ecology in Bangladesh, identifies how women use emotions such as suffering to attract sympathy from others and gain access to valuable resources such as water ([Sultana, 2011](#)). In [Singh \(2013\)](#), affect/emotion inspires new subjectivities and relations to the environment during care work in forests in India. In Pakistan, cattle inspire an emotional landscape because of the multiple instrumental and sociocultural values they hold for households. This landscape is shaped by social difference in that access to cattle, extension meetings and the resources to implement practices varies between social classes of women within the gendered spaces of dairy work. Previous work in cross-species intersectionality by [Petitt and Hovorka \(2020\)](#) identifies how gender, class and ethnicity shape processes of social becoming-with-cattle in Botswana. In this article, caste and class determines who develops the skills through which women cultivate affect/emotion such as pride, derived from their relations to animals.

The insights gained from this research will add to growing literature on gendered agential spatial relations in Pakistani geographies ([Besio, 2007](#); [Viqar, 2018](#)). The article proceeds through the following five sections. Section two situates the study in literature on intersectionality and emotional political ecology. The third section provides context of women's agency and gendered spatial relations in Pakistan. Section four describes the extension program and research methods and the results from the two case study villages are presented in section five. The article concludes with the key contribution of cross-species emotional political ecology.

## 2. Intersectional cross-species emotional political ecology

Recent literature on the gendered impacts of extension programs identifies shortcomings in project implementation, such as the exacerbation of pre-existing socioeconomic inequalities within communities ([Diaz and Najjar, 2019](#)). In light of these shortcomings, [Diaz and Najjar \(2019\)](#) recommend taking a social relations approach to designing extension, such as through an intersectional analysis of the social norms and structures that produce inequality. A recent article by [Lamontagne-Godwin et al. \(2018\)](#) reinforces this view, demonstrating the importance of cultural norms that shape literacy and mobility, and age for shaping the information pathways of women in Pakistan. This article engages intersectionality to understand how social structures, such as gender, caste and class, shape participation in and outcomes of a dairy extension program for both women and cattle in Punjab and Sindh, Pakistan.

There is an extensive body of intersectional studies (and feminist political ecology) that can inform how power and politics shape extension participation and outcomes. In India, [Agarwal \(1992\)](#) has been influential in her examination of how gender and class/caste relations determine the division of labour and distribution of property and power in the household. Gender, caste, class and age differentiate who occupies spaces and how work is performed in these spaces, such as during the collection of leaf litter or gathering firewood in forests (see [Doubleday,](#)

[2020](#); [Elmhirst, 2015](#); [Nightingale, 2006](#)). The literature has been apt at demonstrating the salience of various lines of social difference, such as ethnicity ([Thomas-Slayter and Bhatt, 1994](#)), race ([Mollett and Faria, 2013](#)), familial identity ([Po and Hickey, 2018](#)) or religion ([Nightingale, 2011](#)) as they intersect to shape women's differential configurations of marginalisation. Recent literature has addressed how gender shapes access to extension services. For example, [Bullock and Tegbaru \(2019\)](#) found that women's access to agricultural technologies in Kenya creates opportunity spaces within existing norms of men as authority and decision maker. Conversely in Malawi, women are denied opportunities to participate in extension services due to their position in society as ignorant, passive and illiterate, cheap labour ([Mudege et al., 2017](#)).

In this article, we draw on [Hovorka's \(2012, 2015\)](#) cross-species intersectionality to examine how social difference shapes extension participation and outcomes for both women and cattle. In Botswana, [Hovorka \(2012\)](#) engages a species relation of power to show how gender and class structure attitudes and practices towards herding animals. Women with their chickens challenge social norms that privilege men and cattle by capitalising on economic opportunities to produce chickens more efficiently than cattle in urban spaces. Cattle have instrumental, symbolic and cultural value that places them on top of a hierarchy of importance, relative to other livestock species such as chickens, pigs and goats. These values ensure cattle ownership bestows privilege and social status on their owners, a power that shapes social difference and is common in rural communities in the global South ([Ainslie, 2013](#); [Ferguson, 1994](#)). Recently, [Petitt and Hovorka \(2020\)](#) have expanded on species relations of power to reflect how gender, ethnicity and class shape cross-species relations in a process of [Haraway's \(2016\)](#) "becoming-with". In Botswana, women from different ethnic groups become-with cattle differently i.e., through milking, as support for husbands performing cattle work, or in their absence due to cattle being men's work. However, each of these groups of women challenge traditional ways of becoming-with cattle by capitalising on development opportunities to gain ownership and control of assets.

The extension package in question aimed to empower women to improve the welfare of their animals and increase milk production, consumption and income. Within this livelihood system, affect/emotion is implicated in intersecting relations of gender, class and caste during dairy work. Power can manipulate emotions, designating who can feel what and when in any given context ([Sharp, 2008](#)). This is the case in India, where [Gururani \(2002\)](#) describes the pain of unequal access to forest resources endured by gendered and aged subjects that must fulfil familial obligations. In this case, agency is expressed through enjoyment of the friendship shared during forest work, through which daily transgressions of social and power relations are enacted. Alternatively, [Singh \(2013\)](#) defines the agency of the emotions themselves as the ability to affect and be affected. Livestock can inspire affect or emotion that define rural landscapes ([Buller, 2015](#); [Johnston, 2008](#); [Jones, 2013](#)). In [Gorman \(2017\)](#) cross-species mutuality is a product of animals receiving care and welfare, whilst providing important affective/emotional encounters for people attending care farms in the UK.

For [Sultana \(2011, 2015\)](#) emotions are a subjective response that tap into women's agency in confronting the realities of resource access and use. In Bangladesh, she illustrates landscapes of pain and suffering that shape water access and use for marginalised women. People invoke emotions such as suffering to attract sympathy and secure access to water or create an emotional bond with others that provides support. Like [Petitt and Hovorka \(2020\)](#), [Singh \(2013\)](#) discusses processes of social becoming during care work in forests but in this case identifies how affect inspires new subjectivities, ways of being and relating to the environment. In rural Pakistan, cattle affect their owners by defining the emotional parameters of their dairying work. Women engage with the extension service to enhance their skills, in the process engaging their emotional agency by affecting the welfare of cattle and cultivating affects from cattle work such as attachment, independence and pride.

In this article, we draw on recent developments in emotional

political ecology by [Gonzalez-Hidalgo and Zografos \(2020\)](#) to analyse the personal/political, geographical and more-than-human dimensions of relations between power, emotion and cattle. Through this frame we demonstrate how relations with cattle intersect with class and caste within designated gendered spaces of villages to shape the contours of the emotional bond between women and animals. The extension service essentially serves to reinforce and not challenge these norms. Women's agency and empowerment was a stated objective of the dairy extension program. Definitions of empowerment such as [Kabeer's \(1999\)](#) that challenge western definitions based purely on economic advancement ([Agarwal, 1994](#); [Kabeer, 2001](#); [Quisumbing, 2003](#)) illustrate how women may choose to challenge or assert social norms to achieve their goals ([Djurfeldt et al., 2018](#); [Sharp et al., 2003](#); [Wangui, 2014](#)). Agency expresses the meanings, motivations and purposes of women's actions ([Kabeer, 1999](#)).

The literature commonly illustrates how agency is enabled through access to resources such as extension information, ownership of cattle and social networks that provide support ([Gupta et al., 2017](#); [Halvorson, 2003](#); [Wouterse, 2017](#)). In this article, emotional resources map the complexity of agential relations between women and cattle that can be transactional, commodified or sociocultural in nature. For example, in Zambia, women cultivate pride and respect when they acquire a share of the cattle provided as bride price, whilst also being reduced to means of exchange during marriage transactions ([Machina and Lubungu, 2019](#)). In Gujarat, [Daftary \(2019\)](#) describes women's agency in rejecting the commodification of milk in favour of consumption and nutrition of children and in Mongolia, women's agency leads to outmigration due to pain and distress experienced during livestock work ([Ahearn, 2018](#)).

In this article, we explore exclusion/access to a dairy extension service and outcomes of participation as a product of the emotional agency cultivated from cattle work. Extension serves to illuminate this landscape as the personal/political shapes access to cattle, extension meetings and the resources to implement practices, within the gendered spaces of the village. Through extension practices, women affect their animals and in turn cultivate emotion/affects from cattle work. To do this we employ a cross-species emotional political ecology lens. To contextualise intersections of women's agency and emotion, the following section will review the nature of gendered spatial relations in Pakistan.

### 3. The spatial relations of women's agency in Pakistan

The women of rural Pakistan are diverse in their character due to the multitude of social structures such as kin, ethnicity and religious affiliation that shape their lives. It is through these structures that the social reality of women is articulated, and the boundaries of exclusion/inclusion, privilege/disadvantage and class are drawn ([Shaheed, 2010](#)). The biradari is the basic social, economic and political unit in rural Pakistani society ([Mumtaz, 2012](#)). Biradaris are embedded within wider tribal and ethnic systems but operate as a family-based household that organizes livelihood strategies ([Kabeer et al., 2010](#)). They are, therefore, the basis for understanding how class, caste, religious and gender relations are organized in villages and hence how they influence the wellbeing of family members.

The biradari is the foundation of the kinship power structure in Pakistani villages. [Qadeer \(2006\)](#) describes the typical Pakistani household is led by a patriarch (oldest male) who is head of his family (wife and children) and also married son's and younger brother's families. This extended family functions in the same house with a single kitchen, shared incomes, property and raising children together. In this system, male household heads are the primary decision makers and sons are favoured in terms of inheriting family land and assets ([Rauf, 1987](#)). Marriages are often endogamous and treated as an alliance to suit family and economic needs ([Azhar-Hewitt, 1999](#)). The gendered spaces of biradaris are defined by segregation. Socially acceptable spaces for women consist of biradari members only and the presence of a non-

biradari man or woman renders the space outside and unsafe ([Mumtaz and Salway, 2005](#)). However, considerable variation exists in the arrangement of nuclear and extended family across the country, including in arrangements for organising domestic life, production and consumption ([Qadeer, 2006](#)).

Biradaris are organized differently across Punjab and Sindh. In Punjab, they are generally organized along caste, kinship, class and occupational lines ([Gazdar and Mallah, 2012](#)). [Tamim et al. \(2015\)](#) describe caste groups as having a hierarchical division of labour and occupational stratification (agricultural versus non-agricultural or agricultural wage labour) that define high and low status. This limits social mobility between them and serves to maintain the dependence of lower castes on higher castes. [Kabeer et al. \(2010\)](#) add that this hierarchy governs social interaction in that social mixing between biradaris is rare. Conversely in Sindh, the social hierarchy in villages is weaker due to villages consisting of a single biradari. Despite the unitary nature of villages, land ownership in Sindh is still often concentrated in the hands of a few powerful kin members and the poor still make up the landless and land-poor who work as agricultural labourers.

Superimposed on biradaris is the Islamic system of purdah or seclusion. Purdah ensures the gendered division of resources, roles, responsibilities and power, which renders women dependent on men for their material wellbeing and subordinate in decision-making ([Kabeer et al., 2010](#)). Women are physically segregated from men outside their kinship group from puberty; the home boundary is divided into gendered spaces and the space outside the home is only accessible to women behind a veil and accompanied by a male family member ([Rauf, 1987](#)). Literature on Pakistan commonly cites purdah/seclusion as the system that primarily constrains women's agency, including with respect to livelihood activities such as livestock rearing ([Azhar-Hewitt, 1999](#); [Batoool et al., 2012](#); [Bustamante-Gavino et al., 2011](#); [Elahi et al., 2015](#); [Nazir et al., 2013](#); [Rauf, 1987](#); [Siegmann and Sadaf, 2005](#)).

While structures such as biradari and purdah place overarching constraints on women's mobility and agency, the gender literature in Pakistan explores local nuances in women's agential behaviour. For example, in Gilgit, women use gendered spaces in the home and veiling practices to reinforce identity ([Besio, 2006, 2007](#); [Cook, 2001](#)). In general, within the home compound, women engage in livestock feeding, watering, milking, cleaning shelters and making biproducts such as ghee ([Akram-Lodhi, 1996](#)). Outside the compound, women collect fodder or dung, relishing the opportunity to get away from the house to socialise ([Besio, 2003](#); [Mumtaz and Salway, 2005](#)). Particularly in the northern mountainous regions, women enjoy the autonomy to herd livestock in high seasonal pastures where they produce dairy products and socialise together ([Azhar-Hewitt, 1999](#); [Butz and Cook, 2011](#)).

Intersections of gender, class and age shape women's agentic behaviour. Evidence shows that women may observe strict purdah because they can afford to, while poorer women may have greater mobility, access to resources, economic autonomy and decision making discretion over livelihood activities due to the considerable pressure to take on additional labour and increase income ([Khan and Khan, 2009](#); [Sathar and Kazi, 2000](#)). These lower socioeconomic class women can feel vulnerable as a consequence of being exposed in certain places, as in the case of labourers and domestic workers in urban Lahore ([Masood, 2018](#)). Conversely, in the case of grazing, it is often the young women that are delegated the responsibility and enjoy seasonal migration away from the village ([Azhar-Hewitt, 1999](#); [Butz and Cook, 2011](#)). These examples demonstrate women's highly nuanced and purposeful use of space, such as in Karachi where women appeal to membership of a collective such as a religious group to legitimise their movement through public spaces ([Viqar, 2018](#)).

Literature on the impacts of a modernising force, such as a development intervention, on women's agency highlight tensions in reorganising intra-household dynamics. For example, in [Cook and Butz \(2017; 2020\)](#) the introduction of road infrastructure in Gilgit

reconfigures gendered and aged relations, providing opportunity for some while marginalising others. Older men and young men and women are leaving the village to pursue education and employment leaving older women to carry the burden of the labour shortage in agricultural work around the village. While young women are expanding their economic and social horizons, older women lament the loss of their seasonal migration to pastures for dairying that provided space for socialisation beyond the control of male relatives. Social difference is distributing costs and benefits of development differently, including the devaluation of dairying work and the reconfiguration of the masculine space of the village into a feminine space of reproductive work.

Our research aligns with these common themes of nuances in agential spatial relations but in this case, they are mediated through skills acquired through livestock extension. This article locates the multiple values of cattle work as a force that inspires emotional agency in women within the gendered spaces of villages in Punjab and Sindh. For this reason, we are contributing to this growing literature on gendered Pakistani geographies by engaging the non-human in agential relations with women.

#### 4. Background and research methods

From 2012 to 2017, the Australian Centre for Agricultural Research (ACIAR) funded, Agriculture Sector Linkages Program (ASLP) Dairy project, incorporated a gender dimension to their extension service. The project included women and girls in extension activities to provide them with the skills to increase milk production, leading to improvements in nutrition and income through sale of milk and byproducts. Equality in access to the extension service ensures the benefits of the program flow more equitably in the household. The inclusion of women and youth in extension activities arose from knowledge derived from male participants that livestock responsibilities often fall to other household members. Therefore, extension material was adapted to suit the roles and responsibilities of different household members. This approach, in which information on ways to improve cattle management and welfare is tailored to men, women and youth has been termed the Whole Family Extension Approach (WFEA). The extension package consisted of 9 modules on animal health, nutrition and reproduction (see Table 1).

Due to social norms of gendered spatial segregation, a female extension officer was required to visit each village. Female extension workers have been visiting women in villages since 2012 and have employed extension methods, such as discussion groups, practical

**Table 1**  
Extension package (source: adapted from Warriach et al. (2018)).

Module	Description
1. Animal husbandry	Basic husbandry principles (providing shelter, keeping animal areas clean and providing adequate water)
2. Basics of animal nutrition	Basics of animal requirements Nutritional requirement according to age, weight and production Ration formulation
3. Calf rearing	Calf management Calf diseases Calf fattening
4. Animal reproduction	Principles of animal reproduction Reproductive disorders Importance of feed for reproduction
5. Dairy breeds and their selection	Different breeds of dairy animals Recommendations for the purchase of milking animals Selection of better productive animals
6. Ration formulation	Balanced feed for animals Total mixed ration
7. Improved fodder agronomy	Strategies to overcome fodder shortage Seed selection and preparation Summer and winter fodders Mixed cropping
8. Milk marketing and value chain	Cost of milk production Milk marketing options Milk value addition
9. Animal health	Deworming of animals Infectious diseases and their prevention Mastitis prevention

demonstrations, role plays and brochures to disseminate the WFEA extension package. Extension workers visit villages every-four to six weeks to implement the next round of information sharing, obtain feedback on adoption and update skills. Authors two and three worked on the ASLP Dairy project during this period and have built relationships with the women in the two case study villages described in this article.

In each village, a focal man was selected after extension officers and a local government veterinary officer visited villages to inform local farmers of the project. Farmers registered on the project if they were interested, and they nominated a focal person from amongst themselves who would gather farmers to attend meetings at his house. The wife of the focal man was identified as the focal woman. It is her responsibility to gather women together for meetings which she holds at her house. Women were asked to register on the program if their husbands had previously registered. Ten women were registered on the program in each of the two case study villages. It was hoped that after receiving extension information, women would share it with other women through word-of-mouth or invite them to meetings. These two groups of women were sampled for data collection, as were women that did not participate in the program at all. A total of 21 farmers were selected from each village, seven from each group, to participate in an evaluation of the extension program.

To evaluate the impacts of dairy extension, a feminist methodology is applied in which social structures and processes of marginalisation that serve to oppress women are analysed (Burns and Walker, 2005). To capture relevant insights, research methods include semi-structured interviews with women. In addition, observations and photographs of cattle management including implementation of extension activities and the surrounding resource environment such as water sources and animal shelters are recorded. These methods enabled the extension workers and researchers to collect narratives of adoption/not adoption of extension material, changes in the condition of animals, the local resource base as it contributes to in/decreases in welfare and the women's experiences and attitudes of these changes.

Qualitative, semi-structured interviews with the women farmers were arranged by the focal woman, except for some of the non-participating farmers that were chosen randomly. The interviews were conducted in the interviewee's house by a research team consisting of one person to ask questions and another to take notes. Interviews lasted for approximately an hour. Questions gathered information on the asset and livelihood base in the family, their agency/problems in engaging with and outcomes derived from the extension program and their attitudes towards livestock/work. Women that did not participate in extension were asked about their livestock practices and attitudes and barriers to participating in extension. Data collection took place through January to the end of March 2018. The data from the interviews were coded and analysed based on key theoretical themes such as the personal/political and emotional encounters between species.

Two villages were chosen for the research that contrast in geography and social structure. The village in Punjab, 83D, is located in Pakpattan district. It is a well irrigated region with prosperous agricultural production. The village in Sindh, Khalifo Ahmed is in Sujawal district. This southern part of Sindh is arid with a high water table and frequent problems with saline soils. However, irrigation channels from the Indus River service parts of the district and some households engage in cropping and have access to water pumps in the household. As was outlined in the previous section, villages in Punjab and Sindh differ in their caste/biradari structure, with villages in Sindh predominantly having one caste/biradari while villages in Punjab consist of more than one. By comparing villages with different caste/biradari structures, the way that caste/biradari intersects with different economic conditions and women's extension activity can be analysed. In addition, the villages were chosen for pragmatic reasons such as the number of years the village has been involved in the program (5) and the relationship the researchers have built with the residents of the village throughout the program.

## 5. Emotional political ecology of dairy extension

In rural Pakistan, cattle work is the precursor of an emotional landscape that extension serves to illuminate. The personal/political through caste and class shape mobility around the village, access to the extension service and the resources to implement practices. Through their dairy work, women affect their animals and cultivate emotional affect from cattle work such as independence, pride and satisfaction.

After the extension service providers telephone the focal woman to organise an extension meeting, it is her job to invite all the participants to her home. Women are invited to register on the program if their husbands register, but in interviews it became apparent that in both villages wives of men that didn't want to register were attending meetings. Several women stated that their husbands weren't interested in the program but didn't prevent them from attending if the focal woman invited them. The geography of attendance is that proximity to the focal woman, either socially as friend or relative or physically as neighbour ensures access. Women in Khalifo Ahmed that did not participate said they were too busy with their household work, weren't interested or didn't know about it because they weren't invited by the focal woman. Physical distance also led to restricted access for one woman that lives on the periphery of the village. She relied on her daughter-in-law for extension information as she is the daughter of a registered farmer.

Women in Khalifo Ahmed who had good social networks accessed meetings and cultivated satisfaction at learning new skills. A woman explained that her husband had buffalo but was not interested in registering on the program therefore she could not register. However, he did not restrict her from attending meetings where she learnt about feeding and watering animals, shelter cleaning and providing colostrum to calves. She now has four cattle, two of which produce milk that she consumes and sells. She explained: "Prior to [the] project, I did not have any animals. I heard from my sister in-law about project meetings. She took me to the meetings and I got awareness and interest in livestock farming. I received a heifer from my sister-in-law as a gift. I reared the heifer and built the current herd from that animal" (woman Khalifo Ahmed, interview by author).

In Punjab, where villages consist of more than one caste, poor minority caste women (Dhakoo, Rehmani and Bhatti) made up the largest proportion of women that did not participate in the extension program. These women said that they did not know about the extension program, or they weren't invited by the focal woman who is a member of the dominant caste, Sagla. They also have restrictions placed on their mobility by husbands, so could not attend extension meetings due to meetings being held in the household of an unfamiliar caste. The following narrative expresses one women's attachment to her cow as it is cultivated while overcoming these limitations.

A poor Rehmani woman, who has one cow, was able to participate, for the most part indirectly, in the extension service. There are nineteen people in her household from two families, some of which are in poor health, including her husband who is mentally ill. Their main source of income is daily wage labour and her son is a street vendor. She doesn't have any agricultural land to grow forage, so her neighbours support her by providing fodder. Her neighbours are registered on the program and she has been able to attend one meeting with them. She learnt about the importance of providing balanced nutrition for her cow, so she offers it green fodder, wheat straw and oil. Her neighbours continue to provide extension information on good livestock practices such as providing clean water and good feed. She understands the importance of livestock to increase her income, as in the past she sold a buffalo to purchase a piece of land to build her house. She said she loves her cow as it is a source of income for her family and she does not like it to be hungry and unhappy.

Cattle work inspires women's emotions which arise in response to

their instrumental value in the household. In addition to milk for nutrition, they earn money from sale to cover domestic expenses, pay for a daughter's wedding, buy a plot of land and/or construct a house, pay loans, medical expenses, children's education and shopping for clothes or Eid festivals. There is also an entire economy around manure which includes its use as fertiliser, construction material to build houses, source of energy and commodity to be sold by the truck load. In exchange, women's cattle work in the household compound includes feeding, watering, milking, cleaning up dung out of shelters and making dung cakes.

In addition to mobility around the village, caste shapes the division of labour in the household. Many of the women from minority castes in 83D did not perform a lot of livestock work. In general husbands are more likely to do livestock work, attend extension meetings and make all the livestock decisions. The households of minority caste women are also less likely to own cattle, instead keeping them on a shared basis for other households in the village and keeping milk, calves or half the profit from sale of animals as reward for taking care of them. However, despite their restricted mobility around the village, women accompany husbands or sons to fields to do agricultural work and cut and carry fodder to feed animals. The emotional geography of mobility for these women is illustrative of the enjoyment of performing this task because it gives them an opportunity to get away from the house and meet friends and neighbours to chat in new ecological spaces.

From the interviews conducted, it was the higher socioeconomic class women from both villages that attended a substantial number of meetings and were able to adopt extension material. However, some poorer women were agentic in adapting extension activities to suit their resource limitations. Women adopted low-cost alternatives such as tying animals under a tree instead of building a shelter. Poor women in Khalifo Ahmed in particular, found the cost of purchasing feed or concentrate a burden. Women commented that selling sick animals at depressed prices to cover household expenses is difficult, which is why they just keep cattle for subsistence milk consumption.

Cattle relations are reflected in the emotional bond women share with their animals and through which women cultivate affect from their dairying work, albeit within defined sociocultural parameters. A wealthy Khalifo Ahmed woman described her attachment: "I am emotionally attached with animals, treat them as children and pray for diseased animals to recover" (woman in Khalifo Ahmed, interview by author). In this part of Sindh, wealthier landed households can cultivate irrigated crops such as sugarcane, rice, maize or berseem (forage crop) that they diversify with cattle herds. The woman quoted above was able to make improvements to feeding, watering and vaccinating animals which has led to improved health and milk production and thus nutritional and income benefits. Wealthy cattle households such as these traditionally enter their cattle in competitions in local festivals, earning social prestige when their animals win prizes. In rural Pakistan, where all family members play their part in contributing to collective wellbeing, cattle fulfill their livelihood and sociocultural obligations in the same way women do, thus are relationally family members.

The wealthier women that benefited from extension are endowed with sociocultural resources attached to cattle ownership. Wealthier women enjoy ownership of cattle when parents gift a cow or calf to her for her wedding as part of the dowry. As is illustrated in the following narrative, extension helps these women to not only care for their own animals but ensure healthy offspring that can be donated to their daughters upon marriage.

A wealthy woman from Khalifo Ahmed has built a herd of eleven cattle from the wedding gift she received. She is the primary cattle owner in her household as her husband has no land but has good salaried employment. They rent land to cultivate forage and purchase rice straw to feed to cattle. He was not interested in the extension service but did not restrict her from participating. As part of extension, she was able to increase water provision to cattle as she

has a water pump in her home compound. She increased feeding and shelter cleaning which is at times a time and cost burden due to purchase of wheat bran, fodder and cotton seed cake, but she feels the additional milk produced compensates for these impacts. She also feeds colostrum to calves after birth. She claims she is free to adopt these practices as she wishes, but her husband won't let her purchase concentrate because of the cost. She keeps the money she earns from selling ghee and milk. Wealthier women such as this one, cultivate pride and independence from their relations with cattle which extension helps to develop.

In 83D, none of the poorer women from the minority castes received an animal as part of the dowry. However, despite their limited access to livestock, many women still expressed a desire to increase their opportunities with respect to cattle management and income earning opportunities. Cattle provide meaningful activity for poor women in 83D who display affection for them. One woman has had to sell her four animals (buffalos and their calves) to pay for domestic expenses. Her husband is a middleman when they have money to buy and sell calves at a profit, but now she: "feels bored without animals, as animals keep me busy. I am missing my herd" (woman 83D, interview by author). Cattle relations are felt by women even in their absence. A landless woman from Khalifo Ahmed expressed through longing how cattle shape her emotional landscape. "In the past, when I had to buy milk from [the] village, people sometimes refused to give milk to me and I felt very bad." Women are emotionally burdened when they are unable to fulfil gendered expectations of providing nutrition to their families.

For those fortunate enough to have access to the extension program and the resources to implement practices, rewards include the satisfaction of fulfilling gendered expectations of dairying work. A woman in Khalifo Ahmed who has seven cattle was able to increase the frequency of providing water, vaccination and colostrum to new-born calves. She claimed: "before [the] project, milk production was less and I would wistfully look at neighbours or relatives milking. Now I have increased milk production and enjoy milking and its benefits" (woman Khalifo Ahmed, interview by author). Through cattle work, women benefit from the enhanced relations with the animals themselves but also through increased status in the family when they fulfil gendered family obligations.

Entrepreneurial women that sell surplus milk and biproducts such as ghee at the local market (500PKR/kg for ghee) have enjoyed increased incomes and control over it. In some cases, it has led to independence from husbands, such as in Khalifo Ahmed where a woman commented that: "It's difficult to ask [my] husband for money, I care [for] animals, get milk and make money from it to fulfil the needs" (woman Khalifo Ahmed, interview by author). The geography of emotion that extension serves to enhance is evident in the enjoyment women experience through the socialised meanings of milk income. In Sindh, increased milk production has led to the production of more ghee, which one woman likes to give to her married daughters as gifts and the money earned from selling it enables her to travel to Karachi to visit them, shop and visit parks. For those with resources, extension participation has the potential to expand the emotional geography of women by engaging new ecological and social spaces away from the home. Extension participation can enhance the emotional landscape of cattle work, albeit through intersections of caste and class, enabling both species to reciprocally improve wellbeing.

## 6. Conclusion

This article has evaluated a dairy extension service by examining how social difference shapes participation and outcomes. We have expanded [Petitt and Hovorka's \(2020\)](#) intersectional becoming-with, by engaging the agentive power of emotion in intersectional relations between women and cattle during extension implementation and outcomes. To do this, we employed a cross-species emotional political

ecology lens to articulate how the personal/political (caste and class) shapes the emotions of women within the gendered spaces of cattle work. In emotional political ecology, [Singh \(2013\)](#) suggests the agentive power of emotion is the ability to affect and be affected. During care work in forests, affect inspires new subjectivities, ways of being and relations to the environment. In this article, women in rural Pakistan affect the welfare of their cattle through extension practices and cultivate affects from cattle welfare in return.

Woman-cattle relations are defined by sociocultural parameters that guide women's cultivation of emotions in response to their work. For this reason, this article follows [Singh \(2013\)](#) in which people develop affective ties with plants and animals during forest work, which in her case trigger processes of social becoming. In the current case, extension illuminated affective ties of attachment, satisfaction, pride and independence that women from higher caste and socioeconomic class enjoy when their animals perform livelihood tasks, earn social prestige or wealth for their owners. Cattle work similarly leads to feelings of longing or boredom when women lament the absence of this valuable instrumental and sociocultural resource in their lives. Minority caste women are marginalised from access to this important resource. Unlike in [Singh \(2013\)](#), extension participation served to reinforce prevailing social norms and not challenge them.

The evidence collected as part of this evaluation enables us to make some important observations about implementing livestock extension in rural Pakistan. The sociocultural value of cattle allows us to identify empowering outcomes for women, such as improving the health of calves which may lead to more young women gaining ownership of this valuable asset at marriage. Further research is required to evaluate if this outcome is accessible to more marginalised women, such as those that keep cattle on a shared basis but have the potential to keep a calf as reward for their labour. The structure of the extension service may be adapted to reach these women, such as by holding extension meetings in a neutral location or identifying focal women that will invite different groups of women. In this way, extension services has the potential to provide the opportunity to engage women in new ecological and social spaces, thus expanding the emotional geography of cattle work. Pakistani villages display considerable variation in geography, ethnicity, kin, biradari and religious organisation which will require flexibility in the format of delivery. In the current case, the focal woman, as the wife of the focal man, had the power to choose who had access to the extension service.

In some castes, women don't do cattle work at all, or cattle are privileged women's business and a different intervention may be better suited. We agree with [Yurco \(2018\)](#) who concludes that greater attention needs to be given to intra-household relations and their dynamics when studying the power and politics of social difference in villages. This research has engaged the non-human in intra-household dynamics by articulating the emotional bond between women and their cattle and define family relations as a cross-species collective contribution to wellbeing. Further research will benefit from embedding this in a richer understanding of the local biradari context in rural Pakistan. By understanding the local structure and dynamics of biradaris across locations the essential character of intra-household relations that define circumstances for women and their cattle can be incorporated into extension design.

## 7. Ethics

Veterinary and Agricultural Sciences Human Ethics Advisory Group, The University of Melbourne, application no: 1851432.

## CRedit authorship contribution statement

**Kathryn Gomersall:** Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing. **Anam Afzal:** Investigation, Project administration. **Sobia**

**Majeed:** Investigation, Project administration. **Humera Iqbal:** Supervision, Project administration. **David McGill:** Supervision, Project administration, Funding acquisition.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

The data that has been used is confidential.

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