



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Animal Husbandry and Social Reproduction: A Case Study from Haryana

Srishti Yadav*

Abstract: The paper explores how petty commodity producing (PCP) households employ regional social and patriarchal norms to exert control over women's labour power, particularly with respect to women's labour in the household. It draws on primary field evidence from southern Haryana to argue that animal husbandry, for which labour is expended by married women, is primarily oriented towards meeting the nutritional and consumption requirements of PCP households of the dominant caste and that the sale of output is aimed at meeting cash input requirements. Animal husbandry is therefore a productive activity aimed at meeting reproduction needs. Consumption practices and the labour process in animal husbandry of milch animals are rooted in their socio-cultural association with the Ahir identity, which enables their continuation despite the low monetary returns from animal husbandry. Among landless households, animal husbandry is more actively pursued as an income-generating activity, and women exhibit greater control over decision-making. The difference in the place of animal husbandry in the livelihood strategies of the dominant caste and Scheduled Caste households indicates the complex interplay of economic activities, social identity, and gender norms in this region.

Keywords: Animal husbandry, petty commodity production, social reproduction, women's work, Haryana.

<https://doi.org/10.25003/RAS.14.01.0006>

INTRODUCTION

It is widely recognised that contemporary agrarian households are pluriactive, i.e., they are engaged in a host of agricultural and non-agricultural livelihood activities that span sectors, spaces, and seasons (Bernstein 2004; Lerche 2009; Shah and Harriss-White

* Assistant Professor in Economics, School of Arts and Sciences, Azim Premji University, srishti.yadav@apu.edu.in

2011; Djurfeldt 2019). This paper aims to examine the place of animal husbandry in the ensemble of livelihood activities undertaken by rural agrarian households, i.e., households that maintain some association with land and/or agricultural labour.¹ In particular, analytical emphasis is on the under-explored category of petty commodity producing (PCP) households. The goal of this paper is to understand how households across castes and classes themselves view animal husbandry work in relation to other livelihood activities and to unpack the economic and social factors that motivate this work.

The paper employs primary field evidence from Sangli village (name changed) in southern Haryana. I look at the labour process in animal husbandry, the ways in which households procure resources, the extent of market sales versus internal consumption of the output of animal husbandry, and the socio-cultural norms around animal husbandry work across differentiated agrarian households. I found that while landless households actively pursue animal husbandry as an income-generating activity, for landowning PCP households, animal husbandry perfectly encapsulates the overlap and contestation between production and reproduction processes.

While it may create exchange values, animal husbandry is essentially an activity of biological and social reproduction for landowning PCP households. PCP households undervalue biological and social reproductive work and employ regional patriarchal norms and socio-cultural hierarchies in the devaluation of such work. Animal husbandry work is naturalised as the domestic duties of women from the dominant caste (Mies 1986; Chowdhry 2014). In the case of southern Haryana, livestock rearing is integral to dominant caste (Ahir) sociality, such that animal husbandry work (on the part of women) and the consumption of its products (by men) is linked to status production for dominant caste households (Michelutti 2002). The performance of animal husbandry work by dominant caste married women not only rests on but also regenerates caste-based social norms and values. The low monetary returns from animal husbandry work are therefore overlooked in favour of its contribution to the household consumption basket and its non-monetary value in the maintenance of social status.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Production and Reproduction in Petty Commodity Producing Households

Contemporary class analyses of Indian agricultural households typically identify landlords/capitalist farmers/dominant classes and landless labouring classes/classes

¹ Agrarian households defined in this manner may not be earning the majority of their incomes from cultivation, husbandry, or agricultural labour. However, a host of literature in recent years has argued for a re-imagining of agrarian class analyses to seriously account for the nature and extent of diversification that rural households undertake (Bernstein 2004; Lerche 2009; Shah and Harriss-White 2011; Djurfeldt 2019). In line with this, the analysis in this paper extends beyond strictly agrarian households to capture the place of animal husbandry within the ensemble of livelihood activities in which households are engaged.

of labour as the two poles of the class hierarchy, with a differentiated peasantry or petty commodity producers in between (Lerche 2013; Swaminathan and Rawal 2015; Pattenden 2016; Ramachandran 2019). While the processes of differentiation and proletarianisation of the peasantry have received much scholarly attention, there has been little theoretical engagement with the form of contemporary agrarian petty commodity production (PCP).

Agrarian PCP refers to households that engage in cultivation based primarily on family labour and/or which do not systematically produce a surplus (Pattenden 2016). PCP is conceptually distinct from peasantry because it is embedded in market exchange and from capital because commodity production is aimed at subsistence or need fulfilment rather than accumulation (Harriss-White 2012; Sanyal 2014; Jan and Harriss-White 2019). PCP households are characterised by the embodiment of both capital and labour (in gendered and generational roles) and the corresponding circuits of production and reproduction (Yadav 2022b). The circuits and processes of production and reproduction aid and enable each other while also being in contestation and contradiction (Bernstein 1986).

The contestation between production and reproduction in PCP households can be embodied in the various uses of money capital at the end of a circuit of production – towards the maintenance and reproduction of labour (which, in turn, may be differentiated within the household) and towards the reconstitution of capital for the production process. The processes of production and reproduction themselves are inter-connected. As Harriss-White (2012) and Sanyal (2014) point out, surplus generated through the production process in the PCP household-enterprise could be used for augmented consumption, which aids the expanded reproduction of household labour-power and thus enables future production processes, complicating the boundary of productive and reproductive expenses.

The second type of contestation is over the division of labour-power between productive and reproductive activities. While capitalist firms are able to “export” the costs and labour of social reproduction on to gendered households and the state (Bhattacharya 2017; Fraser 2017; Federici 2020), PCP households cannot do such exporting and must meet the bulk of both production and reproduction needs internally. Gender relations and kinship structures shape the division of the PCP household’s labour-power between productive and (social) reproductive activities (Bernstein 1988; Harriss-White 2010). Several scholars have argued that the cost of precarity and distress emerging from the neoliberal capitalist order and India’s incomplete structural transformation is borne by the increased extraction of women’s social reproductive labour in rural and urban labouring classes/informal economies (Naidu and Ossome 2016; Rao 2018; Rao and Vakulabharanam 2018; Shah and Lerche 2020; Mezzadri 2021). However, there is lack of agreement about the analytical treatment of unpaid social reproduction labour vis-a-vis value generation.

Does Social Reproduction Create Value?

In one strand of contemporary social reproduction theory, labour power is a unique commodity whose production and reproduction is driven not by accumulation but by the worker's own needs of "social development" (Bhattacharya 2017, p. 82). The production and reproduction of labour power takes place in a realm of life-making that is distinct from the realm of thing-making where all other commodities are produced, though the two realms are integrated in the "unitary" capitalist system (Bhattacharya 2013). In this strand of social reproduction theory, domestic work is not value-generative, and domestic workers and women are subject to oppression and domination, not exploitation (Rao and Akram-Lodhi 2021). This strand seeks to expand the struggle against capitalism beyond the factory worker to the gendered and racialised social relations that facilitate the paid and unpaid labour of social reproduction in the capitalist system (Fraser 2017).

In another strand of social reproduction theory, labour power is a commodity like all other commodities, and its production creates surplus value that is exploited from its (domestic) workers twice – first by husbands and then by the husbands' bosses. This latter strand, which emerged from the works of Marxist-feminists in the 1970s, such as Silvia Federici (1975) and Mariarosa Dalla Costa and Selma James (1972), has received renewed attention by scholars who have shifted the ontological and epistemic focus of social reproduction to the Global South. As Mezzadri (2021) and Naidu (2023) have argued, contemporary social reproduction theory is wedded to the separation of spheres of production and reproduction that emerges from the capital-labour duality and the dependence of working class households on wage work. This does not describe the reality of large parts of the Global South where regularised wage work that pays a "family wage" has never been the norm. Most working people secure their livelihoods through a bundle of economic activities that are split across the rural and urban, agrarian and non-agrarian, paid and unpaid, and wage work and self-employment (Bernstein 2004).

This latter strand aims to work past the restrictive scope of the concept of value in Marx (Elson 1979) for a more comprehensive understanding of the types of work that contribute to surplus-value generation. It is this latter strand in which I situate myself. The reason to do so is mainly rooted in the phenomenon under consideration – the labour process in PCP households. PCP is fundamentally different from the operation of "apex" or large capital, i.e., capital that hires wage labour to produce commodities and operates by the logic of accumulation. PCP produces commodities with family labour, and it produces and reproduces family labour itself, biologically and socially. The former is not possible without the latter.

The earnings of PCP after the deduction of material costs of production constitute a fund which serves to meet the reproduction needs of the PCP unit (i.e., the household) as well as the reserve for expanded production. Thus, in PCP, the net

product cannot be disaggregated into a “wage share” and “surplus product.” Family members in PCP households do not receive a wage but a (typically unequal) share in household consumption. Additionally, while all or most members of the household may participate in productive and reproductive activities, all members do not have equal control over or say in production and distribution processes. Class places in PCP are shaped by such factors (Harriss-White 2012).

In the Indian context, Rao *et al.* (2023) presented a framework of four dyads to better explain the importance of social reproductive work through time-use data: paid productive work, paid reproductive work, unpaid productive work, and unpaid reproductive work. Paid productive work, paid reproductive work, and unpaid productive work would (the latter at least partially) be part of the compendium of work recognised by the System of National Accounts (SNA). Unpaid reproductive work is not counted by the SNA, though there are efforts to correct this (for instance, see Hirway (2020) in the International Labour Organisation (ILO) resolution to include reproductive and care work within the boundaries of UN-SNA).

Productive and reproductive activities, however, cannot always be disaggregated neatly, as recognised by Rao *et al.* (2023). Goods (or services) produced in a PCP household can potentially create both use values and exchange values. For rural landowning households in India, particularly marginal, small, and medium landowners, a sizeable part of agricultural production may be retained for own use. This is compounded by the fact that for many landowning households, whether a good is marketed or not is not always pre-determined and may be subject to fluctuation based on market conditions, productivity conditions, household responses to shock, among other things. This makes it difficult to separate value-generating and non-value-generating labour within PCP and has implications for the division of labour within the household across different activities. Additionally, many households cultivate some crops, fruits, and vegetables, entirely for own use. For such activities, there is a direct, complete overlap between the processes of production and (biological) reproduction. Animal husbandry is another such activity that represents the fuzziness between production and reproduction.

Animal Husbandry

Livestock contributes just under one-third of the gross value added by agriculture and allied sectors to the economy and about 5–6 per cent of the total gross value added to the economy (Government of India [GoI] 2020). It is the fastest growing sub-sector within agriculture and allied sectors and is more egalitarian compared to cultivation since many landless rural households also keep livestock (Ali 2007; GoI 2020). In the dominant policy discourse, livestock is presented as a diversification opportunity for poverty-reducing growth (Birthal and Taneja 2012).

The work of livestock is often done by women and so growth in the livestock sector is perceived to be empowering for women (Ali 2007). However, women's animal husbandry work is mis-measured in official employment-unemployment statistics when counted as special activities done by non-workers (Kapsos *et al.* 2014; Mehta and Pratap 2017; Usami *et al.* 2018; Vijayamba 2020). To correct this, Vijayamba (2020) used an augmented measure of female labour force participation rate (FLPR) in livestock sector derived from Kapsos *et al.* (2014) to arrive at the estimate that the number of women engaged in animal husbandry work in India was nearly 50 million in 2011–12.

Animal husbandry is an important source of income for agricultural households (Birthal and Taneja 2012). Historically, farmers in various parts of the country have followed an integrated or mixed approach to agriculture and animal husbandry such that the two feed into and enable each other. While the mixed approach continues to be practised in parts of the country, with the introduction of Green Revolution techniques and mechanisation (tractors, threshers), the use of animal power on the field has reduced. However, there is evidence to suggest that the productivity of livestock has increased in States where Green Revolution techniques have been successfully adopted, though it is unclear whether this is because there is greater availability of good quality grain and by-product in these states or because agricultural households in these States tend to be better off (Chand and Raju 2008).

This study deploys field evidence from southern Haryana. Haryana benefitted from the White Revolution alongside the Green Revolution in the 1970s and has seen widespread adoption of cross-bred, higher milk-yielding cattle (Chowdhry 2014). It is among the best performing States with respect to milk yields and per capita availability of milk – it had the second highest yield rate of milk from non-descript/indigenous cows and the highest yield rate of milk from buffalos in the country in 2021–22 and the third highest per capita availability of milk in the country in 2021–22 (after Punjab and Rajasthan) (GoI 2022). It also has a high labour force participation rate in animal husbandry compared to other States (Birthal and Negi 2012; Vijayamba 2020).

FIELD EVIDENCE

Overview of Sangli

Sangli (name changed) is a village in Rewari district, southern Haryana.² Landholdings in Sangli are small, and map strongly along the lines of the savarna-avarna divide.³

² Compared to northern Haryana, southern Haryana is more arid and less fertile and saw a relatively late adoption of Green Revolution techniques (Bhalla 1981).

³ Savarna refers to caste groups that lie within the four-fold varna hierarchy, i.e., Brahmin, Kshatriya, Vaishya, and Shudra; this includes caste groups officially categorised as “Others” or the twice-born upper castes and “Other Backward Classes.” The formerly untouchable caste groups, officially categorised as Scheduled Castes, constitute the avarna. The terminology and political economic categorisation in the particular context of this research is drawn from the work of Teltumbde (2010).

Located in the Ahirwal belt of southern Haryana–northern Rajasthan, the dominant landowning castes are Ahir, Rajput, Brahmin, and Bania, of whom Ahirs are in numerical majority. Ahirs, or Yadavs, officially categorised as Other Backward Classes, have historically been politically dominant in the region; the area was the seat of the Ahir kingdom of Rewari (Rao 1968; Rao 1972).⁴ Other Backward Classes such as Prajapat and Khati do not hold similar numerical strength, political influence, or material resources, i.e., land. Avarna groups such as Chamar, Dhanak, Bawariya, and Nai are almost entirely landless and have historically performed agricultural labour on dominant castes' fields. Local agricultural labour continues to be performed only by avarna groups and non-dominant Other Backward Classes; dominant caste households do not perform paid agricultural labour. Survey and sample details are presented in Appendix 1.

While agriculture continues to play an important part in the local economy, it is increasingly one among many components of households' economic profile. High levels of formal education enabled by surpluses from cultivation, caste networks, and proximity to New Delhi and the industrial belt on National Highway 8 contribute to varied diversification among dominant caste agrarian households, primarily in formal public or private sector employment and in small businesses (Yadav 2022a). Diversification into formal, preferably public-sector employment is prized for the stable and secure incomes on offer and the sedentary nature of work, as compared to the hard labour of cultivation. Landless households, on the other hand, engage in combinations of casual wage work and petty self-employment across rural and urban and agricultural and non-agricultural spaces to eke out a sustenance (Yadav 2022a). Periodic circular outmigration of one family member or more is common across all castes and classes.

Based on a number of criteria (ownership of means of production, exploitation ratio, re-investment of surplus, type of diversification, caste identity), I classify households into Landlord/business, PCP: major diversification, PCP: investible surplus, PCP: no surplus and diversified: informal (shortened to PCP: no surplus), and Landless Labourers (see Table 1; further details on class analysis have been provided in Appendix 2). Landlords/business are households that have withdrawn family labour from cultivation. They may continue to oversee cultivation in some part of their land and lease out the rest. They are diversified into petty trading, moneylending, and property dealing. Landless Labourers are Scheduled Caste and non-dominant Other Backward Class households which participated in agricultural labour for any number of days in the previous year. Between these two classes are differentiated agricultural petty commodity producers for whom availability of family labour is the primary constraint in cultivation.

⁴ The current (as of May 2024) Member of Parliament from Rewari district is a descendent of the erstwhile royal family of Rewari.

Table 1 Characteristics of agrarian caste-classes: size of landholding, exploitation ratio, net income from agriculture per hectare, and annual income per capita, Sangli, 2018–19 in hectares and rupees at current prices

Caste		Class	No. of HH*	Size of landholding	E-Ratio	Net income from agriculture	Annual income per capita
Dominant castes	Rajput, Bania, Ahir	Landlords/business	8	2.6	4.2 + ∞	5484	214421
	Ahir, Brahmin	PCP: major diversification	14	2.4	1.5 + ∞	6751	189226
	Ahir, Rajput	PCP: investible surplus	9	3.4	1.3 + ∞	7418	115779
Dominant castes + Oppressed castes	Ahir, Khati, Prajapat	PCP: no surplus	15	1.4	0.9	4543	54236
Oppressed castes	Prajapat, Chamar, Dhanak, Nai, Bawariya	Landless Labourers	27	0	—	—	26836

Note: *HH stands for households.

The class PCP: no surplus also includes households diversified into non-agricultural informal sector activities.

Averages are arithmetic means. The E-Ratio is a measure of paid out labour costs in agriculture with respect to imputed value of family labour. The formula is provided in Appendix 2. Cases in which no family labour was employed and E-Ratio approaches infinity are included in the table as the misnomer “+ ∞ .”

Source: Field data, 2019.

PCP: major diversification are landowners who continue to cultivate but earn the majority of income from formal, regular, public or private sector jobs. Labour hiring is motivated by the relative availability of family labour that is spread out (in labour time and spatially) over wage work and cultivation. The produce of agriculture and animal husbandry plays a key role in the consumption baskets of these households. PCP: investible surplus are households for whom cultivation is the largest source of household income and who invest in machinery and cultivate on an expanded scale. Though these households use as much family labour as is available, they need to hire labour to meet the demands of scale. These households are “agents of capitalist development” in agriculture. Primarily, agricultural PCP households that are unable to invest in agriculture and diversified PCP households that are in contractual or informal sector employment form the next class category. These households also need to hire labour, particularly during the harvest period, but their relative use of hired labour is the lowest among dominant caste landowners. These two groups, PCP: investible surplus and PCP: no surplus, constitute primarily agricultural or traditionally *agrarian* classes.

Animal Husbandry in Sangli

Dominant caste households in the region rear buffaloes and cows, predominantly the former. While animal husbandry is more prevalent among dominant caste landowners, nearly half of the landless households keep buffaloes and cows as well (see Table 2). Two dominant caste households herd goats,⁵ and one dominant caste and one landless household had a horse, though for very different reasons.⁶

The connection with milch animals is particularly strong for Ahirs, who are historically an agro-pastoral community. Since the 18th century, Ahirs have positioned themselves as a warrior or Kshatriya caste that descends from ancestors of Krishna (Michelutti 2002). This has further imbued religious significance to the cow and to milch animals in general. Moreover, the consumption of milk, clarified butter (*ghee*), curd, and other dairy products is perceived to contribute to the physical strength of Yadav men who also position themselves as a martial caste/race (Rao 1964; Michelutti 2002). This is the basis of a long history of recruitment to the army, which continues to be a pathway into formal employment for Ahir households in Sangli.

⁵ The labour process and returns from goat herding are vastly different from the animal husbandry of milch animals. For this reason, the two goat-herding households are excluded from the empirical analysis in this paper and from the data presented in Tables 2 and 3. Instead, the two households are discussed below as case studies.

⁶ The dominant caste household that kept a horse was a Rajput household. The horse was a white *ghodi* rented for weddings. The practice of bridegrooms coming to their wedding on horseback is a symbol of dominant caste masculinity and chauvinism. The respondent, N, said that he charges Rs 1,000 per night for the horse and goes to about 20 to 30 weddings per year. This is not enough to feed the horse, according to him. Meanwhile, the landless household is a Chamar household where the horse is used to draw a cart. The respondent J gets work once in about 10 days or so and is paid by the number of sacks that he transports. He reported an income of Rs 7,000 per year from the horse cart.

Table 2 *Animal husbandry: feminisation of labour process, share of output marketed versus consumed, and contribution to household income, Sangli, 2018–19 in percentages and rupees at current prices*

Class category	No. of HH*	No. of AH** households	Median no. of milch animals	HH where only women do AH work	Median share of gross AH output consumed internally (in per cent)	Median AH output internally consumed as share of HH income (in per cent)	Median net income from AH
Landlord/business	8	6	3.5	4	68	6	7650
PCP: major diversification	14	10	4	8	82	8	4225
PCP: investible surplus	9	7	4	4	62	22	–500
PCP: no surplus	15	14	3	10	62	25	–3400
Landless Labourers	27	13	2	11	50	32	15200
Total	73	50	3	37	63	16	–1550

Note: *HH stands for households.

**AH stands for animal husbandry.

Source: Field data, 2019.

In addition to its socio-cultural significance, the rearing of milch animals has historically contributed to, and is integrated with, homestead agriculture for dominant caste households. Bullocks were used to prepare, sow, and harvest the field. Cow and buffalo dung-based manure was widely used to fertilise the soil. Animal feed consisted mainly of dried and green fodder (*chara*) and by-products of crops such as pearl millet and cluster bean. Animal products like milk and *ghee* would be consumed within the household and aid nutrition (and lift status). Additionally, dung cakes were used as fuel and for other purposes like caking the floor or walls of houses and other tasks.

Respondents note that the use of tractors and threshers became widespread from the early 1990s, making bullocks nearly redundant. Manure may still be used but farmers across classes primarily use chemical fertilisers purchased from the market. The main use of livestock now is its products for consumption – milk, *ghee*, and sale of the animal itself. Households either consume the products directly or sell in the open market to private dairies. There are no milk cooperatives in the region.

Moreover, for dominant caste households, while the majority of input requirements for livestock are still met within the household (wheat grain, crop by-products of wheat and pearl millet, and green fodder may be cultivated on one's own farm), meeting many other input requirements entails purchases from the market. This includes cotton seed cakes (*khal-kaakda* and *binola*), for in-milk cows and buffaloes (known to increase milk yield), and dry fodder or hay (*tooda*), in addition to wheat and by-products that cannot be provided internally.

As a result, though the productivity of buffalos and indigenous cows in Haryana is among the highest in the country (GoI 2022), animal husbandry is not perceived to be a viable commercial activity. I do not have actual paid-out costs for all households and use an estimate based on selected interviews (Appendix 3 describes the method of cost and output calculations). If all households met the estimated basic feed requirements of milch animals, the median net income from animal husbandry was less than Rs 8,000 per annum at 2019 current prices for all landowning classes (see Table 2 and Appendix 4 for class-wise variations in net income from animal husbandry).

There are exceptions to the norm. Two dominant caste households (Ahir and Rajput) keep a large herd of goats (65 and 25 respectively), generating an income from the sale of animals. These two households have the highest net cash income from animal husbandry (for the Ahir household, Rs 274,000, and for the Rajput household, Rs 578,000). One male member of the household in both cases is solely responsible for grazing, feeding, and otherwise looking after the goats. Interestingly, both households also keep buffaloes and cows whose products are consumed within the household and sold and whose work is performed only by women. Goat milk, on

the other hand, is typically not consumed in the household. In these two cases, livestock rearing is actively pursued as a commercial activity.

One Ahir household runs a vertically integrated business based on milk products. Once a small milk supplier to dairies, their business has expanded and all labour is undertaken by hired workers. They first produce concentrated milk (*mawa*), which is used to produce sweets (*barfi*) and other value-added products in a factory. Finished products are then sold in a shop in Sangli, run by the younger son of the household, who also oversees factory production. This particular household has succeeded in turning a reproductive activity aimed at survival into a successful surplus-generating business. The family, whose commercially inclined kin also reside in the village, no longer engages in the manual work of cultivation or animal husbandry. Instead, the extended family has multiple sources of income such as rental income from land, ownership of a private school within Sangli, public sector employment, as well as the dairy business.

For landless households, the conditions of production are worsened by lack of access to land, which entails that inputs apart from own labour be procured from the market, in particular, cotton seed cakes and dry fodder. Landless households commonly engage in piece-rated harvest labour on dominant caste landowners' fields for which they are paid in grain and crop by-product. This arrangement is most common for wheat and pearl millet. Landless households said that they specifically undertake such contracts to procure food and feed requirements for the year. Some landless households only purchased inputs from the market if one of the milch animals was lactating; otherwise, they took grain and dried fodder from neighbours and friends.

With the steady and almost complete disappearance of common lands in and around the village, Scheduled Caste women adopt various strategies to procure green fodder – sometimes, they offer labour services to dominant caste landowners in return for fodder; sometimes, they offer money; and at other times, they take fodder without informing the landlord. Landless households spend more time in the procurement of fodder than landed households. Despite these difficulties, landless households report a higher median net income from animal husbandry than dominant caste households (see Table 2 and Appendix 4). This is attributed to three factors: smaller herds, higher ratio of milk-giving animals to total herd size, and to some extent, reduced feed of milch animals (attributable to some of the procurement strategies discussed above).

Given the low returns from animal husbandry particularly for PCP households, we must ask why households continue to engage in the activity. One explanation is that livestock is a form of savings or wealth for agrarian households (Ouma *et al.* 2003; Mogues 2006; Pica-Ciamarra *et al.* 2011; Harriss-White 2023). Livestock can serve as collateral, and the sale of livestock can provide liquidity in times of distress. Since

this study is focussed on sources of income of agrarian households and not wealth, the contribution of livestock to household wealth is not captured.

Interview responses indicate that animal husbandry allows households to meet calorific and nutrition requirements. Though animal husbandry is no longer integrated into cultivation, it continues to be a source of milk and milk products which are a prominent part of the diet in this region. The high yield and availability of milk in Haryana alongside Rajasthan and Punjab should be read along with the fact that these three States also have the highest levels of vegetarianism in the country (Natrajan and Jacob 2018). Socio-culturally, vegetarianism is a religious and political identity for Ahirs and a marker of separation from Scheduled Castes and Muslims (Michelutti 2002). To meet nutritional requirements, milk and milk products are key elements in the food baskets of these States.⁷ As such, in its current form, animal husbandry is primarily a productive activity that is oriented towards the reproduction of the PCP household (rather than accumulation), and the reproduction of social norms and identities.

Table 2 shows the median share of animal husbandry output that is consumed within the household for each class category – it is above 50 per cent for all landowning classes, Landlord/business as well as PCP. The bulk of the product of animal husbandry is consumed within the household, though for well-off households, this is a small share of total household income (see Table 2). Multiple dominant caste respondents reported that they only sell as much milk and clarified butter as needed to meet cash input requirements – the rest of the product is retained within the household. It is worth noting that a greater share of the produce from animal husbandry is retained for own use (median for livestock-owning households is 63 per cent), compared to 30 per cent of agricultural produce retained for own use by dominant caste households. While the median share retained by landless households is smaller, as landless households are in greater need of cash incomes, its value as a share of household income is nearly one-third.

Undervaluation of the Labour of Animal Husbandry

Low cash returns from animal husbandry are in sharp juxtaposition to its high labour intensity. Animal husbandry requires hours of work on a day-to-day basis. Labour time involved in animal husbandry increases with the number of animals, but there is a large fixed cost component to the labour required – certain activities *need* to be performed whether the household has one buffalo or five. Moreover, unlike cultivation in which labour hiring is common across all landowning classes, in this village, the work of rearing animals is performed only by family members and predominantly by women (see Table 2). On average, livestock-owning households spend 125 labour days on animal husbandry (see Appendix 3 for calculation).

⁷ “*Deson mein des Haryana, jitt doodh dahi ka khana*” (loosely translates to: Haryana, that country above the rest, where milk and curd is the backbone of food) is an oft-repeated local saying.

The association of animal husbandry with women holds for dominant cultivating castes across Haryana such as Jats, Ahirs, Gujjars, among others (Chowdhry 2014). Several male respondents reported women's occupation as *ḍaangar-ḍhor* (or *ḍhor-ḍaangar*, which translates to cattle). While men may assist in some activities such as irrigating the fodder crop and operating the fodder-cutter, the primary responsibility for animal rearing lies with women. Two respondents reported selling their milch animals when the woman of the household became sick and could not undertake animal husbandry work. Cases in which livestock rearing or dairying is pursued commercially, men are at the forefront of labouring and decision-making (as in the three cases discussed earlier).

Animal husbandry work cannot be skipped or postponed and is typically spread out over the course of the morning and the evening. As such, it inhibits the mobility of the worker and the worker's ability to participate in paid work outside the household or even unpaid work on own farm. Dominant caste women in general work less than 100 days a year on the family farm, contributing on average about one-fourth, or 25.8 per cent, of the total family manual labour on the farm. Only two women among all dominant caste households sampled were engaged in paid work outside agriculture, both as teachers.⁸ Where women participate in paid work or unpaid productive work on own farm, this is mediated through kin-based divisions of labour within the women of the household.

For landless households, herd size is smaller, and hence, labour required for animal husbandry work is less, but this is complemented by smaller family size with limited scope for division of labour within the household. This is because landless households are much less likely to reside in joint families, and men are likely to be engaged in wage work (median days of wage employment among men in landless households was 264). The implication is that animal husbandry work is more feminised in landless households than in landowning households. This places a huge burden on women's time. Scheduled Caste women are engaged in husbandry work, social reproductive work, as well as wage work – in 25 out of 27 landless households interviewed, women performed at least some wage work in the past year, contributing 29 per cent to the household's total wage income on average. Along with this, Scheduled Caste women's work in animal husbandry contributes consumables that are equivalent to 32 per cent of the household income on average (see Table 2).

The combination of low net returns and high labour intensity entails that women's work in animal husbandry is severely devalued in monetary terms. Table 3 presents net income in current prices from animal husbandry and from cultivation for each family labour day employed in the activity. It is evident that the market valuation of women's work in animal rearing is but a fraction of that in cultivation. However,

⁸ This is despite education levels comparable to savarna men – there were 37 savarna women graduates in the sample and 44 male graduates.

Table 3 Net product per family labour day in cultivation and animal husbandry, Sangli, 2018–19 in numbers, hectares, and rupees at current prices

Class category	No. of HH*	Mean size of landholding	Median net income from cultivation per family labour day	No. of AH** households	Median no. of animals	Median net income from AH per family labour day
Landlord/business	8	2.6	1608	6	3.5	57
PCP: major diversification	14	2.4	1917	10	4	39
PCP: investible surplus	9	3.4	1446	7	4	−3
PCP: no surplus	15	1.4	720	14	3	−26
Landless Labourers	27	0	—	13	2	121

Note: *HH stands for households.

**AH stands for animal husbandry.

Net income from cultivation per family labour day is calculated as the net annual income from cultivation divided by the total reported number of family labour days employed on the farm, normalised to 8-hour days. This figure is only computed for those households which employ non-negative family labour days in cultivation and thereby excludes one household each from the top three categories. Net income from animal husbandry per family labour day is calculated as the net annual income from husbandry divided by the estimated number of family labour days employed in AH.

Source: Field data, 2019.

this is not necessarily how households themselves value animal husbandry labour. The valuation of animal husbandry work is tied to its naturalisation as the moral duty of married women in dominant cultivating castes (Mies 1986; Chowdhry 2014). Among Ahirs in particular, the performance of animal husbandry work and provisioning milk, *ghee*, and other products for household consumption are perceived to be the principal duties of married women (Michelutti 2002). Women's work in animal husbandry is "born out of the cultural understanding that this is 'their work' and they are bound to do it" (Chowdhry 2014, p. 178).

This naturalisation feeds into and is compounded by the limitations on mobility imposed by the nature of animal husbandry labour. Animal husbandry work reaffirms both the socio-cultural identity of dominant caste, particularly Ahir households, and the social norms and values that identify women's role with the performance of unpaid care and domestic work. Together, these factors serve to maintain control over the material resource of women's labour power in service of the social, biological, and material reproduction of the household. Women's work in animal husbandry provides a large implicit subsidy to the process of reproduction of labour power for capital and for the PCP household-enterprise and enables the reproduction of the household's social identity and status (Mies 1986; Michelutti 2002; Chowdhry 2014).

Among landless households, animal husbandry is actively pursued as an income source through the intensified exploitation of women and through lower levels of consumption of output. Though landless households are more likely to earn positive net incomes from animal husbandry, they are constrained by lack of access to land, credit, and marketing channels (Sarkar 2020). The problem is aggravated with the enclosing of common lands and pastures (Chowdhry 2014; Sarkar 2020). Despite these challenges, animal husbandry is pursued by Scheduled Caste women for its contribution to household income. Scheduled Caste women exhibit greater agency in the decision-making around animal husbandry, and greater physical mobility as well, since they are typically engaged in wage labour. It is also possible that animal husbandry is pursued by landless households as a means of upward social mobility, though this could not be explored in my fieldwork.

CONCLUSION AND DISCUSSION

Animal husbandry is part of the ensemble of activities pursued by petty commodity producing (PCP) households in southern Haryana. Husbandry of milch animals contributes to the consumption needs of dominant caste households, and not necessarily towards surplus generation. It allows for better nutritional status of household members through augmented consumption of milk, *ghee*, curd, buttermilk, and other dairy products. The consumption of products of animal husbandry, particularly by men, contributes to the social status and identity of dominant caste households.

Animal husbandry, though undoubtedly a productive activity, and indeed work by any definition, is oriented at the biological and social (including societal) reproduction needs of the PCP household. Animal husbandry challenges the boundary between paid productive work and unpaid productive work. It also challenges the boundary between unpaid productive work and unpaid reproductive work – it creates a good that is used for own consumption but can also be turned into a commodity, and it directly enables the day-to-day biological and social reproduction of the household.

The labour process in animal husbandry in dominant caste PCP households is shaped by socio-cultural and caste-based gender norms that identify animal husbandry work as the duty of married women, which enables its continuation despite low net incomes. Moreover, the nature of animal husbandry work is such that it keeps dominant caste women within the confines of the household, discouraging participation in regular wage work outside the household. It does not endow dominant caste women with economic and bargaining power within the household (Chowdhry 2014) and instead subjugates them to the position of workers. Men of the household – who control the use of surplus, make decisions about production and distribution within the household, and whose work shapes the work of others – embody the position of capital (Harriss-White 2012; Chowdhry 2014). The performance of animal husbandry work, therefore, reproduces the social structures that enable the division of labour (and class relations) within the PCP household.

Landless households, as opposed to dominant caste households, are more likely to treat animal husbandry as an income-generating strategy. Lack of access to land, and commons, and availability of working capital result in smaller herds. Households employ a host of individual and community-based strategies to reduce input costs. They manage to earn positive incomes from animal husbandry, though this imposes a high time burden on women. Unlike women from the dominant caste, women of landless households exhibit greater control over the process of production and marketing. The difference in the place of animal husbandry in the livelihood strategies of dominant caste and landless households indicates the complex interplay of economic activities, social identity, and gender norms in this region.

REFERENCES

- Ali, J. (2007), “Livestock Sector Development and Implications for Rural Poverty Alleviation in India,” *Livestock Research for Rural Development*, vol. 19, no. 2, pp. 1–15.
- Bernstein, H. (1986), “Capitalism and Petty Commodity Production,” *Social Analysis: The International Journal of Social and Cultural Practice*, vol. 20, pp. 11–28.
- Bernstein, H. (1988), “Capitalism and Petty-bourgeois Production: Class Relations and Divisions of Labour,” *The Journal of Peasant Studies*, vol. 15, no. 2, pp. 258–71.

- Bernstein, H. (2004), “Changing Before Our Very Eyes: Agrarian Questions and the Politics of Land in Capitalism Today,” *Journal of Agrarian Change*, vol. 4, no. 1–2, pp. 190–225.
- Bhalla, S. (1981), “Islands of Growth: A Note on Haryana Experience and Some Possible Implications,” *Economic and Political Weekly*, vol. 16, no. 23, pp. 1022–30.
- Bhattacharya, T. (2017), *Social Reproduction Theory: Remapping Class, Recentering Oppression*, Pluto Press, London.
- Bhattacharya, T. (2013), “What Is Social Reproduction Theory?” available at <https://socialistworker.org/2013/09/10/what-is-social-reproduction-theory>, viewed on January 15, 2024.
- Birthal, P. S., and Taneja, V. K. (2012), “Operationalizing the Pro-poor Potential of Livestock: Issues and Strategies,” *Indian Journal of Animal Sciences*, vol. 82, no. 5, pp. 441–47.
- Birthal, P. S., and Negi, D. S. (2012), “Livestock for Higher, Sustainable and Inclusive Agricultural Growth,” *Economic and Political Weekly*, vol. 47, no. 26 and 27, pp. 89–99.
- Chand, R., and Raju, S. S. (2008), “Livestock Sector Composition and Factors Affecting Its Growth,” *Indian Journal of Agricultural Economics*, vol. 63, no. 2, pp. 198–210.
- Chowdhry, P. (2014), “High Participation, Low Evaluation: Women and Work in Rural Haryana,” in *Political Economy of Production and Reproduction*, pp. 157–94, Oxford India Paperbacks, New Delhi.
- Dalla Costa, M., and James, S. (1972), *The Power of Women and the Subversion of the Community*, Falling Water Press, Bristol.
- Djurfeldt, G. (2019), “No Place for Family Farms? Agrarian Transformation in India,” in *Whither Rural India? Political Economy of Agrarian Transformation in Contemporary India*, pp. 22–8, Tulika Books.
- Elson, D. (1979), “The Value Theory of Labour,” in *Value: The Representation of Labour in Capitalism*, pp. 115–80, CSE Books, London.
- Federici, S. (1975), *Wages Against Housework*, Falling Water Press, Bristol.
- Federici, S. (2020), *Revolution at Point Zero: Housework, Reproduction, and Feminist Struggle*, PM Press.
- Fraser, N. (2017), “Behind Mar’s Hidden Abode: For an Expanded Conception of Capitalism,” in *Critical Theory in Critical Times*, pp. 141–59, Columbia University Press, New York.
- Government of India [GoI] (2022), *Basic Animal Husbandry Statistics 2022*, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare, New Delhi, available at <https://dahd.nic.in/sites/default/files/Updated-BAHS-2022.pdf>, viewed on January 15, 2024.
- GoI (2020), *Basic Animal Husbandry Statistics 2020*, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare, New Delhi, available at <https://dahd.nic.in/sites/default/files/BookBAHS2020Final.pdf>, viewed on January 15, 2024.
- Harriss-White, B. (2023), “Brief Non-vegetarian History of Agriculture,” *Seminar*, vol. 761, pp. 41–48.

- Harriss-White, B. (2012), "Capitalism and the Common Man: Peasants and Petty Production in Africa and South Asia," *Agrarian South: Journal of Political Economy*, vol. 1, no. 2, pp. 109–60.
- Harriss-White, B. (2010), "Globalization, the Financial Crisis and Petty Commodity Production in India's Socially Regulated Informal Economy," *Globalization and Labour in China and India: Impacts and Responses*, vol. 12, pp. 131–50.
- Hirway, I. (2020), "Work, Employment, and Labour Underutilisation: What the ILO Resolution Means for India," in *Women and Work in Rural India*, pp. 3–18, Tulika Books, New Delhi.
- Jan, M. A., and Harriss-White, B. (2019), "Petty Production and India's Development," in *Karl Marx's Life, Ideas, and Influences: A Critical Examination on the Bicentenary*, pp. 345–67, Palgrave Macmillan.
- Kapsos, S., Silbermann, A., and Bourmpoula, E. (2014), "Why is Female Labour Force Participation Declining So Sharply in India?" International Labour Organisation (ILO) Research paper no. 10, August 2014, pp. 1–51.
- Lerche, J. (2013), "The Agrarian Question in Neoliberal India: Agrarian Transition Bypassed?" *Journal of Agrarian Change*, vol. 13, no. 3, pp. 382–404.
- Lerche, J. (2009), "From 'Rural Labour' to 'Classes of Labour': Class Fragmentation, Caste and Class Struggle at the Bottom of the Indian Labour Hierarchy," in *The Comparative Political Economy of Development: Africa and South Asia*, pp. 90–111, Routledge.
- Mehta, A. K., and Pratap, S. (2017), "Exploring the Possibility of Estimating the Monetary Value of Women's Contribution to GDP," National Commission for Women, New Delhi, available at https://ncwapps.nic.in/pdfReports/NCW_GDP.pdf, viewed on January 15, 2024.
- Mies, M. (1986), *Indian Women in Subsistence and Agricultural Labor*, Vistar Publications, New Delhi.
- Mezzadri, A. (2021), "A Value Theory of Inclusion: Informal Labour, the Homeworker, and the Social Reproduction of Value," *Antipode*, vol. 53, no. 4, pp. 1186–205.
- Michelutti, L. (2002), *Sons of Krishna: The Politics of Yadav Community Formation in a North Indian Town*, London School of Economics and Political Science, United Kingdom.
- Mogues, T. (2006), "Shocks, Livestock Asset Dynamics and Social Capital in Ethiopia," International Food Policy Research Institute, Development Strategy and Governance Division, discussion paper no. 38, August.
- Naidu, S. C. (2023), "Circuits of Social Reproduction: Nature, Labor, and Capitalism," *Review of Radical Political Economics*, vol. 55, no. 1, pp. 93–111.
- Naidu, S. C., and Ossome, L. (2016), "Social Reproduction and the Agrarian Question of Women's Labour in India," *Agrarian South: Journal of Political Economy*, vol. 5, no. 1, pp. 50–76.
- Natrajan, B., and Jacob, S. (2018), "'Provincialising' Vegetarianism: Putting Indian Food Habits in Their Place," *Economic and Political Weekly*, vol. 53, no. 9, pp. 54–64.
- Ouma, E. A., Obare, G. A., and Staal, S. J. (2003), "Cattle as Assets: Assessment of Non-market Benefits from Cattle in Smallholder Kenyan Crop-livestock Systems," proceedings of the 25th International Conference of Agricultural Economists, August 16–22.

- Patnaik, U. (1987), *Peasant Class Differentiation: A Study in Method with Reference to Haryana*, Oxford University Press.
- Pattenden, J. (2016), *Labour, State and Society in Rural India: A Class-relational Approach*, Manchester University Press.
- Pica-Ciamarra, U., Tasciotti, L., Otte, J., and Zezza, A. (2011), "Livestock Assets, Livestock Income and Rural Households: Cross-country Evidence from Household Surveys," Food and Agriculture Organisation, ESA working paper no. 11–17, July.
- Ramachandran, V. K. (2019), "Aspects of the Proletarianization of the Peasantry in India," in A. Narayanamoorthy, R. V. Bhavani, and R. Sujatha (eds.), *Whither Rural India? Political Economy of Agrarian Transformation in Contemporary India*, pp. 69–83, Tulika Books, New Delhi.
- Rao, M. S. A. (1964), "Caste and the Indian Army," *Economic Weekly*, vol. 16, pp. 1439–43.
- Rao, M. S. A. (1968), "Political Elite and Caste Association: A Report of a Caste Conference," *Economic and Political Weekly*, vol. 3, no. 20, pp. 779–82.
- Rao, M. S. A. (1972), *Tradition, Rationality and Change: Essays in Sociology of Economic Development and Social Change*, Popular Prakashan, Bombay.
- Rao, S., and Akram-Lodhi, A. H. (2021), "Feminist Political Economy," in *The Routledge Handbook of Feminist Economics*, pp. 34–42.
- Rao, S., Ramnarain, S., Naidu, S., Uppal, A., and Mukherjee, A. (2023), "Work and Social Reproduction in Rural India: Lessons from Time-use Data," *Journal of Agrarian Change*, e12569, available at 10.1111/joac.12569, viewed on January 15, 2024.
- Rao, S., and Vakulabharanam, V. (2018), "Migration, Crises and Social Transformation in India Since the 1990s," in *The Oxford Handbook of Migration Crises*, pp. 261–78, Oxford University Press, New York.
- Rao, S. (2018), "Gender and Class Relations in Rural India," *The Journal of Peasant Studies*, vol. 45, no. 5–6, pp. 950–68.
- Sanyal, K. (2014), *Rethinking Capitalist Development: Primitive Accumulation, Governmentality and Post-colonial Capitalism*, Routledge, New Delhi.
- Sarkar, A. (2020), "Role of Livestock Farming in Meeting Livelihood Challenges of SC Cultivators in India," *Indian Journal of Human Development*, vol. 14, no. 1, pp. 23–41.
- Shah, A., and Harriss-White, B. (2011), "Resurrecting Scholarship on Agrarian Transformations," *Economic and Political Weekly*, vol. 46, no. 39, pp. 13–8.
- Shah, A., and Lerche, J. (2020), "Migration and the Invisible Economies of Care: Production, Social Reproduction and Seasonal Migrant Labour in India," *Transactions of the Institute of British Geographers*, vol. 45, no. 4, pp. 719–34.
- Swaminathan, M., and Rawal, V. (eds.) (2015), *Socio-economic Surveys of Two Villages in Rajasthan: A Study of Agrarian Relations*, Tulika Books, New Delhi.
- Teltumbde, A. (2010), *The Persistence of Caste: The Khairlanji Murders and India's Hidden Apartheid*, Navayana.

Usami, Y., Patra, S., and Kapoor, A. (2018), "Measuring Female Work Participation in Rural India: What Do the Primary and Secondary Data Show?" *Review of Agrarian Studies*, vol. 8, no. 2, pp. 3–31.

Vijayamba, R. (2020), "Women in Livestock Rearing," in *Women and Work in Rural India*, pp. 167–88, Tulika Books, New Delhi.

Yadav, S. (2022a), "Caste, Diversification, and the Contemporary Agrarian Question in India: A Field Perspective," *Journal of Agrarian Change*, vol. 22, no. 4, pp. 651–72.

Yadav, S. (2022b), "Reviewing Petty Commodity Production: Toward a Unified Marxist Conception," *Review of Radical Political Economics*, vol. 54, no. 4, pp. 411–19.

APPENDICES

Appendix 1: Survey and Sample

Primary data for this paper were collected through field interviews in Sangli, district Rewari, Haryana, in June–July 2019.

Sangli has 506 households and a population of 2,794 according to the Anganwadi survey conducted in 2018. I interviewed 75 agricultural households (approximately 15 per cent of total households), selected through local contacts and the snowball sampling method. I obtained information on the caste composition of the village and the patterns of land ownership among castes through semi-structured interviews with elders from major caste groups and local officials. With this information, I worked to make my sample as representative as possible, with the exception of oversampling at the top to capture the diversity in non-agricultural income. Informed consent was obtained from all respondents.

Agricultural households are defined as households that earn some part of their collective income from agriculture. Of the 75 households interviewed, 48 are landowning and 27 are landless. Two of the 48 landowning households – one migrant Muslim and one Scheduled Caste – made large losses in the previous year due to exceptional circumstances and were removed from the sample for data analysis.

Appendix 2: Methodology for Class Analysis

The agrarian class analysis is based on ownership of means of production, exploitation ratio, re-investment of surplus, type of diversification, and caste identity. These criteria were used in three stages. In the first stage, I categorised households into landowning and landless. All but one household in the former group was savarna. In the second stage, I classified households by diversification, or the single largest source of household income – rent, business, formal employment, pensions, cultivation, informal employment, and casual agricultural and non-agricultural daily wage work. I found that income sources are related to the hiring of agricultural labour relative to the use of family labour on the farm (captured by the exploitation ratio

or E-Ratio)⁹ and annual per capita incomes. I, then, differentiated primarily agricultural households, i.e., households that earn the bulk of income from cultivation, based on the extent of reinvestment of surplus, captured by the extent of leasing and purchase of machinery. In this way, I arrived at the final class categorisation (Table 1; for further details, see Yadav 2022a).

*Appendix 3: Animal Husbandry Production Cost, Output Value,
and Net Income Estimation Method*

A) Cost of husbandry production

The survey included questions on the number of animals (breed, number of milk-giving animals, adults, calves), which members of the household engaged in animal husbandry, how much produce was sold and at what rates, and additional expenses. Selected respondents from both savarna and avarna households were asked additional questions on the composition of animal feed and market prices. The modal responses for savarna and avarna households were similar and were taken as the average feed requirement, except in cases where households reported using less inputs:

- In-milk cow or buffalo: 6.4 quintal cotton seed cake (0.8 quintal per month for milk-giving months, which is typically eight months in a year) + 10 quintal wheat + 36 quintal dry fodder (*tooda*) + green fodder
- Non-milk-giving adult cow or buffalo: 10 quintal wheat + 36 quintal dry fodder + green fodder
- Cow or buffalo calf: 7.2 quintal wheat + 18 quintal dry fodder + green fodder

The average reported costs for inputs in 2019 current prices were as follows:

- Wheat: Rs 2,000/quintal
- Cotton seed cake: Rs 3,500 for 80 kg
- *Tooda*: Rs 500/quintal

Since almost no household purchased green fodder, it was eliminated from the cost calculation. On average, the annual monetary cost of feed for a lactating buffalo or cow was Rs 66,000, it was Rs 38,000 for a non-milk-giving adult buffalo or cow, and Rs 23,400 for a calf (all at 2019 prices).

⁹ I use a monetary variant of Patnaik's (1987) E-Ratio:

$$E = \left(\frac{LC - ALI}{FL \times 400} \right)$$

where LC is total hired labour costs (manual), ALI is total income from manual agricultural labour, and FL is number of family labour days (manual) employed on own farm, multiplied by the going daily wage rate of Rs 400 to arrive at the imputed costs of family labour.

B) Labour of animal husbandry

The survey did not include questions on time-use. Instead, selected women respondents were asked about their typical day. Women respondents reported waking up between 4 and 5 a.m. and after freshening up, engaging in cooking, cleaning, washing clothes and utensils, cleaning the animal compound, collecting dung, milking animals, cooking for animals, chopping green fodder, and other tasks till 10–11 a.m. At this point, they would typically take a break for food and rest. Then, at 2–3 p.m., they resume work, continuing till 8–10 p.m. – cooking, washing, collecting green fodder, cooking for animals, and cleaning the animal compound. The schedule may vary depending on the number of lactating animals, presence of women family members or children, season, and other jobs. Without time-use data, disaggregating women’s working hours into work on animal husbandry and other tasks is difficult, as women typically move between tasks.

I assume that cleaning the shed and collecting dung take 15 minutes each and need to be done twice a day; cooking slurry, cutting chara, and cleaning the animal take 15 minutes of active time each and are performed once a day. Other miscellaneous tasks like refilling water and feed take 15 minutes a day. Milking a buffalo or cow takes 30 minutes a day. Conservative estimates for time spent on animal husbandry by number of animals are as follows:

No. of animals	1	2	3	4	5	6	7	8	9	10
Hours of work	2	2.5	2.75	3	3.5	3.75	4	4.25	4.5	5

In order to calculate annual number of days, hours of work were normalised into 8-hour workdays.

C) Output and gross value estimation

Selected respondents were asked to specify milk yields of buffalos. Respondents gave similar responses: in the first four months after giving birth, the buffalo yields 13–14 kg milk/day. In the next four months, the buffalo yields about 3 kg/day. For the rest of the year, the buffalo cannot be milked. This gives an average yield of 8.5 kg/day for eight months, which is close to the official state-wide estimate for 2018–19 of 9.11 kg/day (GoI 2022, p. 38).

Milk is sold to local dairies at the average rate of Rs 50/kg (this averages out fat content). Alternatively, 13 kg of milk yields 1 kg of *ghee*. The reported market rate for the sale of 1 kg of clarified butter is Rs 650.

Total output per in-milk buffalo or cow can be taken as approximately 20 quintals of milk (2,040 kg/year) or 150 kg of *ghee* per annum, which can earn a maximum of Rs 102,000 per annum at 2019 current prices.

I used the calculation above to impute gross value of output to each household based on number of lactating animals. I used reported data on milk and butter sales to estimate the amount that was consumed within the household and the amount that was sold.

D) Definitions

Gross Animal Husbandry Output = Market value of total milk and clarified butter sold in previous year + Market value of total milk and clarified butter retained in previous year + Cash receipts from sale of animals in previous year

Gross Animal Husbandry Costs = Market value of own grain and by-product used as feed + Market value of purchased feed + Non-food expenses on livestock (e.g., medical expenses)

Net Income from Animal Husbandry = Gross Animal Husbandry Output – Gross Animal Husbandry Cost

(Net Income from Husbandry is a measure of the household's retained surplus or residual claims from production.)

Net Income from Agriculture = Gross Agricultural Product – Gross Agricultural Paid-Out Costs

Gross Agricultural Paid-Out Costs = Costs of Hired Labour + Costs of Seed + Costs of Fertiliser and Pesticide + Rental Costs for Land and Water + Rental Costs of Machinery + Operating Costs of Own Machinery (fuel and maintenance)

Appendix 4: Class-wise Variation in Net Income from Animal Husbandry

Tables 2 and 3 indicate the presence of some variation across classes in net returns from animal husbandry. A boxplot (Figure 2) of net income from animal husbandry for each class category shows that the data are noisy and there is no clear discernible pattern.

Figure 2 shows that few landless households have negative incomes. This is explained by the variation in herd size and composition of herd (ratio of milk-giving to total number of milch animals). Figure 1 presents a boxplot of herd size across classes, and Figure 3 shows the ratio of milk-giving to total number of milch animals. Landless households have both smaller herds and better ratios of milk-giving to total number of milch animals than PCP households. The same is true to a lesser extent for Landlord/business households.

All seven households across classes with ratio of milk-giving animals greater than 0.5, i.e., where at least half the herd is milk-giving, earned positive net incomes from animal

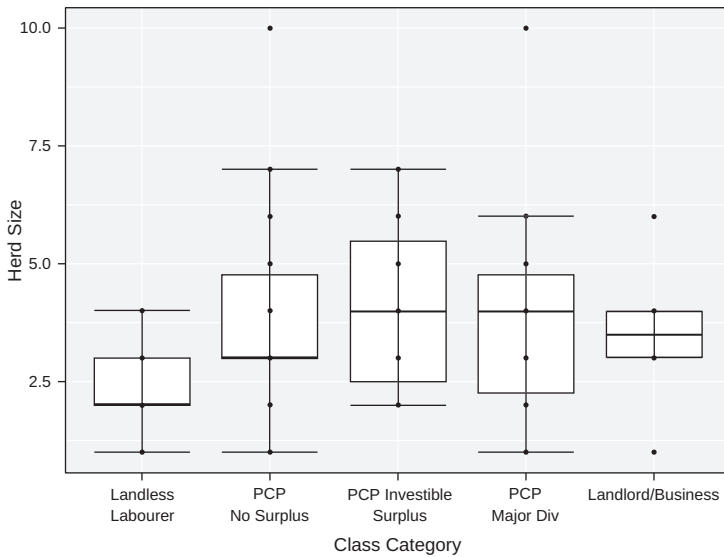


Figure 1. Herd size by class category, Sangli, 2018–19
 Source: Field data, 2019.

husbandry, and households across classes with ratio of milk-giving animals less than 0.5 earned negative incomes (25 out of 28). Households with ratio of milk-giving animals exactly equal to 0.5 also typically earned positive net incomes (13 out of 15). It appears that households need at least one milk-giving animal for every two milch

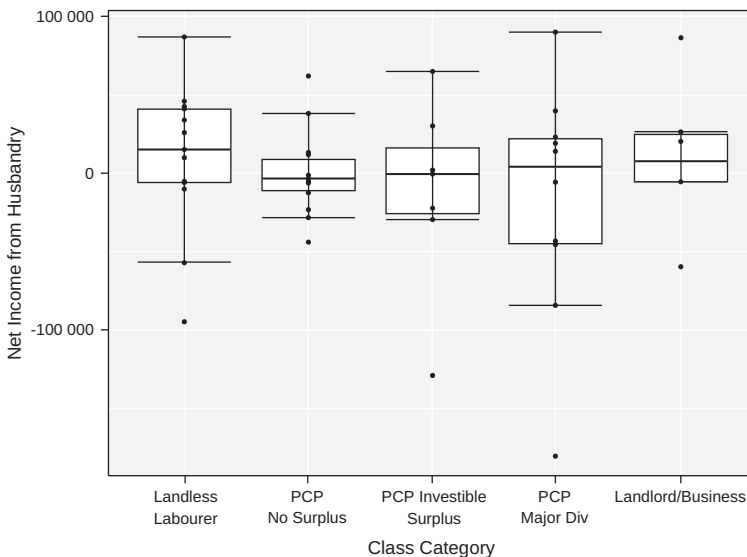


Figure 2. Net income in current prices from animal husbandry by class category, Sangli, 2018–19, in rupees at current prices
 Source: Field data, 2019.

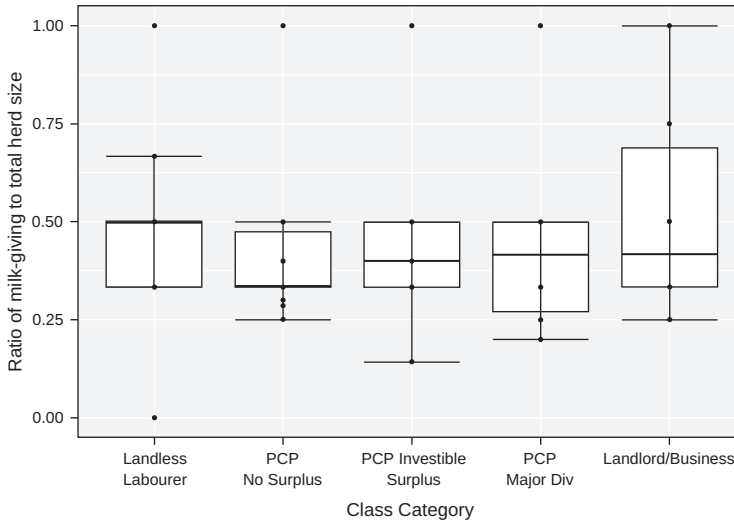


Figure 3. Ratio of milk-giving animals to total herd size by class category, Sangli, 2018–19
 Source: Field data, 2019.

animals to earn positive returns from animal husbandry. Landlord/business households and landless labouring households are able to maintain this ratio by optimising herd size. PCP households on the other hand keep larger herds where the ratio is likely to fall below 0.5.

Date of submission of manuscript: June 8, 2023

Date of acceptance for publication: May 27, 2024