



Improving water use for dry season agriculture by marginal and tenant farmers in the Eastern Gangetic Plains

Village characterization and agrarian relations

Working Paper

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Date: Version 2 – Dec 2016



Australian Government

**Australian Centre for
International Agricultural Research**

Table of Contents

1. Introduction	3
2. Historical context.....	3
2.1 The historical origins of land inequality in the Eastern Gangetic Plains: 1600s – 1950s.....	3
2.2 Post-colonial era: 1950s to 80s	8
2.3 Expanding markets, agrarian stress, and internal feudal transformation: 1990s – 2010s.....	12
2.4 Bihar and Nepal Tarai: Declining dependence on landlords but persisting inequality	13
2.5 The rise of labour migration from the 1980s – 2000s.....	17
3. Cropping pattern and irrigation in study communities.....	18
4. Agrarian structure and land tenure	25
4.1 Farmer typologies.....	25
4.2 Agrarian structure in Madhubani and Saptari.....	27
4.2 Irrigation in Madhubani and Saptari	48
4.4 Irrigation, agrarian structure and productivity in Madhubani and Saptari	51
5. Agrarian Structure in North Bengal	60
5.1 Concentration of land and area under tenancy	60
6. Irrigation and agrarian structure in North Bengal	69
6.1 Ownership of irrigation equipment in North Bengal.....	69
6.2 Ownership of other farm equipment in North Bengal	70
6.3 Irrigation, agrarian structure and productivity.....	71
7. Conclusions	73
References	75

1. Introduction

The Eastern Gangetic Plains, which include the Nepal Tarai, Bihar and North Bengal regions, is one of the most densely populated, poverty stricken belts in South Asia. Behind this persisting poverty are deeply entrenched social structures of class and caste, with a high incidence of inequitable landlord-tenant relations. This is combined with poor access to irrigation water in the dry season, limited irrigation capacity and low agricultural innovation.

Earlier research in the Indo-Gangetic basin established the interactions between poverty and access to water. At present technical, social and economic constraints have limited the effective use of groundwater and ponds for irrigation, and large areas of land remain fallow during the dry months. Access to year round water for irrigation would significantly promote the productivity of agriculture, improving incomes and food security. Marginal and tenant farmers, youth and women are the target set of farmers who could benefit from a new approach to irrigation provision.

It is against this backdrop that the project *Improving dry season irrigation for marginal and tenant farmers in the Eastern Gangetic Plains (DSI4MTF)* was formulated. This project aims to test both technical and institutional innovations in water access which address both biophysical as well as socio-economic barriers for sustainable agricultural intensification amongst the marginal and tenant farmer majority. This report seeks to review the history of this complex region, identifying the origins of the present day agrarian formation. Most importantly, it seeks to review recent trends and stresses on agriculture, and gain a richer insight into the agrarian structure, including the different farmer typologies, and the class and caste relations which serve to reproduce inequalities. The implication for water access is also discussed.

2. Historical context

2.1 The historical origins of land inequality in the Eastern Gangetic Plains: 1600s – 1950s

Pre-colonial period

In order to understand the contemporary agrarian structure in the study villages, an important entry point is an analysis of historical land governance and inequality. The concentration of land in South Asia has been a phenomena since the years of the Indus civilization (Habib, 2002), although the medieval period represents a useful starting point for this research. The revenue generation system of medieval state formations has perhaps had the greatest influence in shaping the distribution of land. Politically powerful families were given the role of collecting land tax from the peasantry, in the process acquiring personal estates and privileges, drawing the fault lines between land owning and land poor groups. Madhubani of Bihar, was under the control of several Hindu kingdoms such as the Karnata and Oinavara dynasties with tax collection hierarchies, although these were consolidated under Mughal rule. The region was subordinated to the Mughals in the 13th century. Hindu rajas and chieftains continued to retain economic and political privileges on payment of tribute, the most notable of which was the Darbhanga Raj an upper caste Hindu family appointed by the Mughals to maintain law and order and collect revenue in the 16th century (Chaudhury, 1964).

As in other parts of the Mughal empire, politically and ideologically powerful land owners, extracted a portion of the crop from the peasants to channel to the state as tax, retaining a portion for themselves as payment, while also extracting surplus as rent from tenants on their private holdings (Chaudhury, 1964). There was continuity in social relations when the region fell into British hands in 1765, as the colonialists

preserved the administrative power of landed intermediaries to maximize revenue for the regime and solidify their political control. The most powerful intermediaries were given the title of *zamindar*, and with the support of a network of lower level administrators, were given the right to collect tax and look after land administration. This included the descendants of the Darbhanga ruling family who became the largest land owners. The *zamindars*, most of whom owned large tracts of land, took advantage of their reasserted political privileges to maximize the exploitation of the peasantry (Jha, 2003, Ram, 1997).

While the Mughal influence extended across the Eastern Gangetic plains, there were significant forest frontiers where the power of the centralized Mughal state apparatus was weaker. One of these frontiers was the North Bengal lowlands, which encompass present day Cooch Behar and Alipurduar districts. The northernmost tract around Alipurduar was inhabited mostly by indigenous communities such as the Meche and Garo who retained relative autonomy, although as one moved south into Cooch Behar and Rangpur, the region was more settled and under the control of the Cooch Behar state, a Hindu tributary kingdom of the Mughals (Chaudhuri, 1995, Grunning, 2007 [1911], Ray, 2002). Both the regions where Uttar Chakoakheti and Dholaguri are located today were heavily forested during this period.

The medieval history of the east and central Nepal Tarai – a continuation of the North Bengal lowlands, which includes present day Saptari, was also characterized by the presence of large forested regions beyond state control. It was known in legends and oral histories to have been partially depopulated after the collapse of the ancient Vaidehi dynasty at the time of the Ramayana, and reforested. Nevertheless, Burghart (1978) points to the archaeological evidence from more than 500 years ago of numerous Hindu and tribal chieftaincies and petty kingdoms across the region. Oral histories collected in Saptari also suggest the presence of small kingdoms prior to the resettlement of the Tarai. In Koiladi for example, there was reportedly a small kingdom which was destroyed by an earthquake nearly 1000 years ago, leaving only a few families. Resettlement of the Tarai was established with the emergence of centralised state formations of the hills such as the Sen Kingdom in the 17th century. Land grants were distributed to religious institutions and political elites as a means of retaining political control of the plains at a time of border incursions from the south (Burghart, 1978). Forest was gradually cleared from the south as settlers migrated from India to farm the new estates. It was around this time, approximately four centuries ago, that Koiladi was reportedly established by a few Rajput families from India. To the north however along the Churia range, the land was still extensively forested until much later. The region around Kanakpatti was home to the indigenous Tharu community, who historically resided in the forest and carried out shifting cultivation.

Colonial period

In Madhubani, there was continuity in social relations when the region fell into British hands in the 18th century. Land administration was a priority for the British in India, given that land tax constituted 60% of revenue in the early colonial period (Banerjee and Iyer, 2002). Following the 1793 Permanent Settlement, the British established the *zamindari* system across much of Bihar and Bengal, where the traditional landlords from the Mughal era were given rights to collect revenue (Banerjee and Iyer, 2002). The Mughal era zamindars became the administrator of all property rights to land under their jurisdiction and could collect fixed revenue from the tenants according to customary rates (Raihan et al., 2009). This would be transferred to the colonial authorities, after retaining a for themselves (Hartmann and Boyce, 1983). They were accountable however to the British and would have to sell their assets if they defaulted on payments (Raihan et al., 2009). The Permanent Settlement gave unparalleled power to the zamindars of North Bihar

to maximize appropriation of surplus from the peasantry, solidifying a level of political and economic control over the peasantry which had not been present under Mughal rule (Jha, 2003, Ram, 1997, Raihan et al., 2009).

In Madhubani, as in other regions, the colonial authorities preserved the political power of several powerful zamindars, including the descendents of the Darbhanga ruling family who owned one of the largest estates in Bihar and had their own network of tax collecting intermediaries who were also large land owners. Zamindars and their associates took advantage of their reasserted legal rights to land administration provided by the British to maximize the exploitation of the peasantry and expand their land holdings (Jha, 2003). There was a strong correlation between land ownership and caste, with zamindars and their administrators being predominantly from the Brahmin and Bhumihaar community (Ram, 1997).

In the Nepal Tarai meanwhile, despite its history as a forest frontier, the colonization by the Gorkhali dynasty in the late 18th century culminated in the implementation of a revenue collection apparatus not dissimilar from the Mughal and colonial system, and the social formation of the two regions became broadly similar (Regmi, 1978, Sugden, 2013c, Yadav, 1984). The new rulers gave tax collection responsibilities to elites from within the Muslim and Hindu caste population of the southern plains, as well to nobles from the hills and even India. The large personal estates bestowed upon them for their services and capacity to appropriate the land of tax defaulting peasants, allowed them to emerge into a powerful landlord class (Regmi, 1976). Oral histories note that many of the Rajputs of Koiladi had roles in the tax collection hierarchy, and Dalit and tribal *Dhanuk*, peasants emerged into a class of labourers and tenants.

In the forest frontier to the north and east, which includes Kanakpatti, Tharu shifting cultivators were subjugated to the new rulers through taxation, and the clearing of forest lands they depend on, a process well documented in the tribal domains of Morang to the east (Sugden, 2013c). In Kanakpatti, powerful Rajput families from nearby villages were given tax collection roles, and they emerged into the dominant landlords in the community.

Across the Nepal Tarai, the landlord-intermediaries would channel a portion of the harvest to the bureaucracy to fund its military campaigns and luxury consumption, while retaining part for themselves. Meanwhile, to compensate for labour shortages on recently cleared forest land and to maximize tax revenue, the regime encouraged the migration of farmers from India to the south, who joined the ranks of poor peasants (Gage, 1976, Regmi, 1976, Sugden, 2013c).

At the base of the agrarian structure in both the Nepal Tarai and North Bihar was a large class of middle and low caste labourers, tenants and marginal landowners. At its apex was a politically powerful class of usually high caste¹ landlords and intermediaries who extracted surplus through rent, interest on loans and tax, a large portion of which was sent to the state (Sugden, 2013a, Regmi, 1976, Chaudhury, 1964). While there were clearly two classes appropriating surplus (local landlords and the centralized rulers), official documents from the period point to conflicts over spoils between the two groups. In Saptari and

¹ Although in Nepal it was common for middle castes or chieftains from *adivasi* communities to also take up administrative rule if they have local political power.

Dhanusha of Nepal in the early 19th century for example, records point to efforts by the centralized feudal state to clamp down on additional taxes and unpaid corvee labour obligations or *begari* being levied by local functionaries (Regmi, 1982). This suggests that aside from official land tax and rent, the local landed elite frequently took advantage of administrative weaknesses to maximize the appropriation of surplus from the peasant majority for personal gain. With regards to the Indian side of the border, the District Gazetteer of Darbhanga (which includes Madhubani) reports very similar incidences throughout the 19th century, with zamindars beyond the control of colonial authorities not only retaining a greater share of the tax revenue than they were entitled, but extracting additional labour rents to work for land owners or plough their land (Chaudhury, 1964).

Nepal's Rana regime in the mid nineteenth century implemented a more efficient tax collection system to regularize the collection of revenue, but land inequalities also intensified in the Tarai during this period. The surplus appropriated through tax went on to fund luxury consumption for the elite in Kathmandu, while local landlord-intermediaries retained significant power to extract surplus and appropriate the land of indebted peasants (Regmi, 1976). The Ranas also distributed tax free 'land grants' to elites from the hills across the Tarai, many of which emerged into semi-independent feudal vassals with their own power to extract surplus from the peasantry (Regmi, 1976). Oral histories in the study sites reported that the surplus appropriated by landlords through rent and usury was invested in an extravagant lifestyle. Landlords in Saptari reportedly kept elephants as status symbols and for transport.

In Cooch Behar, the revenue administration system was somewhat different from Nepal and Bihar. The Cooch Behar kingdom was by now a princely state within the British empire home to the Rajbanshi community which collected its own revenue and channeled tribute to the British (Sarkar, 2015). Central to the revenue generation machinery was the *jotedar-adhiari* system. A large owner cultivator or *jotedar* would be allocated land by the Raja, on which he would need to pay a rent. They would in turn sub-let some of the land to tenants known as *chukanidars* who would pay a fixed rent to the *jotedar*. The tenants had inheritable rights, as well as the right to sub-let the land again to other poorer tenants, *dar-chukanidars*. The poorest group of sub-tenants were *adhiars* who were sharecroppers who retained half of the produce, and worked for *chukanidars* or directly for *jotedars*.

With the absence of a caste hierarchy, it was common for tenants and *jotedars* to be from the same ethnic Rajbanshi community initially (Sarkar, 2015). In an attempt to maximize revenue between the late 19th and early 20th century, the Cooch Behar state encouraged the clearing of forest land which was extensive, and requisition of land belonging to temples (Sarkar, 2015). In some parts of the region, smaller *jotedars* unable to meet revenue paying demands of the state lost land to new settlers, or sold the land due to debt and economic distress – and subsequently became tenants for new overlords. Some Marwari money lenders acquired land from indebted *jotedars*, emerging into a growing non-Rajbanshi absentee landlord class (Ray, 2002).

Further north, the frontier land to the foot of the hills, known today as the Dooars, was colonized by the Bhutanese state in the 18th century. Uttar Chakoakheti is located in this region. The predominantly adivasi communities in this belt such the Mech, Garo and Rabha, were subjugated by taxation through corvee labour and levies on forest based activities, including crops produced through shifting cultivation (Grunning, 2007 [1911]). This created a wealthier class of intermediaries and tax collectors within the tribal social structure. They also proceeded to clear the jungle and set up permanent agricultural villages

through implementing a *jotedar* system led by large owner cultivators, as had occurred in Cooch Behar. The Bhutanese also encouraged the migration of enterprising peasants or *jotedars* from more settled regions of North Bengal to clear the jungle and set up farms (Chaudhuri, 1995, Ray, 2002). As in Cooch Behar, they also used tenants, the *chukanidars* and *adhiyars* to farm the land.

The forest belt of North Bengal fell into British hands in 1856. They were quick to see the economic potential of the region for the production of cash crops and tea (Ray, 2002). However, rather than seeking the complete subordination of the region to capitalism, the British sought to simultaneously preserve the existing feudal social structure so as to expand settlement, increase their authority in the region, and maximize revenue. Rather than a *zamindari* system akin to other parts of Bengal being supported, large owner cultivators were directly given a legal administrative and revenue collection role² as in Cooch Behar, bypassing any higher authorities (Ray, 2002). The British therefore formalised the existing agrarian hierarchy of *jotedars* and their tenants (Ray, 2002). It was believed that by preserving this hierarchy and the right to sub-let land, the rapid reclamation of forests would be facilitated (Chaudhuri, 1995). As well as supporting existing elites, they encouraged the establishment of new *jotes* by wealthy Rajbanshi, caste Hindu and Muslim peasants from the south, further pushing back the forest frontier (Bhowmik, 1988).

The area under tea cultivation increased from 331 hectares in 1876 to 32,916 hectares by 1907, with a total of 180 gardens (Gunning, 2007 [1911], 135). The feudal mode of production associated with the *jotedar* system continued to operate alongside the emerging colonial-capitalist plantation economy, and in many cases *jotedars* themselves facilitated capitalist expansion by selling off portions of their newly cleared jungle estates to tea companies (Chaudhuri, 1995). Around this time, a steady migration of tribal communities from the Chotanagpur plateau of central India began, to work in the tea plantations of the region (CDHI, 2015). However, in time, the availability of work outstripped the newly settled population, and many tea estates established their own permanent resident labour force. In this context, many migrated tribal families took up agriculture.

In Uttar Chakoakheti during the mid-19th century, oral histories suggested that there were several *jotedar* estates as well as smaller family run farms which had been cleared from the jungle. The land was farmed by mostly Oraon tribal migrants, indigenous Rabha communities and Rajbanshis who migrated from other parts of the region – particularly present day northwest Bangladesh. A large *jote* reportedly owned by a family linked to the Cooch Behar and Assam kings. Others were even owned by enterprising tribal migrants.

Late colonial period: Population growth, declining value of land tax, and consolidation of landlord class

Throughout the region, lack of industry, combined with population pressure, poor harvests, and of course the existing pre-capitalist agrarian structure meant that the emergence of a surplus labour pool was present even in the early part of the 20th century. For example, the colonial Gazetteer for Darbhanga (and Madhubani), with reference to the 1920s noted how:

“Agricultural base has not been compensated by the industries and minerals and the burden of dependents on self-supporting persons have terribly increased. Absorptive capacity in agriculture is limited and with diminished

² Jotedars in the Western Dooars paid their rents directly into the Jalpaiguri treasury (Gunning, 2007 [1911])

opportunities for migration, 'unemployment' and under-employment have considerably increased. As much as 38 per cent of the total population constitutes the mass of cultivating labourer who are landless and a major portion of this class is redundant to the requirement of rural economy. Further the seasonal character of activity in agriculture makes the situation worse in off seasons and with little opportunities avoidable elsewhere they remain economically inactive for a greater-part of the year.

The district Gazetteer for Darbhanga notes that there were steady population increases throughout the 20th century, paralleled by price rises, and an increase in cash needs to pay for consumables available via the colonial market and the rising costs of cultural expenditures such as marriages (Chaudhury, 1964).

In North Bengal and the Nepal Tarai, the clearing of the forest frontier represented an outlet for population growth. Migration into villages on former forest land increased throughout first half of the 20th century in the Nepal Tarai, with migration from both India as well as other more settled parts of the Tarai (Gaige, 1976). For example, in Kanakpatti, Muslim families from other parts of the lowlands settled to enriched the cultural diversity of the village.

Similar in-migration was evident in North Bengal. In Uttar Chakoakheti, there was a migration of new tribal families, particularly following the establishment of Mathura tea estate in 1917. In time, the availability of work outstripped the supply of newly settled migrants, and many tea estates had established their own permanent resident labour force. In this context, many migrated tribal families took up agriculture both on the land of the jotedars, as well as on unclaimed forest land.

The significance of land tax as a form of surplus appropriation had declined at the end of the colonial era in both Nepal (Regmi, 1976) and India (Habib, 2002) with its declining value. The surplus appropriation role in agriculture had by now been taken over almost entirely by land owners, who continued to exploit the peasantry through rent, usury and low wage labour. There was also limited change in the land ownership structure. During the 1950s for example, 77 percent of the total agricultural holdings in Darbhanga on the Indian side of the border were reported to be below 2 acres with only 8 per cent of the holdings are above 5 acres. Only 40 per cent of the total population were owners of land (Chaudhury, 1964).

2.2 Post-colonial era: 1950s to 80s

Expansion of cultivation stopped

By the end of the colonial era, large landlords had consolidated their position at the apex of the agrarian structure. One of the first changes in this period was that the expansion of cultivation had reached its limit, with stricter forest laws. In Nepal land continued to be cleared for cultivation throughout the 60s with migration from more settled areas and even from Bihar itself (Gaige, 1976). While the Koiladi region had been settled for centuries, settlement on forest land around Kanakpatti continued in the 1960s with the settlement of mostly Muslim farmers from other parts of the Tarai. Many settler emerged as independent peasant farmers with their own plots, although some migrated and became tenants. However, expansion had reached its limit by the 1970s, particularly as stricter forest laws prevented the expansion of new estates. In Madhubani, the last forests were cleared entirely by the 1960s (Chaudhury, 1964).

On the Bengal frontier, concerns by the colonialists that there would be no forest left for commercial enterprises culminated in the 1865 Forest Act which set aside certain reserved forests where clearing of land was forbidden. By the time of independence most remaining jungle land in North Bengal had been

set aside as reserved forest, while private forests unaffected by colonial laws were also acquired by the post-colonial state and protected (Banerjee et al., 2010). Both sets of legislations extinguished customary use rights by farming communities to use the forest for hunting, fishing and gathering. In sum, by the early post-colonial era, expanding the area under cultivation was no longer an option, putting new pressures on the agricultural economy of the Eastern Gangetic Plains region.

Nevertheless, the clearing of land continued in Cooch Behar, and in Dholaguri village wealthy jotedars with links to the Cooch Behar royal family in the 1960s encouraged the migration of other Rajbanshi, caste Hindu and Muslim settlers from Bangladesh. The population rose significantly particularly during the war of independence in Bangladesh in the early 1970s. Today there is no jungle left.

Land reforms and persistence of feudalism

In the 1950s and 60s, both Bihar, West Bengal state and Nepal saw state implemented land reforms and the abolition of the now largely redundant agrarian tax collection hierarchy. In Madhubani and Purnia the 1950 Bihar Land Reforms act abolished the zamindari system and a 1961 act fixed ceilings on holdings. In the Nepal Tarai, the 1964 Nepal Land Related Act abolished the *jimidari* system, introduced ceilings on landholdings, regulated rents, and sought to redistribute surplus land (Adhikari, 2006, Regmi, 1976). Despite the stated objectives, there was limited political commitment to change, ceilings were weakly enforced, and reforms failed to create real transformations in agrarian relations. In Nepal for example, only 50,000 hectares of land estimated to have been acquired by the government as of 1972, representing only 3% of the cultivable area (Regmi, 1976). In both Bihar and Nepal, landlords were integrated into the state agencies actually implementing reforms, acting as a considerable impediment to change (Adhikari, 2006, Kishore, 2004, Sugden and Gurung, 2012). Oral histories in the study communities also note how landlords were able to avoid reforms using their political connections or deception to retain ownership of their holdings.

Nevertheless, there was still some redistribution of holdings. For example, in the Morang-Sunsari region of Nepal, it was claimed that landlords with weaker political links to the regime were first to lose land in the reforms (Sugden, 2013c). The end to the zamindari system and reforms in Bihar also led to some redistribution, as suggested by National Sample Survey data on tenancy. In 1953-4 11.64% of households' land in the Bihar sample was purely leased in. This had declined to less than 1% by 1971/2, while there was an increase in the number of households both leasing in land while also owning a plot. This suggests that more landless farmers were able to access small plots (see Table 1). While the trends may be reflective of real changes, it is worth noting that data on tenancy is often prone to significant under-estimation in official records, particularly when contracts are informal, so the proportion of tenant farmers from this survey data was likely to have been significantly higher (Sharma, 2009a).

On the whole, agrarian relations in the Nepal Tarai and Bihar remained semi-feudal in character by the end of the 1970s. Even the Bihar data on tenancy showed that despite a decrease in the percentage of 'pure' tenants, the area of land under tenancy increased from 12.35% to 14.5% between the 50s and 70s, possibly due to distress sales by marginal owner cultivators, who would go on to take land on lease (see Table 1). A survey carried out in Gopalganj, Purnea and Madhubani in 1982 found that 65.5% of households were landless or owned less than 1 acre (0.4ha), and they owned only 16% of the land. 13% of farmers had 10 acres (4ha) or more, the majority of which were from the Brahmin or Bhuhimar castes 36.23% of households (and 52.99% of farming households) were leasing in land (Karan, 2009). In the Nepal

Tarai as of 1981, 41.65% of land belonged to farmers with more than 3ha, who represented just 2.6% of cultivators, while 54% of farmers had less than 0.5ha.

The inter-linkage of credit-debt relations with land tenure was widespread in Madhubani in the 1970s and 80s, increasing the dependence of farmers on landlords, with a number of bonded labour contracts in place such as the *halwaha* where a ploughman remains attached to a landowner (Karan, 2003, Rodgers and Rodgers, 2001). In Bhagwatipur, farmers noted how landlords were the primary source of loans – and the absence of any institutional credit increased their grip over the peasantry. Often in kind consumption loans were taken of paddy – and for each 1 maund, recipients would have to repay 1.5 maund at harvest time, as well as providing 10 days unpaid labour on the farm of the landlord.

This backs up oral histories collected across the region. During earlier work in Ekrahi VDC of Dhanusha, elder respondents recalled the 1970s when several upper caste Brahmin, Buhimar and Kyastha households held private holdings of up to 60 *bighas* (40.2 ha in Nepal). A *jajamani* (ritualized exchange between castes) system was still in place, whereby tenants or labourers would work for free for these landlords, only to receive grains as payment during festivals. Poverty was extreme, and it was recalled how many households did not even have a fire to cook or utensils. If one wanted to go to Janakpur for some official work they had to borrow formal clothes from land owners. Similar stories were recalled in Koiladi of Saptari, and Bhagwatipur of Madhubani, where elders recalled how several decades ago the poor farmers were in perpetual debt to zamindars and often had just one meal a day, with subsistence needs pushed down to the physiological minimum. People were unaware of their rights and of opportunities outside, and thus migration was rarely considered an option to escape debt bondage. Even tenancy was not common in Bhagwatipur, with many farmers working directly for landlords and receiving wages in kind. In Koiladi, the power of the Rajput landlords was notorious, and the threat of violence was invoked frequently to keep the Dalit and Dhanuk tenants and labourers under their control.

Table 1: Tenancy in Bihar and West Bengal, 1953/5 – 81/2

State	Year	% owner cultivated holdings	% owned and leased holdings	% purely leased holdings	% cultivated area under tenancy
Bihar	1953-5	64.84	23.53	11.64	12.35
	1971-2	60.24	39.03	0.73	14.5
	1981-2	78.03	20.04	1.01	10.27
	1991-2	86.02	1.9	5.56	3.91
West Bengal	1953-5	58.26	24.71	17.13	25.34
	1971-2	65.44	31.28	3.28	18.74
	1981-2	71.58	19.37	7.02	12.34
	1991-2	75.4	12	5.27	10.4

Source: India National Sample Survey of Landholdings (cf Sharma, 2009a)

In West Bengal state land inequality remained severe into the 1950s and 60s, but there was some positive change from the late-1970s following one of the more successful land reform experiences in the region. Operation Barga was implemented in 1977, and sought not to actually re-distribute land but regulate tenancy. In particular, it sought to actually enforce the provisions in the Indian Land Reforms Act of 1955. The act states that (1) *Sharecroppers will have permanent and inheritable incumbency rights to land that*

is registered in their name provided that they pay the legally stipulated share to the landlords, do not leave the land fallow, and do not sublease the land. Except in such cases, the sharecropper will lose his right to the land only if the landlord wants to use the land for personal cultivation. These rights are inheritable but not transferable. (2) The share that the landlord can demand from a registered tenant will be no greater than 25 %. (Banerjee et al., 2002)

During the 1950s and 60s Loopholes in the law allowed landlords to use the personal cultivation exemption to retain estates, and to threaten to evict the tenants who tried to register. Tenancy was informal in nature, and rents were far higher than the stipulated 25% (Banerjee et al., 2002). The West Bengal Land Reforms Act in 1977 closed most of the loopholes in the 1955 act. It imposed strict regulations on what constitutes personal cultivation and when landlords can evict tenants, gave tenants permanent and inheritable tenure, and enforced the 25% limit to the crop share. *Operation Barga* which proceeded the act was a large village to village mass campaign to sensitize tenants to their rights and ensure they were registered. By 1993, more than 65% of an estimated 2.3 million sharecroppers had been registered, facilitating significant productivity increases (Banerjee et al., 2002). As of 2005, 445,503ha of agricultural land had also been redistributed in the state (Bakshi, 2008). The success of the land reforms can be seen in the West Bengal data from Table 1 which points to a significant rise in the percentage of owner cultivated holdings and drop in land under tenancy. However, the operation relied on significant political support by then left wing government, including a strong network on the ground – conditions which had not been present in Bihar, Bangladesh and the Nepal Tarai.

In both Uttar Chakoakheti and Dholaguri, operation Barga was successful in breaking up the estates of the larger *jotedars*, and thus inequality in holdings was not as severe as Bihar and The Nepal Tarai during the period. In Uttar Chakoakheti, the land reforms, combined with the registration of the government forest land they farmed in their name, ensured that most families were able to secure at least a small personal plot.

Non-farm sector

The persistence of feudalism (with landlords as the main exploiting class), population pressures, and rising prices for commodities was increasing the demand for wage labour, and there was some evidence of early articulations with the capitalism between the 1950s and 60s, particularly as rural industries developed with the expansion of markets and transportation links. However, levels of employment were very low. According to 1951 census of Darbhanga, local industry supported only 2 per cent of the total population. Most factories were low value agricultural processing and textile industries, and labour was often seasonal. This is unsurprising given the skewed economy of post-colonial India (Kirk, 1981) which has seen Bihar emerge as one of the most peripheral and industrially stagnant states. Data from the 1970s in Purnea pointed to a similarly bleak situation, with very limited involvement of farmers in wage labour aside from a few cottage industries, while poor transport linkages made work in towns impractical (Rodgers and Rodgers, 2001). Across the North Bihar region, out-migration was relatively limited (Rodgers and Rodgers, 2001, Karan, 2003).

Industrial employment was even lower on the Nepal side of the border. By the end of the colonial period, an unequal trade relationship between Nepal and India had become entrenched, retarding the growth of industry, backed up by the comprador interests of the ruling class (Blaikie et al., 2001). Aside from a government run factory in Janakpur, most factories were restricted to an industrial corridor in Morang, east of the Koshi and, far from the Saptari and Dhanusha case study sites (Regmi, 1977).

In Cooch Behar and Alipurduar also, industrial development was limited. Following independence, there was moderate capitalist development across North Bengal, although it retained its colonial character. The tea economy continued to expand, with the area under tea in Jalpaiguri district (includes present day Alipurduar) increasing from 54,609 hectares in 1951 to 70,996 hectares in 1999³. The economy also diversified with some domestic capital investment in industries in district urban centers (Chaudhuri, 1995). However, like in the Terai, it has remained dominated by low value timber based and agro-processing facilities, which represented 85% of value of invested capital in Jalpaiguri district in 2004-05 (Government of West Bengal, 2007).

2.3 Expanding markets, agrarian stress, and internal feudal transformation: 1990s – 2010s

Rising demand for cash

From the late 1980s and into the 1990s, demands for cash and for loans increased considerably. Firstly, the cost of agricultural inputs has been increasing steadily (Raihan et al., 2009, Sugden, 2014). While this on one level represents a pattern of growth in agriculture with greater investments in tubewell irrigation and fertilizers to increase yields, this also represents a process of offsetting the impact of population growth and the fragmentation of holdings which has been widespread over recent decades⁴. The costs have also increased exponentially over the last two decades, regardless of levels of input use. For example, on the Nepal side of the border, the price for diesel increased by 352% between 1995/96 and 2009/10, both impacting the price of fertiliser as well as overall food prices (Pant, 2011).

Secondly, with neo-liberal restructuring and continued improvements in communications, the expansion of markets and mass media have driven an emergent culture of consumerism, with rising demand for manufactured goods. Farmers increasingly prefer to purchase plastic utensils and household goods rather than depending on what is produced in traditional cottage industries. Another study from Dhanusha and Madhubani also pointed to a huge increase in the costs of dowry, weddings and cultural events (Sugden et al., 2014), a trend which is widespread across the region (Rankin, 2004, Rao, 2001). Focus groups and interviews in the study communities invariably noted that due to the rising cost of living, marginal owner cultivators and landless households, once partially dependent on what labour was available locally to meet their subsistence needs are no longer able to subsist on previous wage rate, driving them to seek work outside of the sector through temporary and seasonal migration, which will be reviewed below.

Climate stress

There is also a perception that the climate has become more unpredictable (Sugden et al., 2014). Climatic changes farmers have observed include an increase in extended dry spells and late monsoons, more frequent extreme precipitation events such as floods, greater winter chilling and increased temperatures in the summer. This has been acknowledged in the literature from the region (Practical Action, 2009, Bartlett et al., 2010, Sharma, 2009b). These changes mean there is a greater risk of failed harvests, while production costs are increased as farmers seek to offset the risk of drought through greater investments in supplementary groundwater irrigation. In this context the pressure to migrate has increased considerably, as farmers seek to manage risk (Sugden et al., 2014)

³ Source: Jalpaiguri District Government, <http://www.jalpaiguri.gov.in/>

⁴

2.4 Bihar and Nepal Tarai: Declining dependence on landlords but persisting inequality

In the region with the most hierarchical agrarian structure – Bihar and the Nepal Tarai, the political authority of the traditional landlord has declined. Testimonies with farmers suggested that the new economic opportunities available to the younger generation from the educated landed elite mean that the pressure to hold onto the land has declined. Holdings which are perceived to have limited value have reportedly been sold, and in Saptari, many landlords have moved to urban centres. Added to this is the fragmentation of estates due to population growth and the division of land amongst sons, which means that the amount of land being controlled by just one family is declining. Table 2 shows a significant decline in the percentage of land being owned by households with more than 3ha between the 1980s and 2010s in Saptari.

Similarly, with regards to Madhubani, Karan's (2009) study which includes this region, shows that the proportion of households owning more than 10 acres has declined by from 12.94% in 1982/3 to 5.5% in 1999/00. At the same time, the proportion of land owned by farmers with less than 1 acre has increased from 16% to 30%. These parallel trends at a state level. The National Sample Survey (NSS) notes how the percentage of the largest land holders with more than 4ha has dropped from 4.03% in 1971 to 0.8% in 2003 (see Table 2), while the share of the land they own has halved from 30.3% to 14.19% (see Table 3).

Table 2: Land ownership structure in Saptari

Year	% land owned by households with >3 ha	% households with land holdings <0.5 ha
1981-2	56.52	47.72
1991-2	40.43	35.02
2001-2	31.39	42.26
2010-11	17.91	43.53

(source: Central Bureau of Statistics, 1992, Central Bureau of Statistics, 2002, Central Bureau of Statistics, 2011, Central Bureau of Statistics, 1982)

Table 3: Changes in the % of landless households in Bihar and West Bengal, 1971-2 – 2003

State	Year	% landless households
Bihar	1971-2	4.3
	1982	4.1
	1992	8.6
	2003	7.6
North Bengal	1971-2	9.8
	1982	16.2
	1992	11
	2003	6.2

Source: (NSSO, 2006)

Table 4: % Distribution of households by farmer category in Bihar and West Bengal

State	Year	% households with <1ha	% households with 1-2ha	% households with 2-4 ha	% households with >4ha
Bihar	2003	89.4	7.1	2.7	0.8
	1992	80.56	11.1	6	2.34
	1982	76.55	12.42	7.79	3.13
	1971-2	71.71	15.11	9.15	4.03
West Bengal	2003	92.06	5.7	1.4	0.2
	1992	85.88	9.48	3.94	0.71
	1982	81.6	11.5	5.54	1.36
	1971-2	77.62	12.64	7.3	2.44

Source: (NSSO, 2006)

Table 5: Distribution of area owned by farmer category in Bihar and West Bengal

State	Year	% area owned by households with <1ha	% area owned by households with 1-2 ha	% area owned by households with 2-4 ha	% area owned by households with >4 ha
Bihar	2003	42.07	25.29	18.53	14.19
	1992	28.58	23.84	24.45	23.12
	1982	23.96	22.91	27.02	26.12
	1971-2	18.2	23.43	28.07	30.3
West Bengal	2003	58.23	25.71	11.88	4.02
	1992	41.29	28.11	22.98	7.62
	1982	30.33	28.77	27.23	13.66
	1971-2	27.28	25.69	27.72	19.31

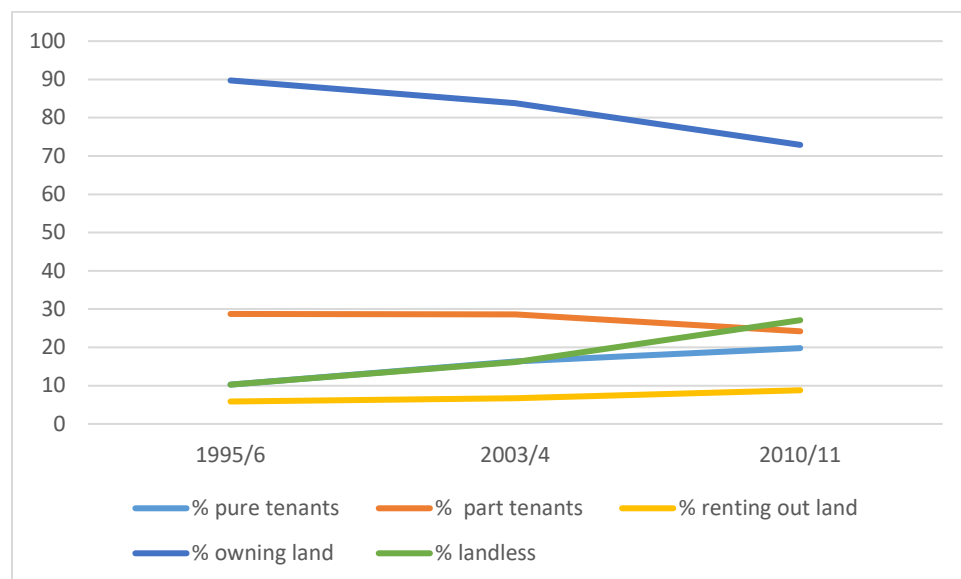
Source: (NSSO, 2006)

It is important to note that there are still large landlords across the region, even if their estates are smaller than in the past, and in Bhagwatipur and Mahuyahi of Madhubani it was reportedly still common for land owners to have holdings of more than 30 hectares. In Bihar as a whole, the NSS suggests that the percentage of households with less than 1 hectare has increased steadily from 71.76% in 1971-2 to 89.4% in 2003. The percentage of households with no land at all has also increased from 4.3% to 7.6% in the same period, while further analysis of the 2003 data shows that the percentage of households who own only uncultivated homestead land and no fields is a significant 31.01% (Rawal, 2008). The average holdings for those who do own farm land was just 0.4ha (NSSO, 2006). Similar results were evident in Karan's (2009) study from Bihar which included Madhubani, and suggested that between the 1982/3 and 1999/00, there had been an increase in the proportion of households with less than 1 acre from 65.5% to 72.5%, while landlessness had risen by 3%.

With regards to tenancy data, the NSS suggests that 12.82% of the owned area is leased in by other farmers, who represent 12.3% of the sample. 93% of these tenants themselves have less than 0.5ha of their own land. 1.94 % lease out land. Data in tenancy is however, often prone to underestimation as noted earlier. Karan's (2009) study suggests that tenancy is considerably higher in the North and South Bihar study sites, at 22.67% in 1999/00. This was a decline from 36.23% in 1982/3, yet the area of land under tenancy had increased in the same period from 24.59% to 25.47%.

In Nepal, the situation was somewhat similar. Table 2 shows that there has been little change in the proportion of households owning less than 0.5ha of land since the 1980s. The Nepal Living Standards Survey data from the East and Central Tarai (see **Error! Reference source not found.**) shows that between 1995/6 and 2010/11 the proportion of farmers owning land has actually declined significantly, while landlessness and the proportion of pure tenants has increased. The Rajput landlords in Kanakpatti and Koiladi still hold large estates of 20 hectares or more, and as will be discussed below, both villages have a tenant majority.

Figure 1: Change in % of tenancy and land ownership in East and Central Tarai of Nepal



Source: Nepal National Sample Census of Agriculture, 1992 – 2011)

Another change in more recent decades has been a rise in a class of middle farmers. The NSS data in Table 2 and Table 3 from Bihar highlights a shift in the pattern of inequality across the region. The increase in the percentage of small owner cultivators between 1971-2 and 2003 is matched by a decline in the percentage of medium and large owner cultivators. This can be explained by the increased distress sales⁵ of land amongst many small and medium owner cultivators as well as land fragmentation due to population growth – a trend reported across the Nepal Tarai and Madhubani in earlier work (Sugden et al 2014). The decline in large owner cultivators can be explained by the disintegrating estates of large landlords. The proportion of land owned by farmers with 1-2 hectares however, has increased slightly, despite a drop in the number of these farmers. This is likely to be due to a reported rise in a class of middle farmers from the intermediate castes such as the Yadav and Kushuwaha (Koeri), who have bought land of the larger landlords who are selling off their estates, a change observed between 1982 and 1999 in Karan's (2009) comparative study from Bihar.

⁵ For example, the survey from Dhanusha noted that amongst marginal owner cultivators (owning <0.5ha) and tenants, land sales over the last decade exceeded purchases by 9%, while amongst middle and large owner cultivators owning more than 0.5ha purchases exceeded sales by 27%.

It is worth noting however, that despite the decline in the proportion of large owner cultivators, the proportion of land owned by this group has not declined at the same rate, highlighting that there is still a substantial landlord or large owner cultivator class, and some of them may have increased their estates, even if the total numbers of landlords had declined. For example, despite a fourfold decline in the proportion of farmers with 2-4 ha and <4ha, the proportion of land owned by this group has only halved. Today, just 3.5% of households the Bihar sample with more than 2ha own a substantial 32.72% of the land, pointing to lingering inequality (NSSO, 2006).

Furthermore, national level data does not include absentee landlordism which has increased as landlords migrate to cities. They are therefore often not included in official land data. Absentee landlordism is widespread in Saptari, where some of the Rajput landlords have migrated to urban centres such as Kathmandu, Biratnagar or Rajbiraj.

Persisting semi-feudalism

Given the persisting inequality in the distribution of holdings, the changes in the composition of the landlord class have not significantly altered the relations of production and primary forms of surplus appropriation affecting the marginal and tenant farmer majority.

As in the past, the relationship between tenants poor farmers on the one hand and large owner cultivators and landlords on the other, remains extractive in nature. As shown in earlier related studies in Dhanusha and the nearby district of Morang (Sugden, 2014, Sugden and Gurung, 2012, Sugden et al., 2014) land owners (particularly those who are absentee) play a limited role in contributing to the cost of inputs or encouraging investment on the land, rent is generally used for consumption purposes and there was little evidence of productive re-investment.

What has changed now however, is that the marginal owner cultivator and tenant majority are no longer tied to landlords in the same way they were in the past. Contracts have become more impersonal. Firstly, the *jajamani* system described above, has broken down with the increased monetization of the economy. Secondly, the changing caste composition of landlords and tenants has undermined the ideological power of landlords, particularly with the rising class of middle caste medium and large owner cultivators. Thirdly, the migration of landlords to urban centres has reduced traditional ties of dependence between tenants and landlords. The collection of rent is often contracted out to an agent or *kamtiya*, resulting in much reduced interactions with tenants, undermining many of the patron-client relationship which once existed. The shift towards fixed rent tenancy in some regions is emblematic of this change. This requires minimum supervision, and the landlords or their agents can just visit the land once a year to collect rent. Karan's (2003) study suggested this had increased significantly in South Bihar from just 3% to 31% between 1982 and 1999.

Finally, the incidence of interlinked contracts appears to have declined. The landlords' role as money lender for subordinate tenants or labourers has declined. In kind consumption loans are less common, due to improved irrigation and outputs. Farmers are however still in perpetual indebtedness, perhaps more than ever before with rising cash needs, and interest rates remain extortionate. Nevertheless, the situation described in earlier studies on South Asian feudalism (Bhaduri, 1973, Bhaduri, 1977) where peasants are tied to landlords through debt bondage, is less relevant today. Karan's (2009) data set from Bihar points to a decline in debt bondage to landlords between 1982/3 and 1999/00, as does a study from Purnea by Rodgers and Rodgers (2001). The farmer survey conducted by IWMI in Madhubani in 2013

suggested that poor farmers now take loans now from a variety of sources, including one's own landlord, other landlords, rural businessmen (some of whom are also landlords or large owner cultivators) and commercial banks. The amount of accumulated debt to respondents' own landlords is far below what is taken from other private money lenders (Sugden et al., 2014). There has also in this context been a decline in bonded labour such as the *Halwaha* system, a fact corroborated in both Rodgers and Rodgers (2001) and Karan's (2009) study from North Bihar. In fact, many landlords no longer hire labourers, preferring to give all their land out to tenants.

Persisting land inequality in West Bengal

In West Bengal state as of 2003, the National Sample Survey (NSSO, 2006) shows that the proportion of households without any land has declined since the 1980s from 19.1% to 6.15% (see Table 3). This only refers to households without any land, and when one looks at the proportion of households who only own uncultivated homesteads, it is 34.69% as of 2003 (Rawal, 2008). Nevertheless, this does indicate a decline in landlessness unlike in Bihar where it has increased. Bakshi (2008) attributes declines in landlessness to the tenancy reform and redistribution of plots following the land reforms and better availability of credit. This has increased the economic position of the most marginalized and land poor castes, allowing many to purchase land to add to what was acquired during the reforms. Overall inequality in holdings is also lower than in Bihar. For example, the 2003 NSS shows that the percentage of households with more than 4 hectares is just 4.02%, a nearly fivefold decline from 19.31% in 1971/2. This contrasts with Bihar where 14.19% own more than 4ha, representing only a twofold decline from the 1970s (see

Table 4 and Table 5). There is also an even larger middle farmer class, with 25.29% of farmers owning 1-2 hectares of land

Nevertheless, it is important to note that land poverty is still high, even if it is lower than neighboring regions. The average land holding for those who do have land is just 0.315 ha, and 92.06% of households own less than 1ha, a figure which is even higher than Bihar. 11.27% of farmers lease in land, 89% of whom own less than 0.5ha, and 2.26% lease out land (NSSO, 2006). This is again likely to be higher given the tendency for underestimates on tenancy in official data. Nevertheless, the success of Operation Barga, means that the condition of tenants is considerably better than in Bihar and the Nepal Tarai.

2.5 The rise of labour migration from the 1980s – 2000s

A significant change in the agricultural sector over recent years has been the rise in labour out-migration. In the context of rising cash needs and climate stress from the late 1980s and 2000s, and the persistence of feudal inequalities, labour migration has increased considerably. This was initially to the Punjab and Haryana to work in the agricultural sector under the sways of the Green Revolution, and later to work in capitalist industries in the Indian urban centres. These changes are reflected well in a study and large scale time wise comparative survey from Madhubani, Purnea and Gopalganj districts (Karan, 2003). It noted that as of 1982/3, 27.69% of households had migrated. As of 1999/2000 this had doubled, jumping to 48.63%. Rodgers and Rodgers comparative study from Purnea from 1971 to 1999 reports a similar increase (Rodgers and Rodgers, 2001).

From interviews carried out with women farmers in Madhubani, Dhanusha and Saptari by IWMI in 2014, less than 5% today worked in the Punjab, with 31% in Delhi and Mumbai, and the remainder to other destinations across India (Sugden et al., 2015). Many were working in factories in the 'capitalist' sector. The labour is usually unskilled, being dominated by work in low value industries such as agro-processing

where wages and conditions of employment are poor (see analysis of Indian labour market by Bhaduri, 2009, Harriss-White and Gooptu, 2009). Others work on an even more casual basis in ancillary sectors such as construction or the service industry (e.g. as cleaners, cooks or drivers) which are indirectly linked to capitalist development.

Similar increases in migration are evident over the border in Nepal, although the location of migration and type of work is very different. As of the 1981 census at a national level, there were 402,977 household members classed as 'absentee'. This increased more than fourfold to 1,921,494 by the 2011 census. 93.1% of migration in 1980 was to India (Khatiwada, 2014), although from the 1990s onwards there was a shift in the pattern of migration towards overseas destinations such as the Persian Gulf. By 2011, 90.1% of migration was now to overseas destinations and just below 10% was to India (Khatiwada, 2014), although the latter is likely to be much higher if one considers seasonal migration to urban centers which is often not captured in censuses. As of the 2011 census 26.3% of households in the Eastern Tarai have an 'absentee' member either in India or overseas. Migration is often an expensive livelihood strategy, and brokers or middlemen have to be paid high fees to facilitate the process. Households who migrate overseas often spend the first two years paying off the significant loans incurred to migrate in the first place.

As noted above, debt bondage and the political power of landlords was one reason for reduced migration in earlier decades amongst the poorest farmers. The changes in feudalism outlined above though had made migration easier. Farmers also reported in interviews in Koiladi and Bhagwatipur that they are more aware of their rights particularly following the Maoist movement in Nepal, and under the populist OBC⁶ politics of the 1990s in Bihar. In this context, wage labour migration as an option to reduce bondage to landlords becomes more feasible. The greater availability of cash with expanding markets also made it easier for individuals to cover migration induced expenses. These shifts are evident in Karan's (2003) study from Bihar which shows a disproportionate increase in migration amongst households who were landless or owned less than 1 ha, where it increased from 25% and 24%, to 51% and 50% respectively between 1982 and 1999. By contrast, amongst middle farmers with between 1 and 2.5ha there was actually a small decline from 46% to 42% (Karan, 2003)⁷.

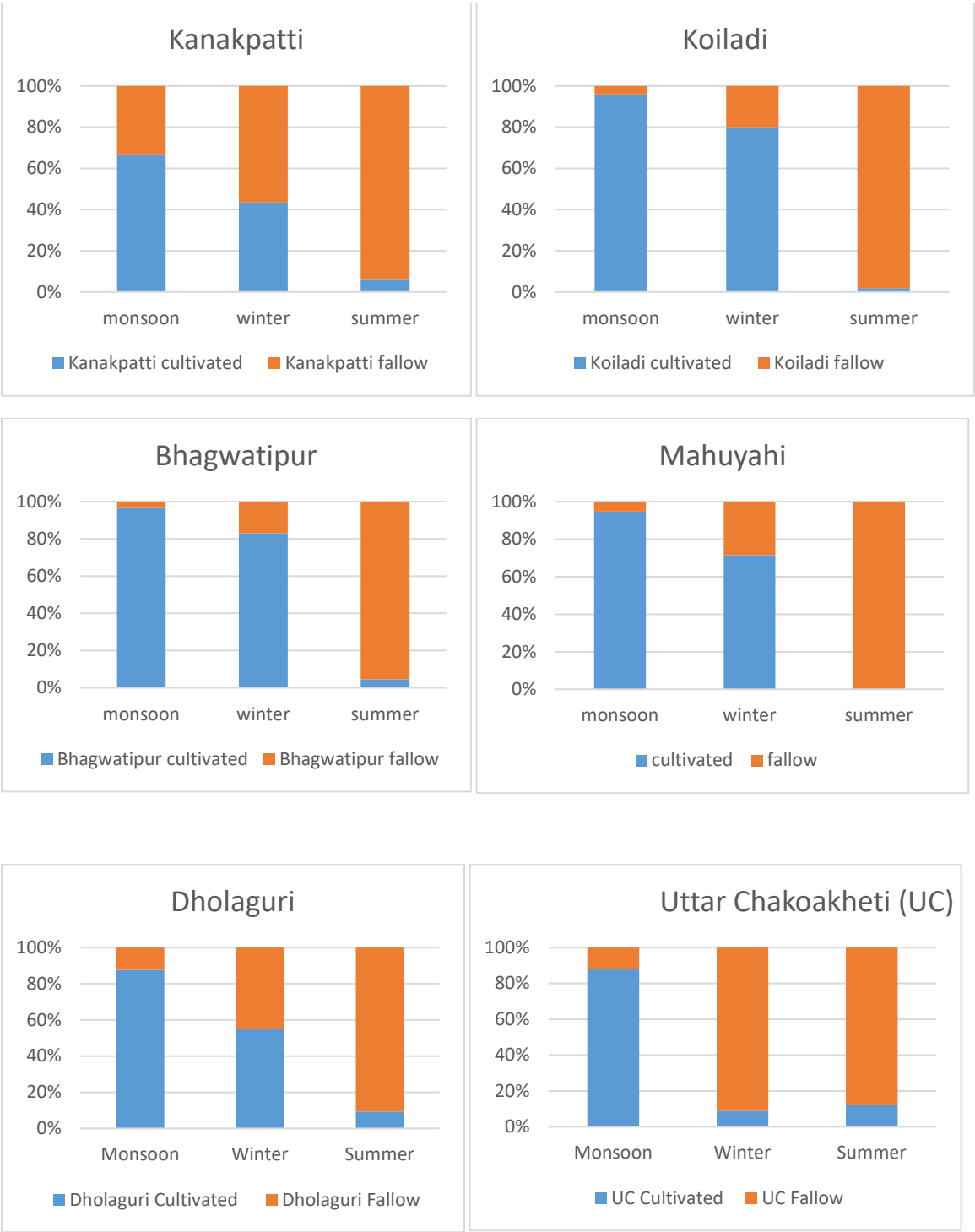
3. Cropping pattern and irrigation in study communities

Farming in all six communities is highly seasonal. The most extreme differences are in Madhubani and Saptari (see Figure 2). Most land is cultivated with paddy entirely during the monsoon season, with the exception of a few plots which are prone to waterlogging. The only exception is Kanakpatti, where around a third of the land is fallow during the monsoon. This may be due to the hilly terrain in some parts of the village, which causes water management challenges. In all villages, paddy is the primary crop (see Figure 3), with a few small plots being put aside for monsoon vegetable production, often on higher fields where water logging is not a risk.

⁶ OBC refers to 'other backward castes' according to the official government classification.

⁷ Karan's (2003) paper also notes how migration has increased significantly amongst the richer farmers at the apex of the agrarian structure, although this is driven not by the need for labour income, but the slow movement of some members of the educated landlord class out of agriculture and into professional and urban based employment – again, a product of the changing nature of agrarian feudalism and the rise in absentee landlordism.

Figure 2: Fallow and cultivated land in each village by season (%)



During the winter, the fallow area is higher, at 20%, 17%, 38% respectively for Koiladi, Bhagwatipur and Mahuyahi. The most popular summer crop is wheat, cultivation of which occupies between 62% of the land in Mahuyahi and 49% in Koiladi. Other important crops include pulses and mustard. In Kanakpatti, the fallow area in the winter is again very high, with 56% of the land not being used. This may be due to its unsuitability for wheat, an important grain staple. Only 16% of the land is under wheat, although there is some land being put to use for vegetable cultivation, which can be profitable given the proximity to the markets on the Tarai's East-West highway.

The most notable extreme however, is the summer season. With falling water tables and high irrigation costs, most land in all the four communities on both sites of the Nepal-India border is fallow, with the exception of a few isolated plots where pulses have been planted. There is no cultivation of summer vegetables, despite the potential profits. In sum, the cropping intensity for Kanakpatti, Koiladi, Bhagwatipur and Mahuyahi is 117%, 178%, 184% and 166% respectively, showing significant room for improvement.

The cropping pattern in Dholaguri in North Bengal is not dissimilar to Madhubani and Saptari, with much of the land under cultivation during the monsoon, and 55% of the land cultivated during the winter. The monsoon cultivation is entirely made up of paddy (see Figure 5). Summer cultivation is also very low with just 3.31% of land under vegetables in Dholaguri and 9.48% under jute in Uttar Chakoakheti, with the remainder fallow (see Figure 7). In winter, Figure 6 shows that there is established winter vegetable production in Dholaguri, representing 43.60% of the cultivated area, while in Uttar Chakoakheti, it is much more limited, at below 10%.

Figure 3: Primary crops by village for monsoon season in Madhubani and Saptari

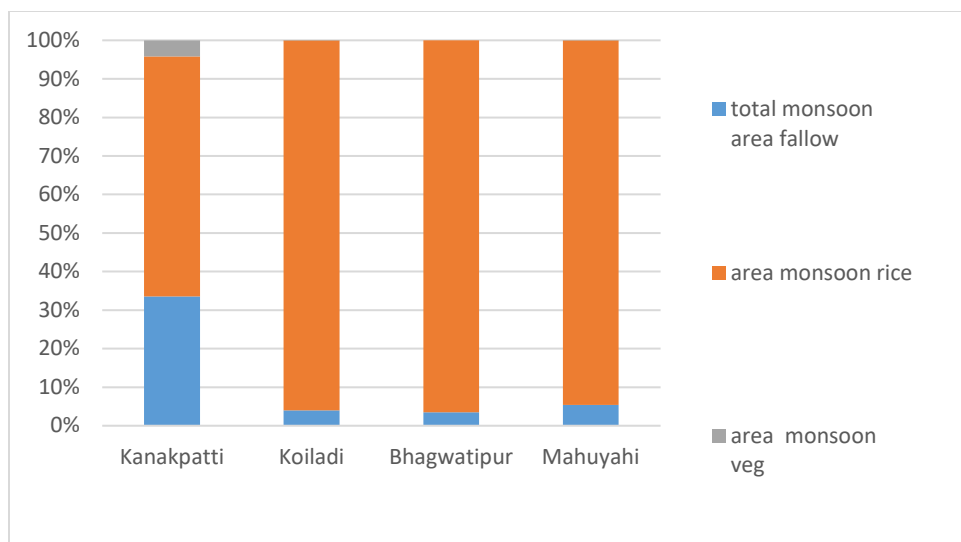


Figure 4: Primary crop by village for winter (rabi) season in Madhubani and Saptari

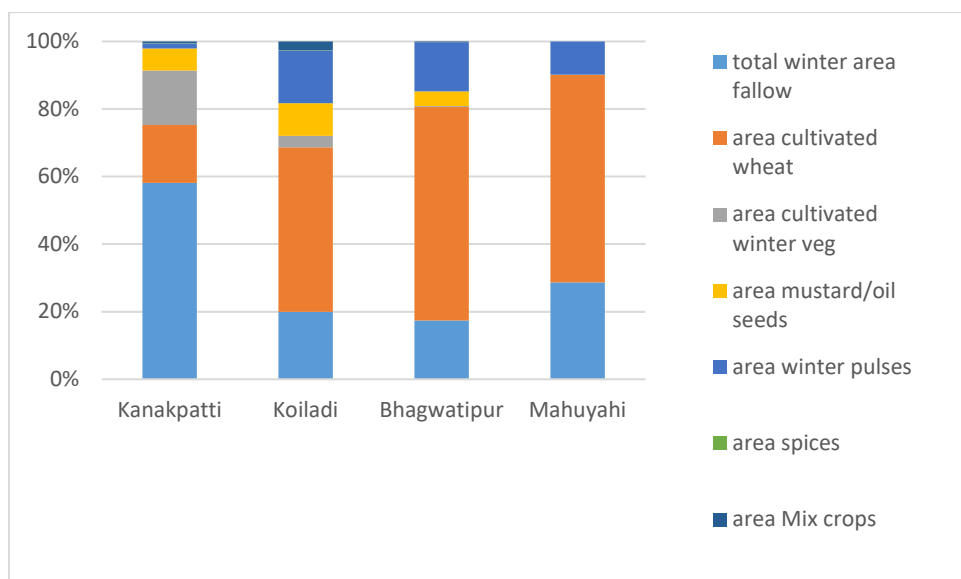


Figure 5: Primary crop by village for monsoon season in North Bengal

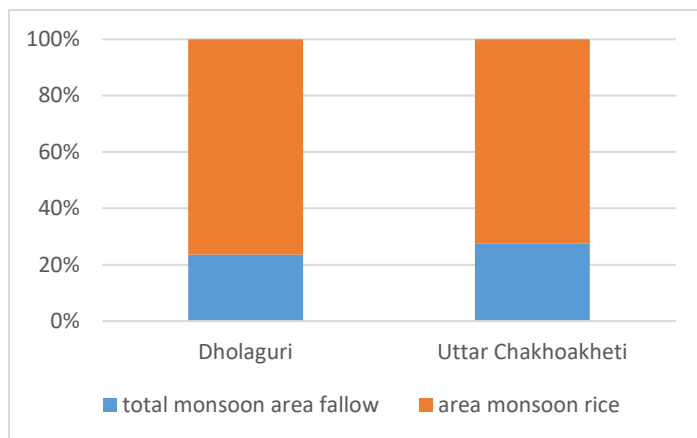


Figure 6: Primary crop by village for winter (rabi) season in North Bengal

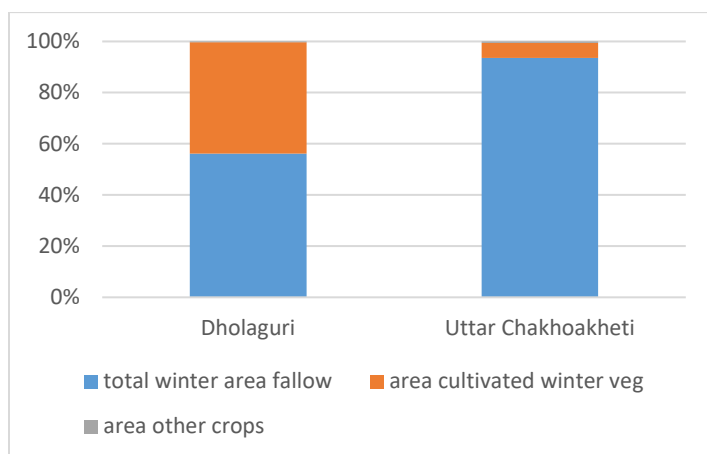
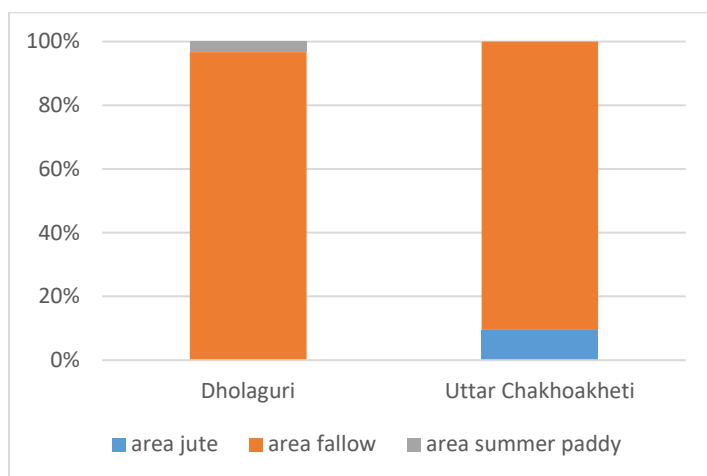


Figure 7: Primary crop by village for summer (pre-monsoon) season in North Bengal



To gain a better understanding of the above trends, it is worth looking at the irrigation use for land which is actually cultivated (see Figure 5). From an initial analysis of the 6 study communities, it appears that irrigation facilities vary considerably. Out of the land which is cultivated in the monsoon, irrigation access

appears highest in Koiladi. This is unsurprising as this village also has access to the large Chandra canal which flows from the Koshi river during the monsoon, and only 4% of the land is shown to be unirrigated. Kanakpatti, in the gently undulating land at the foot of the Churia hills, is shown to high level of unirrigated land. This is likely to be due to a large proportion of this land being upland fields which are more difficult to irrigate, as well as the more unreliable aquifers in this complex Churia zone. In North Bengal the unirrigated land is the highest, although the implications for rice yields are perhaps less significant given that this is a very high rainfall region. Although there is a large area left fallow in North Bengal, this is not due to lack of irrigation but due to waterlogging. The fallow land in Kanakpatti however, is likely to be due to its upland characteristics, which makes it difficult to retain water, regardless as to whether there is irrigation or not.

As for the winter season across all sites, out of cultivated land, irrigation is almost essential if one is to gain a satisfactory harvest. Nevertheless, there are still a lot of fields which depend on rainfall alone – particularly in Uttar Chakoakheti (see Figure 6). As noted above, only a tiny fraction of land in Uttar Chakoakheti is actually cultivated in the winter, usually for vegetables. Sometimes, land which is waterlogged during the monsoon and is unsuitable for paddy, can be used for winter crops, taking advantage of high residual moisture. It is worth noting that some of the land which is purportedly unirrigated may actually be kitchen gardens which receives other forms of water not captured in the survey as ‘irrigation’ such as by hand pump. Lack of irrigation infrastructure (tubewells) and limited ownership of pumpsets is itself a reason that a lot of land is fallow in the dry season. Another factor however, is the threat of wild elephants who frequently rove into the fields during the dry season in search of food – often destroying crops in the process.

In Dholaguri, Kanakpatti, Bhagwatipur and Koiladi where there is greater winter cultivation, at least two thirds of the winter cultivated land is under irrigation, and in Mahuyahi nearly all the land has access to water from both ponds and tubewells. There is however still a significant proportion of rainfed winter land in Kanakpatti (34.37%), Dholaguri (25%), Koiladi (34.12%) and Bhagwatipur (24.62%). Interviews with villages suggested that this is mostly for wheat and pulses, and in the case of Dholaguri for vegetables, again, depending on residual moisture and winter rains.

With regards to the summer season (see Figure 7), only data from North Bengal is included given that summer cultivation is negligible elsewhere. It is clear that a far greater proportion of the cultivated land is unirrigated. This is likely to be due to the pre-monsoon showers in April and May, which make cultivation more feasible, particularly in Uttar Chakoakheti and Dholaguri, which receives the earliest monsoon rains.

Figure 8: % of the cultivated area under irrigation in monsoon season

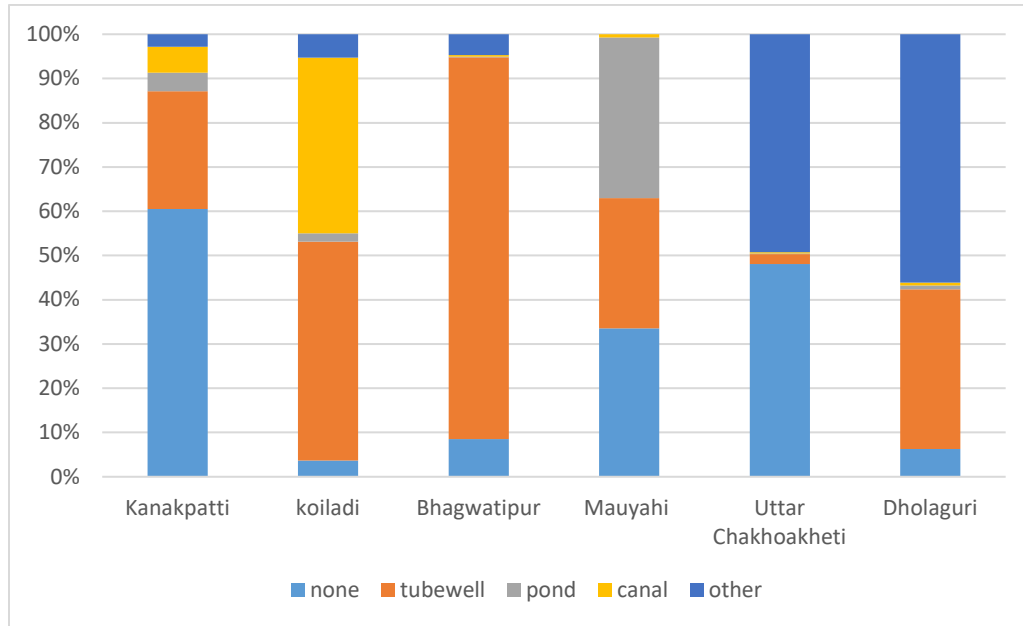


Figure 9: % of the cultivated area under irrigation in winter season

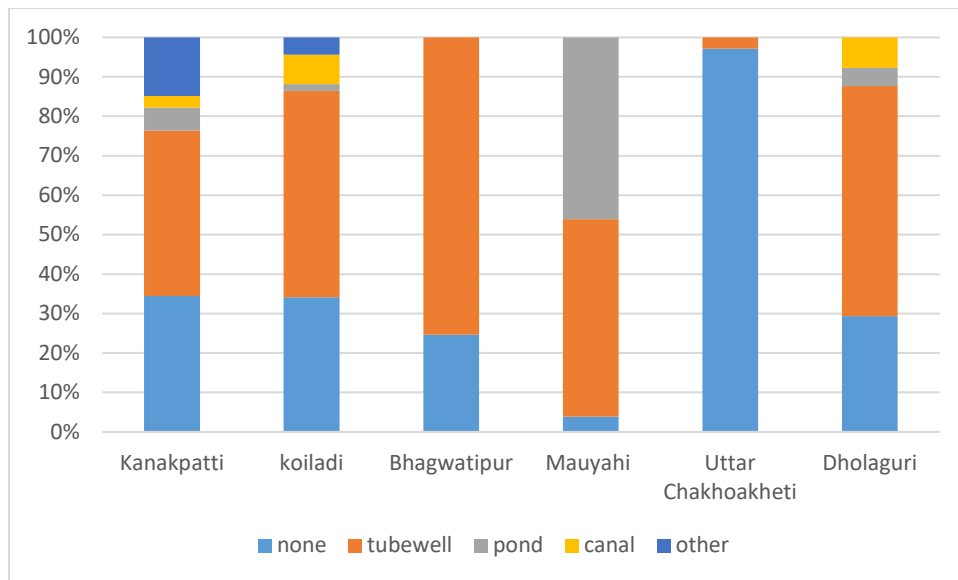
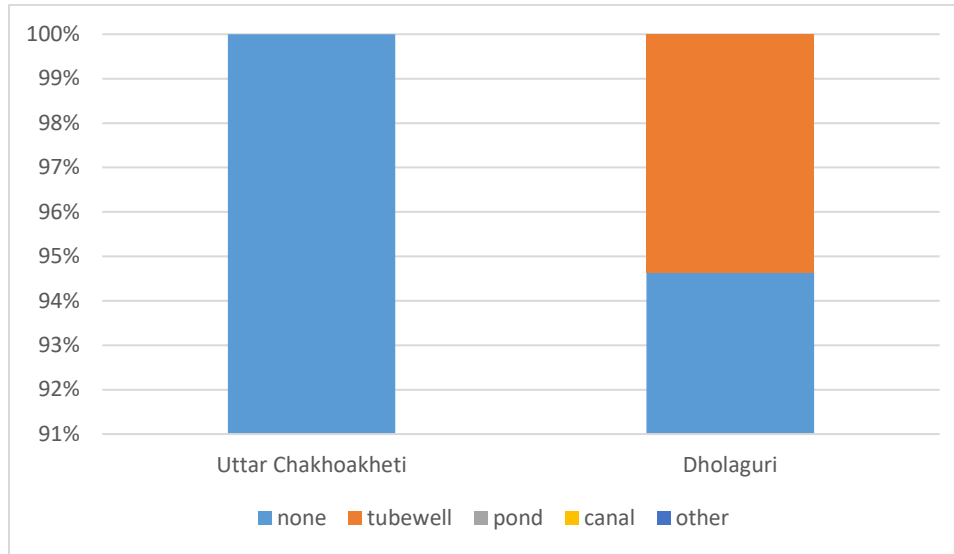


Figure 10: % of the cultivated area under irrigation in summer season (North Bengal only)



4. Agrarian structure and land tenure

4.1 Farmer typologies

Given the history outlined above, land inequality is acute in both the Saptari and Madhubani sites, with a clear division between a marginal and tenant farmer majority and a minority class of large owner cultivators and landlords. The 'mode of production' can be described as broadly semi-feudal in character. Past research has characterized semi-feudalism by concentration of land amongst a minority landed class, appropriation of surplus through rent and usury, and reinvestment of surplus primarily in luxury consumption. In North Bengal by contrast, there was a history of land inequality. However, past land reform efforts mean that today, although holdings are small, the distribution is relatively more equitable, with few large landlords. The mode of production in Cooch Behar can be considered one based upon peasant production, with some semi-feudal relics in the areas where large owner cultivators or *jotedars* retain control over land.

In order to break apart the mode of production further in the three sites, it is useful to identify classes within the peasantry, their position in the land ownership structure, and the relations between these classes. Analyzing agrarian classes has long been fraught with controversy. Athreya et al (1987) identifies a methodology to measure the degree to which households' retain a surplus. It seeks to identify whether or not farms yield a per capita grain and cash requirement above a set level which is deemed to constitute one's minimum subsistence needs. However, the data requirements for such a study are large and it is highly problematic to assume that every household has fixed food and cash requirements, considering it is a very subjective category. The study also overlooks distress sales or use of grain to repay loans later the year, processes which could push a household below subsistence level.

An earlier study from the Nepal Tarai (Sugden, 2009) identified the capacity to produce a 'surplus' based upon whether households are engaged in menial labour. Larger 'accumulating' households were separated from households at 'subsistence' level by observing their investment in high value assets. This strategy is problematic however in the changed socio-economic context since the data was collected in 2007. Today, wage rises mean that households may still engage in menial wage labour even if they are producing a surplus – and wage laboring farmers may even leave some land fallow for part of the year, even if they could 'in theory' produce a surplus through multiple harvests. Furthermore, the earlier study was drawn from a region with little migration at the time, while in the study sites today, migration is the primary form of off farm labour. Given the diversity of work outside, migration can offer an opportunity for income generation regardless as to whether they produce a surplus, so cannot be assumed to have always occurred out of compulsion.

In the development literature, further attempts have been made to identify farmer categories, based upon a similar surplus/deficit framework. Birch-Thomsen et al (2001) based upon research in Tanzania, divides livelihood strategies into three types. An 'accumulation strategy', applies to households that are commercialized with a high income and reinvestment of profits to expand their asset base. A 'peasant strategy' on the other hand, entails limited market participation and subsistence orientation (i.e. they have neither a surplus or deficit). Finally, a 'coping strategy', applies to households that struggle to meet their minimum subsistence needs, with limited income and dependence upon common property resources. However, it is difficult to identify concrete indicators which can determine which category a household fits, as market participation, dependence on common property resources may be for other reasons.

Other problems with a surplus based class criterion include the reduced profitability of agriculture due to agrarian stress, which means even some large owner cultivators do not choose to reinvest profits in high value agriculture assets and may divert them into luxury goods, one of the hallmarks of semi-feudalism outlined above. Similarly, in the context of monetization and spiraling costs of living, even poorer farmers may make high value cash investments far beyond their means such as payments for weddings or investment in 'cultural capital' such as a '*pucca*' home (using modern building materials rather than mud). Rather than being a sign of accumulation, such expenditures often push them further into indebtedness and poverty.

Lenin's *Preliminary Draft Theses On The Agrarian Question* sought to define agrarian classes under capitalist contexts, and put a particularly strong emphasis on land ownership and participation in the labour market (Lenin, 1951). He differentiated five main 'agrarian classes'. At the bottom are the agricultural *proletariat* – the wage workers in agriculture without access to land, and the *semi-proletariat*, the small peasants who till small plots of land which provides part of the family subsistence, while laboring simultaneously for others to meet the remainder of their needs. The third category is the *small peasantry* who own or rent small plots of land enabling them to satisfy their family's minimum subsistence needs, without hiring outside labour, or participating in the labour market. The fourth is the 'middle peasant', the small owner cultivators who hold small plots which can potentially yield the family a surplus in good years, and may sometimes hire labour. The fifth category lies the big peasants, who have larger holdings and employ hired labour regularly on the land, renting out excess holdings. Finally, at the apex of the agrarian structure are the landlords, descended from feudal lords, who do not labour on the land themselves, and exploit the labour of the proletariat/semi-proletariat, small, and even middle peasants.

This somewhat rigid categorization is problematic in the context of a pre-capitalist economy such as the Eastern Gangetic Plains. While participation in the labour market as buyers or sellers provides an important measure against which one can differentiate different class groups, in the context of the case study sites, surplus appropriation more often takes place through the rent burden. Furthermore, labour for others can occur as an ‘exchange’ of labour between households of the same economic status, something intricately tied to water and land management for paddy cultivation. Households may employ others to transplant their own land after applying water, and then may move on to labour on someone else’s land for the same task.

Given the complexity of identifying agrarian classes in a pre-capitalist context, it was decided to focus on one’s relation to the primary means of production – land. From analysis of the qualitative and quantitative data, it appears that one’s socio-economic status, and indeed one’s capacity to produce a surplus or accumulate, is intricately connected to the size of one’s holdings, and whether they are owned or rented. Land ownership and tenancy status is shown below to be critical in shaping the type of surplus appropriation households are subject to, as well as their access to non-land means of production such as agricultural machinery.

4.2 Agrarian structure in Madhubani and Saptari

Concentration of land and area under tenancy

An initial analysis of the census survey data from Kanakpatti and Koiladi of Saptari, and Bhagwatipur and Mahuyahi of Mahuyahi, points to a high concentration of land (see Table 6). Before going into the farmer groupings in each community, it is useful to get an overview for all four villages. It appears that a substantial 80.54% of the population of the three villages is either landless or owns less than 0.5ha of land. The area of land under tenancy is high in Koiladi, Bhagwatipur and Mahuyahi, where it is 77%, 66% and 62% respectively, while in Kanakpatti where landlords are less powerful, it is 27%.

What is most striking when one considers all the data from the four villages, is that the land owners with more than 1ha represent just 6.9% of the surveyed population, yet own a substantial 56% of the cultivated land. This does not of course include non-resident land owners such as absentee landlords, a group which will be discussed below. We have divided the surveyed population into eight farmer groupings, which are described in detail below.

Table 6: Concentration of land in the survey for Saptari and Madhubani: Kanakpatti, Koiladi, Bhagwatipur and Mahuyahi

category	Aggregate area of land owned by this category (ha)	No of households in group	% of total cultivated land owned	% size of group
landless labourer	0	461.00	0.00	28.74
pure tenant	0	347.00	0.00	21.63
part tenant	63.91	227.00	13.54	14.15
marginal owner cultivator <0.5ha	57.90	257.00	12.27	16.02
small owner cultivator 0.5-1ha	86.1	203.00	18.24	12.66
medium owner cultivator 1-2 ha	88.5	66.00	18.76	4.11
large owner cultivator (>2ha)	98.3	32.00	20.82	2.00
landlord	77.25	11.00	16.37	0.69

Total	471.93	1604.00	100.00	100.00
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Table 7: Ownership of land in study communities

	Total cultivated area (ha)	Total area of land owned by residents of village	Area of land cultivated owner cultivated	Area under tenancy	% area under tenancy
Kanakpatti	128.92	110.49	99.97	29.28	22.71
Koiladi	270.77	131.61	61.83	208.95	77.17
Bhagwatipur	154.65	90.00	52.58	102.07	66.00
Mahuyahi	192.79	139.83	78.05	119.47	61.97
Dhaloguri	63.93	55.40	53.59	11.14	17.42
Uttar Chakoakheti	141.02	132.56	122.46	28.43	20.16

Figure 11: Size of each farmer category and proportion of land owned in Saptari

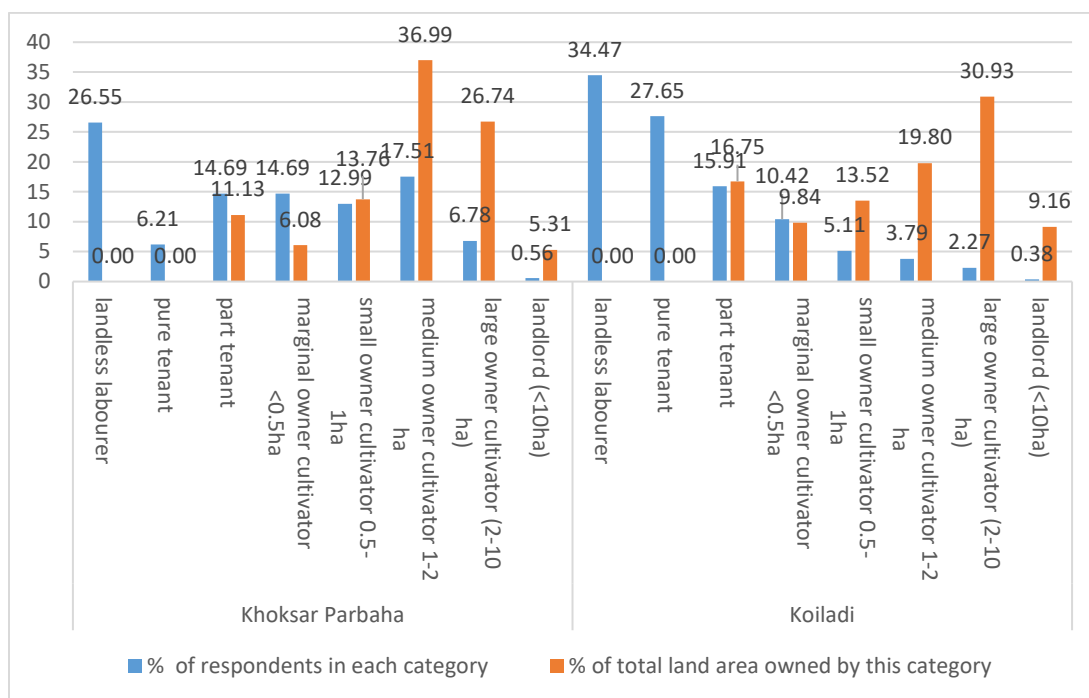
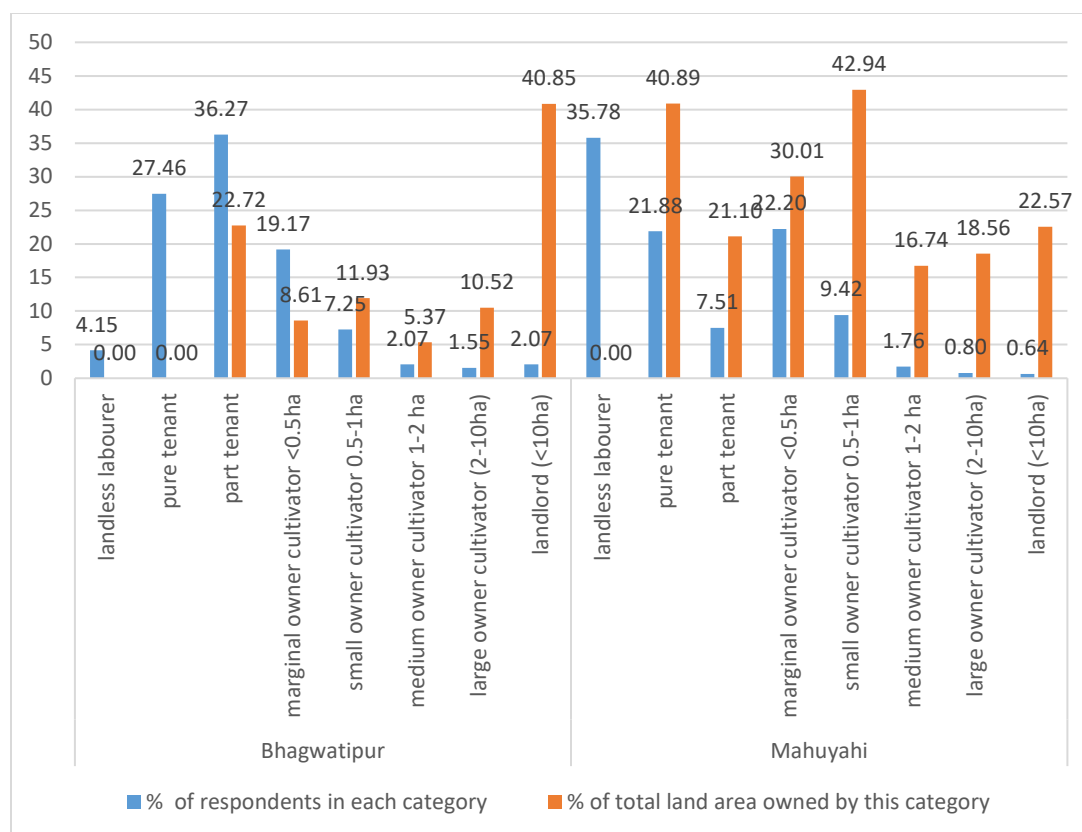


Figure 12: Size of each farmer category and proportion of land owned in Madhubani



Landless labourers

At the base of the agrarian structure is a large class of landless households, who are dependent upon others for their subsistence – large proportion are from the Dalit community. While across all four sites, they represent 29% of the surveyed population (see **Table 6**), the size of this group in each village generally depends on the degree to which the landlords prefer their estates are cultivated directly by labourers, or whether they give it out to sharecroppers or fixed rent tenants. They represent 27% and 34% of households in Saptari's Kanakpatti and Koiladi respectively and 34% in Mahuyahi. Only in Bhagwatipur is it a more marginal 4%, given the small size of this group, as most landless households engage in tenancy rather than direct labour for landlords.

Some of this group are entirely landless, while others own a small plots of less than 0.05ha for their homesteads. It is clear that agricultural labour remains an important source of income for this group, with the average number of person days per year standing at 97 and 96 for Kanakpatti and Koiladi. It is lower in Bhagwatipur and Mahuyahi, at 30 and 39. The preponderance of sharecropping over direct hiring of labour may be one reason (see). Landless labourers perform the bulk of the agricultural labour in most of the villages.

Table 8 shows that 49% of the aggregate farm labour days in Kanakpatti, 59% in Koiladi and 42% in Mahuyahi is performed by landless labourers. Only in Bhagwatipur is it less due to the small size of this group.

Wages for farm labour are variable (see Figure 13), depending on the type of work. There are also gender differences, with women often receiving a lower wage for tasks such as paddy transplantation. Average

wages for farm work are extremely low, at around \$1 in Madhubani. In Saptari wages are slightly higher, at around \$1.5 in Koiladi and close to \$2 in Kanakpatti. This is likely to be due to the presence of overseas migration in Saptari, which has meant agricultural labour is in higher demand - a point which will be discussed below. The lower wages in Koiladi compared to Kanakpatti may be linked to the higher level of overall landlessness in the former, which has increased the demand for labour. Despite an increase wages in Nepal, this is reportedly offset by rising retail prices for food and the rising cost of living in a more monetised economy. A number of wages are actually paid in kind. These farmers receive between 4kg and 6kg of paddy per day as wages – although at the time of writing, it was reported that cash wages were becoming more common.

Only some households, often from the Dalit community, depend entirely on farm labour, with consumption often pushed down to the physiological minimum. On the whole though, landless labourers are by no means only engaged in farm labour. They play an important role in the non-farm labour economy in all villages except Bhagwatipur, where off farm local labour income is limited. In Kanakpatti, Koiladi and Mahuyahi menial non-farm labour is important, with on average 134, 121 and 219 days respectively spent in off farm labour in the last year amongst this group (see

Table 8). With low levels of education amongst this group, income from business or salaried work is negligible (see Figure 14).

Most also engage in small scale subsistence activities such as fishing, poultry or livestock rearing. Other than poultry which is not included in the survey, the main animals raised include cattle, buffalo and goats. With the exception of Bhagwatipur, Figure 15 shows that in Kanakpatti, Koiladi and Mahuyahi, between 17% and 28% of landless labourers keep cows, Ox and buffalo. This includes both cows which give some income selling milk, and bulls which can be used as draft animals. Ownership of bulls allows men to work as ploughmen, offering them a higher wage than tasks which are considered more menial such as transplanting and weeding. Some of those without their own cows, rear them for richer farmers and landlords on a share basis, keeping half of the milk which is produced. Between 3% and 20% of landless labourers own goats also, although pig raising is restricted to the Dalit community in Koiladi.

In spite of these multiple livelihood activities, economic insecurity remains widespread, as does indebtedness. Landless labourers are highly vulnerable to exploitation through usury and frequently take loans from private lenders. The average outstanding debt to money lenders is \$375 in Mahuyahi, \$348 in Kanakpatti and \$366 in Koiladi – a substantial sum. These are generally landlords or richer farmers. In Bhagwatipur, respondents noted how there were four lenders to choose from for large loans of more than \$1000, and around twenty households who could give smaller loans of \$200 or less. This is a change from 30 years ago, when there was strong interlinkage between land, labour and credit markets, and individuals would often take loans from their own landlords, repaying them in cash as well as through work, in a form of bonded labour. Nevertheless, despite the increased ‘choice’, interest rates remain high. Figure 19 shows that the average recorded interest rates for outstanding debts varied from 60% per year (5% of total loan per month) in Bhagwatipur, 39% in Mahuyahi, 43% in Kanakpatti and 47% in Koiladi. In Kanakpatti, some landless labourers even reported paying 72%. In the case of Koiladi and Kanakpatti in particular, Figure 19 suggests that landless households are charged higher rates than land owning farmers, given their limited bargaining power and lack of land which could be used as ‘collateral’.

Meeting one’s subsistence needs entirely from local labour alone is difficult, and as a result both surveys show that a large proportion of landless labourers are engaged in some kind of migration. Overall

migration levels are higher on the Nepal side of the border, given the high levels of migration to Gulf countries, as well as to Indian urban centres. A substantial 54% of landless labourer households in Kanakpatti have long term migrants, while 29% have seasonal migrants, who migrate for labour to urban centres in India or Nepal for the agricultural slack season (see Table 9). In Koiladi, the figure is lower, at 26% and 16% for long term and seasonal migrants, although migration is still present in nearly half of households. In Bihar migration is an important livelihood strategy, but levels of movement are slightly lower.

It is important to note that landlessness and caste are intricately connected – a legacy of caste oppression, not to mention the tendency for Nepal’s Rana regime and British India’s zamindari system, to prop up the more dominant castes to collect tax and revenue from the lower castes and adivasis who made up the base of the agrarian structure. It is important to note though that there are ambiguities – particularly with regards to the middle castes, Muslim and Tharu community. There is a minority who are economically powerful. These in particular includes castes such as the Yadav, but also some wealthier Tharu families who were once part of the historic tax collection hierarchy. There is also a new elite of middle castes, who have emerged over the last 2-3 decades in Bihar, and this has paralleled the rise in political parties representing the middle castes – also known as OBCs (other backward castes, according to the government of India classification). Nevertheless, in spite of this, the majority of these three groups, the majority are still poor. Over 90% of landless labourers in Bhagwatipur, Koiladi and Kanakpatti are either Dalit, Muslim, Adivasi or middle caste, while this stands at 82% in Mahuyahi.

Table 8: Labour contributions by farmer group

Village	Farmer category	Farm labour			Other off farm labour		
		average no of labour days per year	total no of labour days	% of total labour days in sample	average no of labour days per year	total no of labour days	% of total labour days in sample
Kanakpatti	landless labourer	97.3478	4478.00	62.11	134.4783	6186.00	44.88
	pure tenant	37.0357	1037.00	14.38	104.8571	2936.00	21.30
	part tenant	30.9211	1175.00	16.30	64.2368	2441.00	17.71
	marginal owner cultivator <0.5ha	23.6364	520.00	7.21	37.2727	820.00	5.95
	small owner cultivator 0.5-1ha	.0000	.00	0.00	16.6667	250.00	1.81
	medium owner cultivator 1-2 ha	.0000	.00	0.00	36.6667	550.00	3.99
	large owner cultivator (>2ha)	.0000	.00	0.00	120.0000	600.00	4.35
	landlord	.0000	.00	0.00	.0000	.00	0.00
	TOTAL		7210	100.00		13783.00	100.00
Koiladi	landless labourer	96.0055	17569.00	56.00	121.3333	22204.00	43.10

	pure tenant	70.7287	9124.00	29.08	142.5194	18385.00	35.69
	part tenant	36.5556	2632.00	8.39	73.5417	5295.00	10.28
	marginal owner cultivator <0.5ha	27.4068	1617.00	5.15	57.5085	3393.00	6.59
	small owner cultivator 0.5-1ha	.8824	30.00	0.10	39.1176	1330.00	2.58
	medium owner cultivator 1-2 ha	10.8108	400.00	1.28	22.6486	838.00	1.63
	large owner cultivator (>2ha)	.0000	.00	0.00	3.9474	75.00	0.15
	landlord	.0000	0	0.00		.00	0.00
	TOTAL		31372	100.00		51520	100.00
Bhagwatipur	landless labourer	30.0000	360.00	6.43	0.00	995.00	14.23
	pure tenant	52.4340	2779.00	49.62	122.85	2407.00	34.42
	part tenant	25.5143	1786.00	31.89	193.30	1933.00	27.64
	marginal owner cultivator <0.5ha	18.2703	676.00	12.07	141.60	758.00	10.84
	small owner cultivator 0.5-1ha	.0000	.00	0.00	300.00	900.00	12.87
	medium owner cultivator 1-2 ha	.0000	.00	0.00	0.00	.00	0.00
	large owner cultivator (>2ha)	.0000	.00	0.00	0.00	.00	0.00
	landlord	.0000	.00	0.00	0.00	.00	0.00
	TOTAL	28.4315	5601.00	100.00		6993.00	100.00
Mahuyahi	landless labourer	39.3874	9965.00	41.73	129.05	11344.00	39.72
	pure tenant	76.1606	10434.00	43.70	133.86	7630.00	26.71
	part tenant	44.1489	2075.00	8.69	166.00	1328.00	4.65
	marginal owner cultivator <0.5ha	10.1079	1405.00	5.88	207.93	6030.00	21.11
	small owner cultivator 0.5-1ha	.0000	.00	0.00	271.25	2170.00	7.60
	medium owner cultivator 1-2 ha	.0000	.00	0.00	60.00	60.00	0.21
	large owner cultivator (>2ha)	.0000	.00	0.00	0.00	.00	0.00
	landlord	.0000	.00	0.00	0.00	.00	0.00
	TOTAL	36.4565	23879.00	100.00		28562.00	100.00

Figure 13: Average wages for farm and local off farm labour

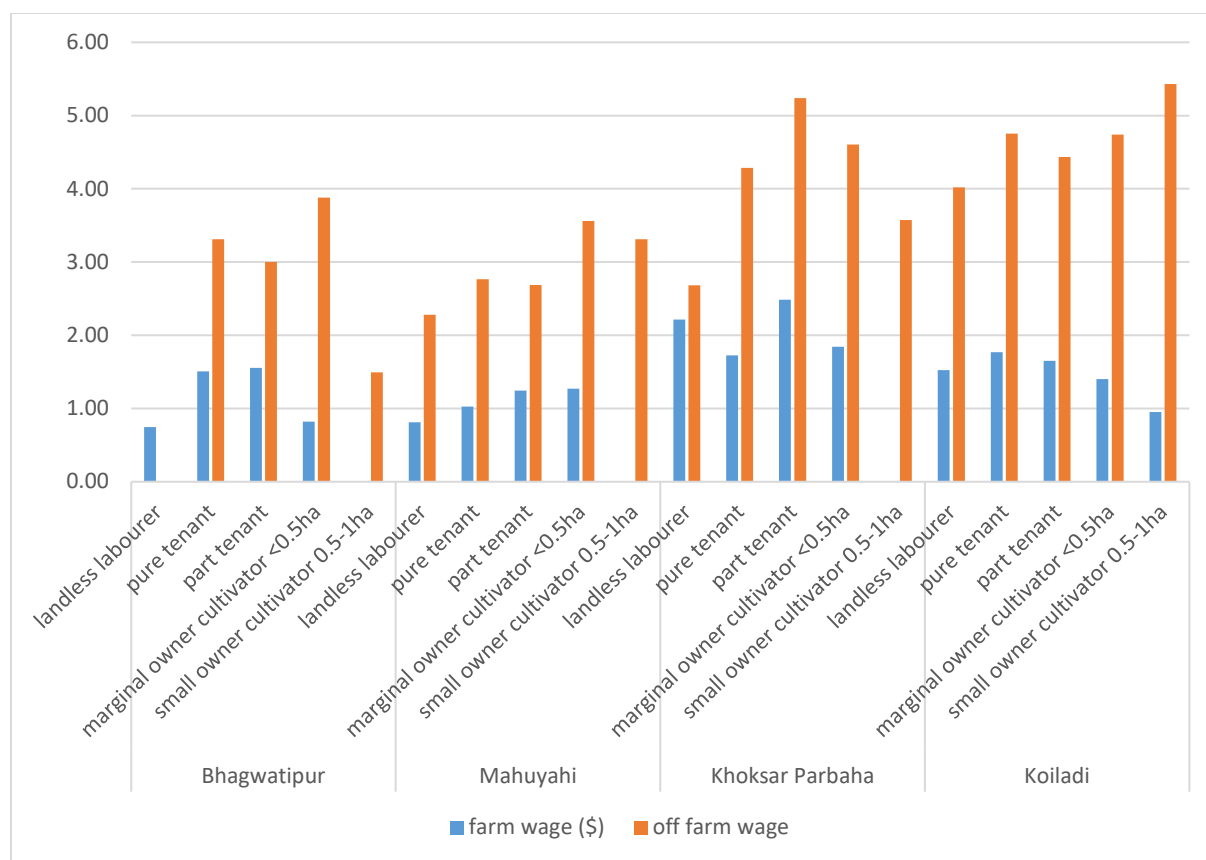


Figure 14: Income from salaried work, business or pension in Saptari (US\$)

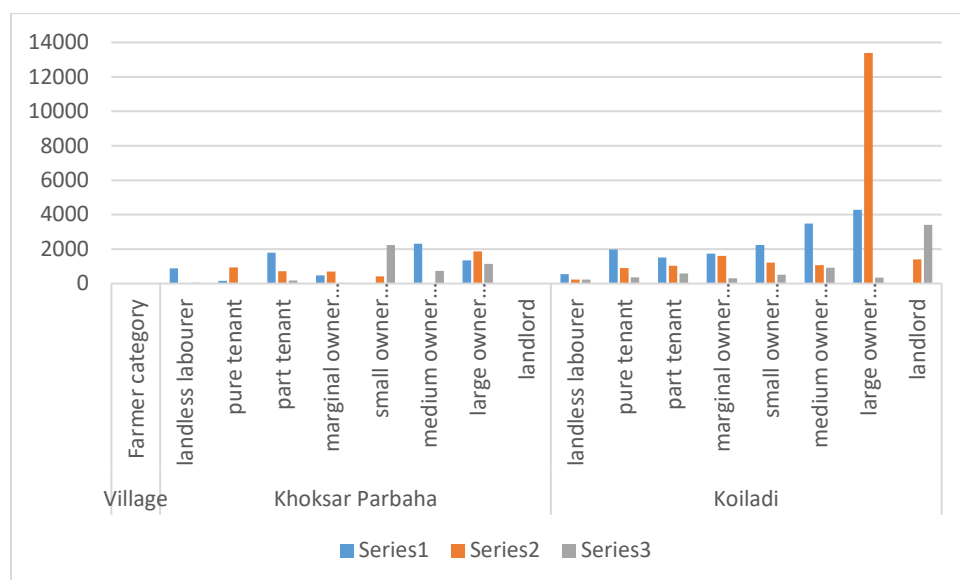


Table 9: % of households with migrants

Village	Farmer category	% of hhs with seasonal migrants	% of permanent migrants in each category
Khoksar Parbaha	landless labourer	53.85	29.30
	pure tenant	30.77	33.76
	part tenant	3.85	20.38
	marginal owner cultivator <0.5ha	7.69	5.10
	small owner cultivator 0.5-1ha	0.00	0.64
	medium owner cultivator 1-2 ha	0.00	3.18
	large owner cultivator (2-5 ha)	3.85	7.64
	landlord (>5 ha)	0.00	0.00
Koiladi	landless labourer	26.27	16.47
	pure tenant	6.27	9.69
	part tenant	10.98	32.36
	marginal owner cultivator <0.5ha	5.49	12.40
	small owner cultivator 0.5-1ha	1.18	1.94
	medium owner cultivator 1-2 ha	0.00	2.33
	large owner cultivator (2-5 ha)	49.80	24.81
	landlord (>5 ha)	0.00	0.00
Bhagwatipur	landless labourer	21.88	15.24
	pure tenant	12.50	23.81
	part tenant	15.63	10.48
	marginal owner cultivator <0.5ha	3.13	13.33
	small owner cultivator 0.5-1ha	6.25	6.67
	medium owner cultivator 1-2 ha	6.25	4.76
	large owner cultivator (2-5 ha)	34.38	24.76
	landlord (>5 ha)	0.00	0.95
Mahuyahi	landless labourer	21.22	24.89
	pure tenant	14.29	15.56
	part tenant	13.47	10.67
	marginal owner cultivator <0.5ha	6.94	7.56
	small owner cultivator 0.5-1ha	11.02	5.33
	medium owner cultivator 1-2 ha	5.31	3.56
	large owner cultivator (2-5 ha)	27.76	32.00
	landlord (>5 ha)	0.00	0.44

Figure 15: Ownership of cattle, oxen and buffalo by farmer category

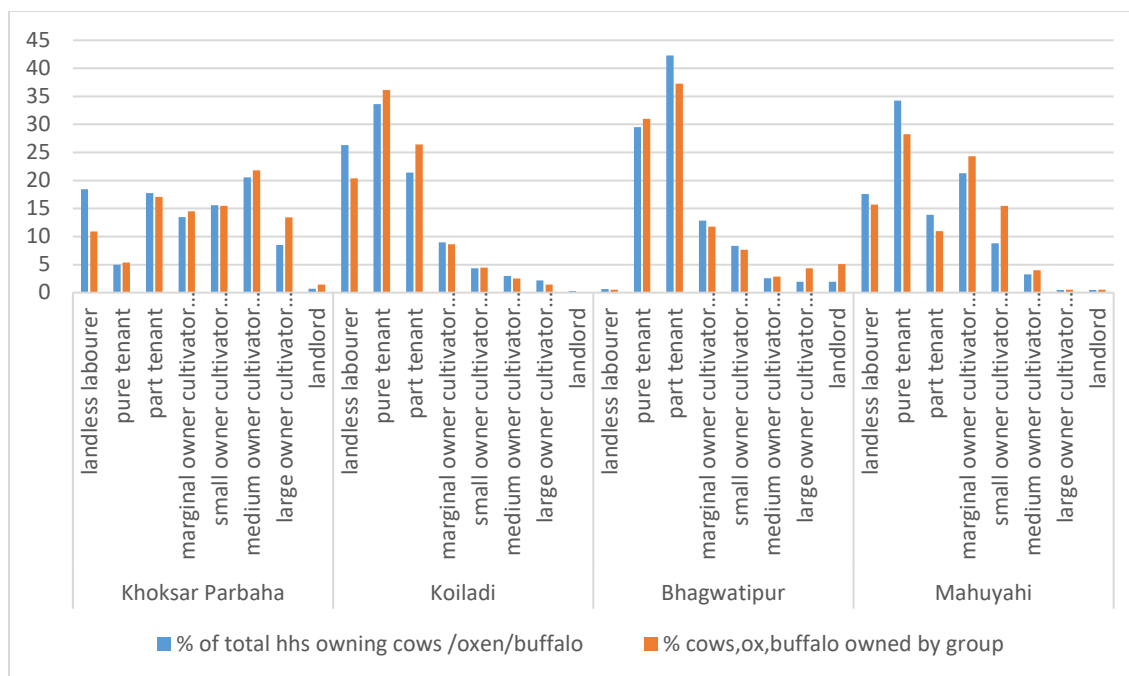


Figure 16: Income from salaried work, business or pension in Madhubani (US\$)

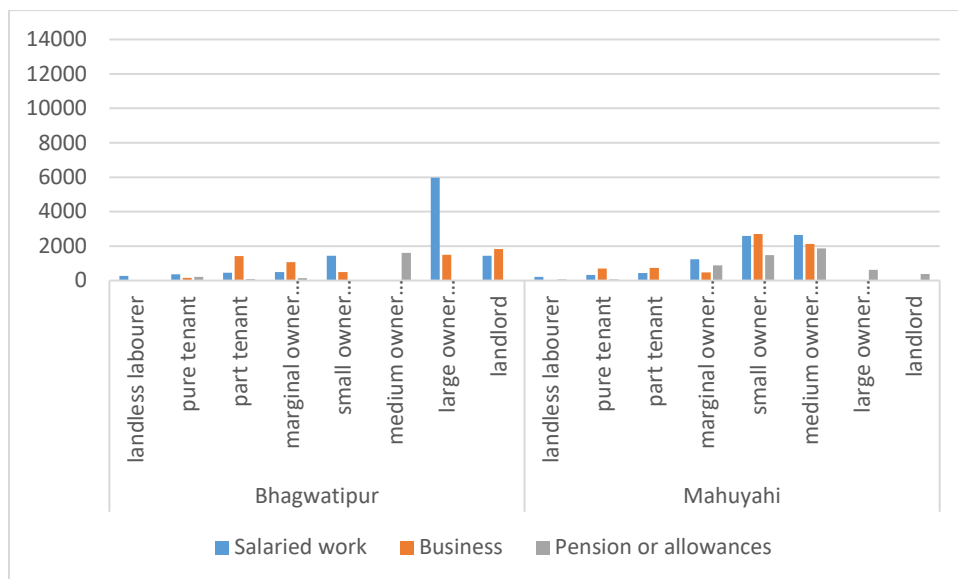


Figure 17: Income from salaried work, business or pension in Saptari (US\$)

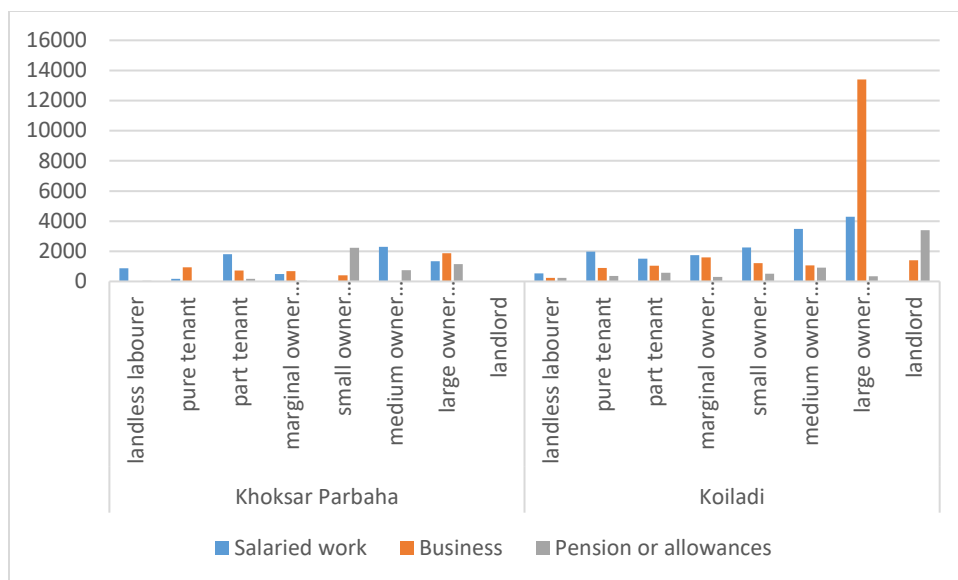


Figure 18: Average outstanding debt to private lenders

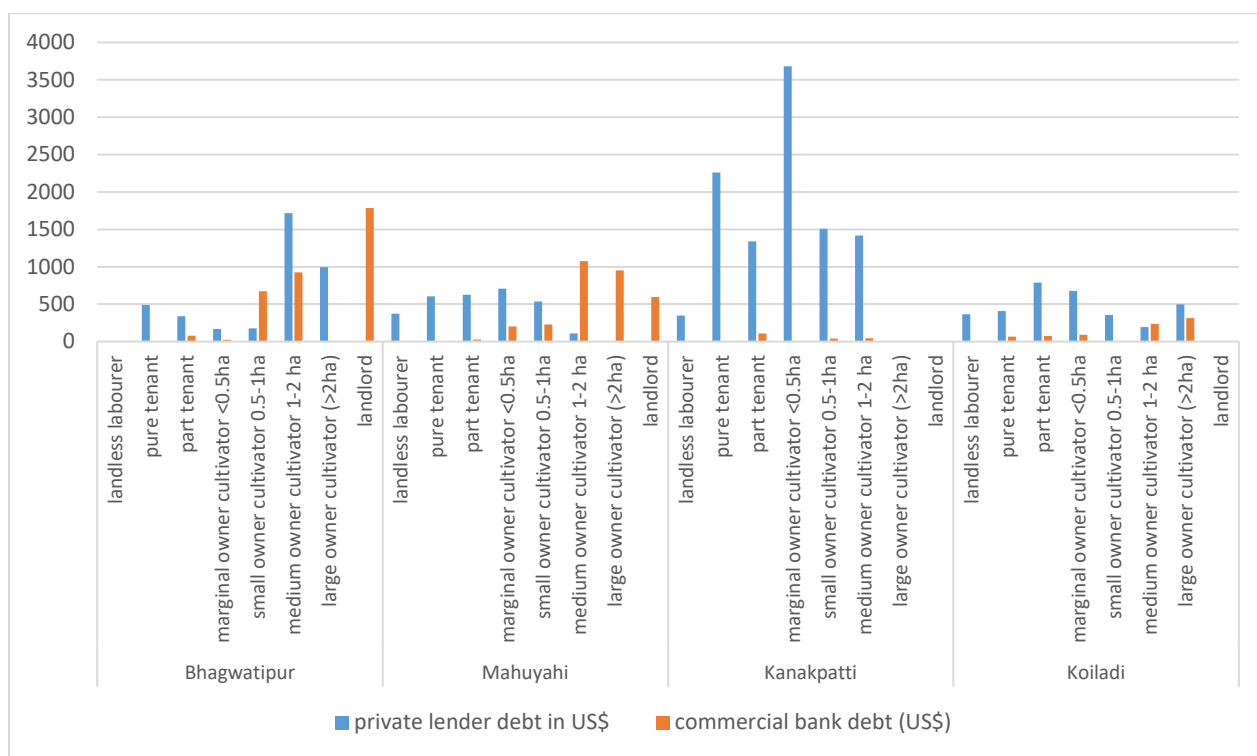
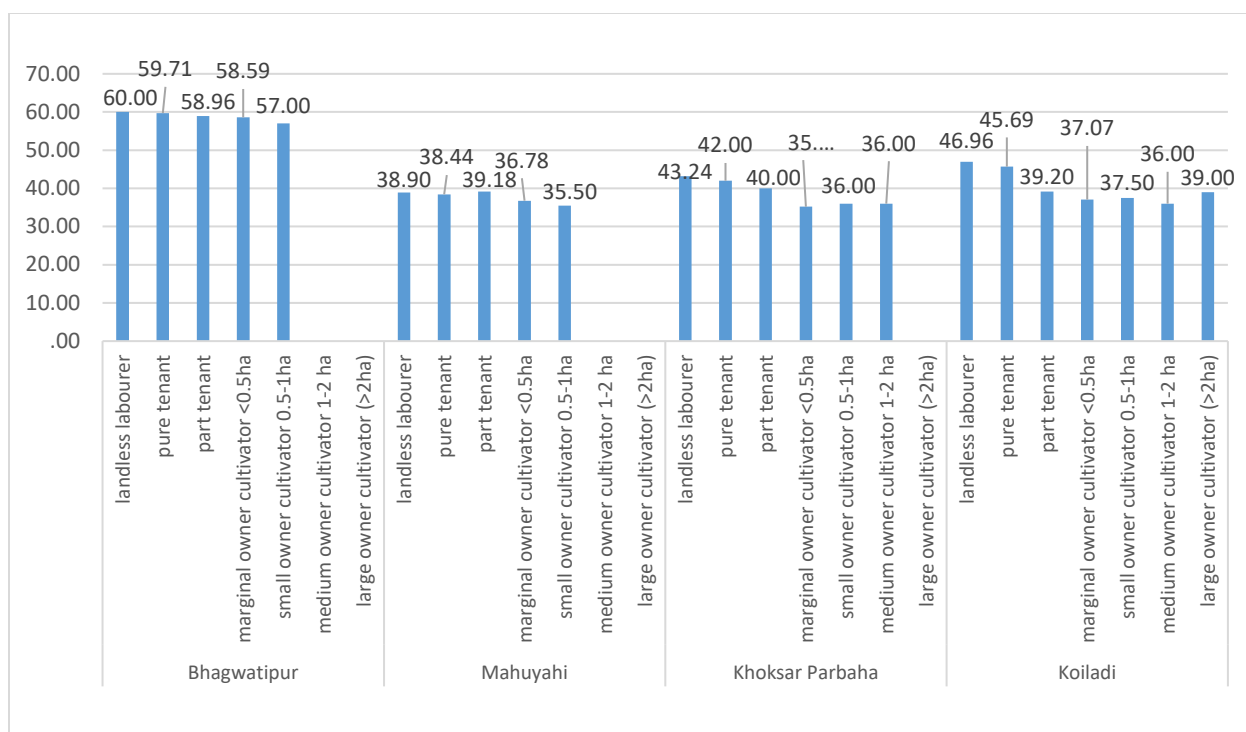


Figure 19: Average recorded interest rates for loans by private money lenders by farmer group (% of loan amount per year)



Pure tenants

The second landless group are the pure tenant farmers, who represent 22% of the surveyed population across the four villages. As one would expect, the three villages with the highest levels of tenancy also have a high proportion of pure tenants. They represent a substantial 27.65%, 27.46% and 21.88% in Koiladi, Bhagwatipur and Mahuyahi respectively, and a more marginal 6.21% in Kanakpatti. The division between this group and the landless labourers is not always distinct, with many landless households moving in and out of tenancy according to family needs or availability of land.

The vast majority of contracts are negotiated informally through word of mouth agreements between land owners and tenants, and only a small proportion of farmers in Koiladi have tenancy or *mohi* rights through registered contracts (see Table 11). Sharecropping or *bhaataiya* is the most common form of tenancy, and it represents 84.74% of the rented land in Kanakpatti, 99.38% in Bhagwatipur and 92.49% in Mahuyahi (see Table 10). Under sharecropping, the landlord retains half of each crop harvested. The net surplus appropriated by landlords though is higher when one considers that the tenants mostly need to meet the production costs. Table 11 shows that only in Koiladi is have a significant proportion of landlords contributed to their tenants' fertiliser costs, and even this is low, at just 20.25% of rented plots. In 14.81% of plots they have contributed to irrigation costs. Other contributions to costs are negligible. The only concessions offered by landlords include offering tenants the right to keep all the straw after harvest.

The second type of tenancy is fixed rent tenancy, known in Nepal as *thekka* and Bihar as *mankap*. This involves farmers paying a fixed and pre-agreed amount of produce in kind each year. For example, in Bhagwatipur, farmers were expected to pay 20 kg of paddy and 10 kgs of wheat per kata of land rented. This is the most common system in Koiladi, and is present on around two thirds of the rented land. The volume of rent is either more or less than what is paid under sharecropping, depending on the yield in a particular season. The advantage of *thekka* is that farmers can retain the increment in yield due to investment in the land or a favourable monsoon, whereas under sharecropping the landlords always

retain half. On the other hand, thekka rents on rainfed land are risky, as even with a crop failure, the tenant would still be expected to pay the pre-agreed consignment of grain to the land owner. For this reason, tenants often preferred sharecropping, particularly if they had no irrigation. There is a small amount of tenancy where a fixed cash rent is paid, although this is rare (see Table 10), and is usually associated with more commercialised regions.

For both tenure types it is worth noting that tenants rarely have formal contracts for their lease. In Koiladi and Kanakpatti, these contracts are known as *mohi*. They state that when the tenant ends the contract, they should be entitled to half of the land. This no longer applies today though, and even when it did, the landlord would not allow the tenant to separate, and they had to take the initiative first. In spite of this, landlords are unwilling and afraid to give any written contracts to tenants.

Table 10: Tenure type by area in each village

Village	% rented area under sharecropping	% rented area under fixed kind tenure	% rented area under fixed cash tenure
Kanakpatti	84.74	9.04	6.22
Koiladi	33.74	61.46	4.80
Bhagwatipur	99.38	.00	.62
Mahuyahi	92.49	6.56	.95

Table 11: Landlord engagement with farmers

Village	% of plots with tenancy paper	% of plots whose landlord is contributing to fertiliser costs	% of plots whose landlord is contributing to irrigation costs	% of plots whose landlord is contributing to other costs
Kanakpatti	0.00	8.77	1.75	0.00
Koiladi	19.01	20.25	14.81	0.49
Bhagwatipur	0.60	0.30	0.30	0.00
Mahuyahi	0.00	0.00	0.00	0.28

Pure tenants can rarely subsist from tenant farming alone, and it is nearly always supplemented with wage labour to meet their growing cash needs. Money is also needed to purchase food to make up for shortfalls after paying half the harvest as rent. In all the villages, pure tenants are engaged in agricultural labour like their landless labouring counterparts. In some cases their engagement is higher such as in Mahuyahi, while in others such as in both sites in Nepal, it is lower. What is clear is that along with landless labourers, these two landless group carry out the bulk of farm labour in the community. In Mahuyahi, pure tenants and landless labourers carry out 42% and 44% of the aggregate recorded labour days on others farms. This stands at 29% and 56% for Koiladi and 62% and 14% for Kanakpatti (see

Table 8). Together with the landless labourers, they conduct much of the farm work for others in the community.

An important difference though is that this group also hires labour for busy times such as paddy transplantation. Hiring labour is not a sign of 'wealth' or class dominance though. Although wages are

paid to outside workers, this is often part of a de facto exchange of labour, and it is common for the same household to labour on another farm later in the season. Similarly, women headed households or those suffering a temporary labour shortage due to migration, may also hire labour for busy times of the year. The degree to which labour selling exceeds labour buying depends on a number of factors, including whether large owner cultivators and landlords prefer to cultivate their land using labourers, or sharecroppers. **Figure 20** shows that the average number of labour days sold for this group, is similar to the average number of labour days purchased in Bhagwatipur and Mahuyahi, although in Koiladi and Mahuyahi, the selling of labour exceeds the purchase nearly twofold. What is clear though in spite of village wise differences, is that this group is largely dependent on others for its subsistence, either through tenancy or wage labour.

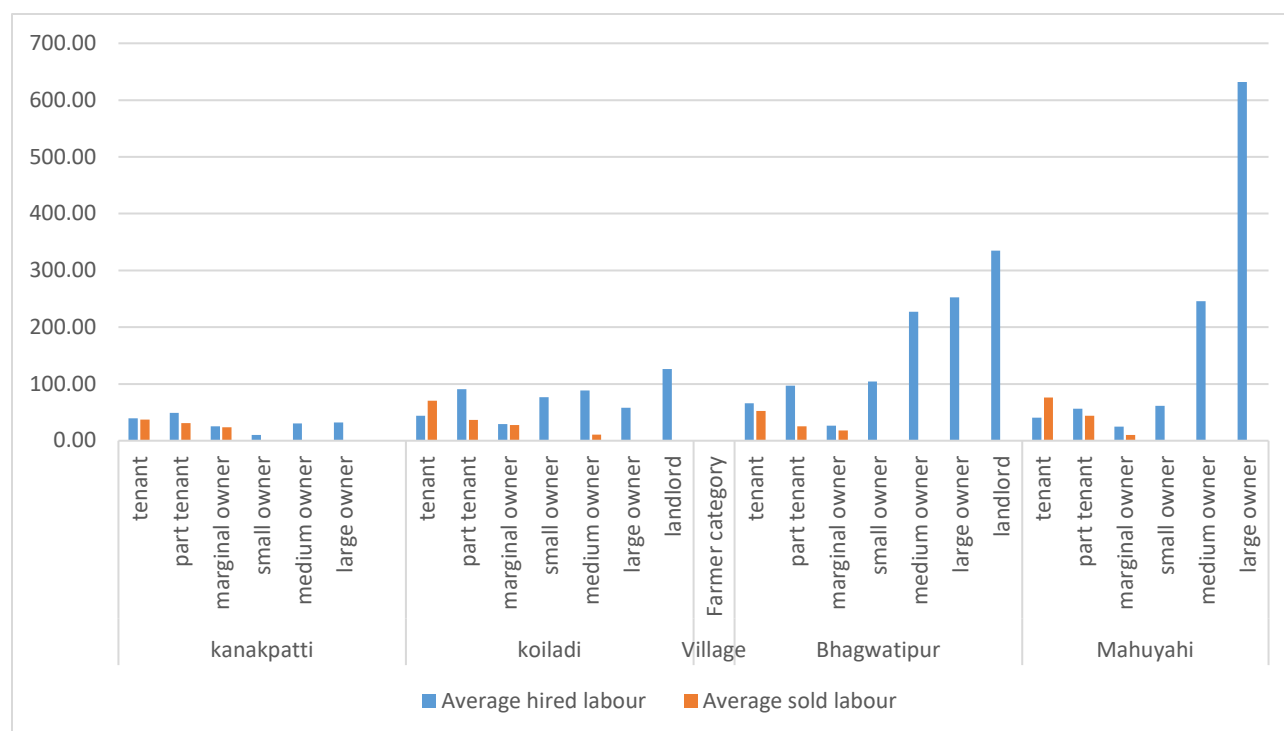
In the past, interlinkage of labour and tenancy contracts were common, with landlords also taking 'labour rents' (known in studies of feudalism as 'corvee' labour) whereby tenants must provide unpaid labour in addition to rent. This reportedly persists in Koiladi, with tenants being expected to provide some days of labour to the land owner on whose plot they cultivate for free, although the research team was unable to collect concrete figures. In the other villages formalised labour rents have declined, although they persist in informal ways. For example, two different landlords for example (including one in a village outside the study area), noted how when his own tenants work for him they provide extra services, such as labouring on his land for lower wages than outside workers, or providing a few hours' labour for free. Indebtedness is also widespread. In the past tenants would usually take loans from their own landlords, and while this still occurs, as noted above, there are now several landlords who offer loans. Average debt to private lenders is even higher for pure tenants than landless labourers, perhaps due to the fact that tenants need to take loans for agricultural inputs also (see Figure 16). It stands at a considerable \$2261 in Kanakpatti, \$604 in Mahuyahi, \$488 in Bhagwatipur, and \$406 in Koiladi. Interest rates remain high, and are similar to landless labourer households (see Figure 19).

Off farm labour is also widespread although again, at levels comparative to landless labourers (see Table 8). In Figure 12 it also appears that average wages for farm and non-farm labour are slightly higher when compared to their pure labouring counterparts. Tenants who have some agricultural produce to meet subsistence needs may be more selective when taking up work, possibly explaining the small discrepancy, although more analysis is required. Migration amongst pure tenants is also an important livelihood strategy, although perhaps due to engagement in agriculture, levels of migration are slightly lower than landless labourers (see Table 9). With the exception of Kanakpatti, around a third of this group own cows and buffalo, which they also use as draft animals on their land (see Figure 15). A large number also keep goats. Income from business or salaried work is low, like landless labourers (see Figure 14 and Figure 16)

Table 12: total no of labour days hired by village and rented area

Village	farmer category	monsoon	winter	summer	% of total hired labour bought	% of total rented area
kanakpatti	tenant	77	1019	2	25.56	0
	part tenant	411	1446	7	43.40	0
	marginal owner	356	198	2	12.95	2.905741
	small owner	20	126	9	3.61	25.86818
	medium owner	25	419	16	10.71	9.496811
	large owner	18	144	0	3.77	14.24522
	landlord	no data	no data	no data	no data	47.48405
koiladi	tenant		2995	1	26.73	0
	part tenant	3467	3029	29	30.90	0
	marginal owner	1181	535	6	8.15	4.762629
	small owner	1489	1079	37	12.33	8.657943
	medium owner	2068	1166	36	15.48	23.11321
	large owner	707	389	3	5.20	55.31041
	landlord	164	88		1.19	8.155813
Bhagwatipur	tenant	3094	387	16	22.21	0
	part tenant	5594	1126	71	43.13	0.478215
	marginal owner	788	187	11	6.26	6.85441
	small owner	1235	196	32	9.29	5.313496
	medium owner	755	154	0	5.77	1.222104
	large owner	649	109	0	4.81	13.09777
	landlord	972	342	26	8.51	73.03401
Mahuyahi	tenant	4787	776	0	25.41	0
	part tenant	1971	665	0	12.04	1.659814
	marginal owner	2815	642	0	15.79	15.33425
	small owner	2992	645	0	16.62	32.00853
	medium owner	2443	259	0	12.34	5.816964
	large owner	2778	382	0	14.44	10.81163

Figure 20: Average labour days sold versus average labour bought in last year



Part tenants

Another group of tenants are the part tenants, who rent land while also owning small plots. 14.15% of the surveyed population include this group. This group makes up 14.69% of households in Kanakpatti, 15.91% in Koiladi, and a substantial 36.27% in Bhagwatipur. In Mahuyahi, where pure tenants and landless labourers were more widespread, it is just 7.3%. It is worth noting that the average size of the owned portion is significantly smaller than the rented area (see

Table 8), suggesting that the bulk of the agricultural work for this group is carried out on rented land⁸. The average owned area is less than 0.32ha in all villages, and it represents a small proportion of the owned land by the surveyed farmers, varying from 22% in Bhagwatipur to just 6% in Mahuyahi.

While the average area of land owned is generally small, they are better off than pure tenants in that they have the security of land ownership, which can make accessing credit and resources easier. One's own plot also offers them the full return of their labour, however small.

⁸ It is worth noting that some richer farmers also rent land, although they are not classified as part tenants. Only those farmers for whom the area rented exceeds the area owned are included in this category, and the land owned must be less than 1 hectare.

Table 13: Average area of land owned versus area rented in for part-tenants (ha)

Village	Owned	Rented in
Kanakpatti	0.3	0.48
Koiladi	0.32	0.66
Bhagwatiour	0.29	0.42
Mahuyahi	0.16	0.25

Nevertheless, given that much of their land is usually rented, agriculture alone rarely meets their subsistence needs and most are heavily engaged in wage work for others. Agricultural labour is on average notably lower than for their landless tenant counterparts. Given the low wages, agricultural labour is often carried out as a last resort, with individuals entering the market on a distress basis. The security of a plot of land may give part-tenants more leeway to wait until they can find access to better paid off-farm work. While they do contribute to the farm labour force, the bulk of the farm labour is still done by landless households (see Figure 8). Figure 20 also shows that in all four villages, the average number of labour days bought exceeds the number sold.

Off farm labour is however important for this group, and in Mahuyahi and Bhagwatipur, the average recorded labour days are higher than their pure tenant and landless laboring counterparts. For similar reasons perhaps, part-tenants appear to receive slightly higher wages when compared to landless pure tenants (see Figure 13). Nevertheless, income from salaried work or business is low, although slightly higher than their landless counterparts (see Figure 14 and Figure 16).

Migration is important for this group. In Kanakpatti, Bhagwatipur and Mahuyahi it is slightly lower than landless households, but in in Koiladi it even exceeds the levels for part tenants and landless labourers (see Table 9). Debt is also a significant concern for part tenants, and levels of indebtedness are similar to pure tenants (see Figure 18). With access to land, some part tenants are able to receive slightly lower interest rates, particularly in Koiladi, although this difference is not significant. As with other land poor groups, part tenants are engaged extensively in livestock rearing. Levels of livestock ownership is comparable with pure tenants and landless labourers with between 17% and 42% owning cows, ox or buffalo.

All pure and part tenants are either Dalit, middle caste, Muslim or Tharu, with the exception of Mahuyahi where there are a few poor Brahmins who fully or partially rent out their land (around 26% of part tenants and 2% of pure tenants). The majority of tenants in Mahuyahi are actually from the Muslim community who are particularly poor in this village, and numerically larger than the Dalits and middle castes.

Marginal and small owner cultivators

The fourth group are marginal and small owner cultivators. This group own their own plot of land and are not engaged in tenancy. However, they can not necessarily meet their minimum subsistence needs off the land. During previous research in the Nepal Tarai, farmers considered 1.5 *bighas* (1.005ha in Nepal) of land to be an optimal holding for a typical family of 6 to subsist (Sugden, 2009). While this is a somewhat arbitrary figure, farmers with land smaller than 1 hectare do appear to share certain commonalities in

terms of the degree to which they must engage in wage labour, and their ownership of other agricultural assets.

Of course, the economic status of those with close to 1ha will be considerably better than those at the bottom of the land ownership scale, who may own just a tiny plot of 0.2ha or below. Many move in and out of tenancy, again according to family subsistence needs. To gain an insight into some of the differences within this category however, the group has been split it into two, including those with less than 0.5ha (marginal) and those with between 0.5ha and 1ha (small). Across all four villages they represent 28.68% of the survey (see Table 6) and own 30% of the cultivated land (see Table 6), although the marginal owner cultivator category is invariably larger. In Kanakpatti the marginal owner cultivators represent 14.69% and small owners represent 12.99%. In Koiladi, marginal and small owners represent 10.42% and 5.11% respectively. In Bhagwatipur they represent 19.17% and 7.25%, while in Mahuyahi they form 22.20% and 9.42%.

Marginal owner cultivators have an economic status similar to that of many part tenants who own less than 0.5ha of land. The only difference may be due to a smaller household size or better wage labour income, owner cultivation may be sufficient for the families' subsistence needs without them having to recourse to tenancy. Marginal owner cultivators also work for other farmers, although it is notably lower (see

Table 8), and like part tenants, is exceeded by the buying of labour for busy times in the agricultural cycle. Migration is still present for this group, although it is notably lower than for part tenant and landless households.

The better of this group, with more than 0.5ha may still not have enough to support the family through agriculture alone, yet are better off than those who have to rent in land. Few of this group engage in labour on other farms, with the exception of Koiladi. However, they retain a strong foothold in the off farm labour market, and in all four villages, it appears that this group has recorded a significantly greater number of labour days on average in the last year than their marginal owner cultivator and tenant counterparts. This again highlights that there is a hierarchy of jobs in the off farm labour market, and slightly better off farmer often are able to access the more favourable off farm jobs. Migration is low amongst this group in the Saptari villages— suggesting that the improved livelihood security from the land reduces the incentives for labour migration, particularly when one considers the high costs involved. In the Bhagwatipur and Mahuyahi though, 10% and 15% of households have migrant family members.

There is some renting-out of land amongst both marginal and small owner cultivators, although rather than signaling economic dominance, land is often rented to farmers of a similar economic status as part of a resource management strategy. This is present for very small families with lower food needs yet perhaps have insufficient labour to cultivate their fields, and thus rent out excess plots. Out of land rented-out by surveyed farmers, the proportion being given away on tenancy by marginal and small owner cultivators is just 12% in Bhagwatipur, 13% in Koiladi and 29% in Kanakpatti. If one considers that some land lies with absentee landlords, the total proportion of rented out land belonging to this group is likely to be even lower.

Nevertheless, marginal and small owner cultivators still face considerable economic insecurity. Although not subject to surplus appropriation through rent, they are heavily indebted to private lenders. In Bhagwatipur indebtedness is lower amongst marginal and small owner cultivators when compared to

tenants, although in Koiladi and Kanakpatti, the average debt remains high for marginal owner cultivators, who actually report a higher average debt than tenants. It is however, slightly lower for small owner cultivators (see Figure 16 and Figure 17).

It should be noted though that the position of marginal/small owner cultivators in the agrarian structure is quite different in Mahuyahi village due to caste dynamics. is in Mahuyahi. While 87% of landless labourers, tenants and part tenants in this village are Dalit, OBC and Muslim, 89.2% of the total land owned by surveyed farmers belongs to the Brahmin community. Not all of this community are big farmers and landlords though, and 75% are actually marginal and small owner cultivators. Some may have been larger land owners in the past, although land was lost due to fragmentation amongst sons. While indebtedness is still present amongst this group (see Figure 18), this group is relatively well off, due to higher levels of education, access to political power, and historical privilege rooted in caste.

shows a substantial income amongst small owner cultivators in particular in Mahuyahi alone from salaried work (\$3483), business (\$1065) and associated pension and allowance (\$911) payments. Similar salaried and business income levels in Bhagwatipur and Kanakpatti for small/marginal owner cultivators is lower, and only slightly higher than part tenants. For marginal owner cultivators it is less, but still high compared to other villages. There is some salaried work though in Koiladi for small owner cultivators (\$2246), who are from a mixed caste background, including upper caste Rajputs.

Amongst the Brahmin community of Mahuyahi (and much of the Mithila region) there are traditional cultural and religious taboos against cultivating land themselves, and for this reason, many prefer to rent out their land to others, and as a result, 47% of the land rented out by surveyed farmers belongs to the marginal and small owner cultivators, and 96% of the land rented out is by marginal and small owner cultivators is from the Brahmin community. There is also no engagement in farm labour amongst this group. While there is substantial 'off-farm' labour, it is likely that the nature of this work is quite different from what is done by their counterparts in other villages.

Medium owner cultivators

Medium owner cultivators include those who own between 1 and 2 hectares. Such farmers generally are self-sufficient on their land, and with investments in irrigation and improved inputs, can generally produce a saleable surplus. They are a small group, representing just 4.11% of the surveyed farmers, yet they have a strong position in the land ownership structure, owning 18.76% of the cultivated land (see Table 6).

This group is present in a significant population only in Kanakpatti, where they represent 17.51% of households (see Figure 12). The presence of recent settlers who migrated to the village in the 1960s and cleared their own fields may be one reason why this figure is high. Past research has shown that in regions of the Tarai where there was settlement on former jungle land, the proportion of 'medium' farmers is larger (Sugden, 2013b). This is because farmers could overcome the constraints posed by landlord monopoly over land, using family effort to clear their own estates. Most recent settlers are Muslim and middle caste and they represent 53.34% of medium owner cultivators. Nevertheless, a third of this group are also local Tharus, which could include members of the former Tharu nobility as well as farmers who cleared additional jungle land alongside the newcomers. Medium owner cultivators in Kanakpatti own 37% of the land, but most of this is self-cultivated, and only 9.5% of the land rented out by surveyed households belongs to middle farmers. They only employ a small number of labourers from other households hiring workers for just 31 person days on average (see Table 8).

In the other three villages, the monopoly of land amongst landlords, means that middle owner cultivators represent less than 4% of the population. Although they are smaller in number, they still play a relatively more powerful position in the other three villages, being important employers of farm labour. The average number of labour days purchased is 88 in Koiladi, 227 in Bhagwatipur and 245 in Mahuyahi, while selling of labour is zero in all villages apart from 11 days on average in Koiladi, where it is most likely part of a labour exchange (see Figure 19). In spite of the high level of labour buying, it still represents only a marginal amount of the total labour bought by sampled farmers, and is less than 15% (see Table 12). The reality is that much of the labour buying and selling is within the poorer socio-economic groups, primarily due to their numerical majority, the need for labour during busy times, regardless of farm size. Some medium owner cultivators rent out land, although this is most prominent only in Koiladi, where 23.11% of the land rented out by surveyed households belongs to this group.

Salaried work or business income is notably higher for this group, with the exception of Bhagwatipur. The highest is in Koiladi, where on average \$3485 was recorded in the last year from salaried work, \$1065 from business and \$911 from pensions and allowances. This income is similarly high in Mahuyahi, where the Brahmin community represents 91% of the middle farmer group, with \$2654, \$2127 and \$1859 respectively recorded for salaries, business and pensions/allowances. Migration is however very low for this category, at less than 5% across all villages.

Large owner cultivators

Large owner cultivators represent a small minority at just 2% of farmers overall who own between 2 and 5 hectares. This group generally produces a reasonable surplus, does not labour for others (even as an 'exchange'). While most of this group owns land surplus to the requirements of the household, how this land is used, and its link to class relations is variable from village to village. Some prefer to rent out surplus land and use small plots for family consumption. Others prefer to employ labourers on land surplus to household needs and sell the excess produce.

In Kanakpatti, large owner cultivators (representing just five families) own 26.74% of the land in the survey and 14.74% of the rented out land (see Table 12). They do not sell labour, and have hired a modest 32 person days of outside labour in the last year on average. One family is from the Rajput caste, who were traditionally the dominant landlords in the region, although most of these land owners are absentee. Three households are Muslim. The Muslim farmers were mostly settlers from other parts of the lowlands who cleared jungle land in the 1960s, perhaps explaining why they have larger plots than their Tharu counterparts.

In Koiladi though the large owner cultivators are considerably more economically dominant, and there are 19 households in total. Over Despite their small numerical population (2.27%), a substantial 30.93% of the land in the survey belongs to this group. A substantial 55.31% of land 'rented out' in the survey belongs to large owner cultivators. They have hired 88 person days in the last year on average. More than half of large owner cultivators are upper caste Rajputs with a history of political and economic dominance, while the remainder belong to the middle castes, or the Dhanuk Muslim community. There are no Dalits in this group.

In Bhagwatipur and Mahuyahi their control over land is slightly lower, at 10.52% and 13.28% respectively (see Figure 11 and Figure 12), and the proportion of the rented out land belonging to this group is 13.10% and 10.18% respectively. Their dominance as land renters is lower than villages such as Koiladi, with

bigger landlords fulfilling this role. Nevertheless, they tend to employ labourers extensively on land surplus to household needs. Figure 20 shows that this group hire a substantial 632 days on average of outside labour in Mahuyahi and 335 days in Bhagwatipur. All large owner cultivators in Mahuyahi are from the Brahmin community, and in Bhagwatipur, they are all from the middle castes.

Indebtedness to private lenders is negligible for large owner cultivators (see **Figure 16**), although like medium owner cultivators they appear to have higher level of engagement with formal lending channels such as private banks. In fact, some large owner cultivators are themselves money lenders, offering out high interest informal loans to poorer farmers or labourers.

This group also appears to have a substantial income source from salaried work in the case of Koiladi, although it is lower in the other village. Interestingly though, in all villages, while migration appears to be low for medium and even small owner cultivators, it appears to rise substantially for large owner cultivators. It even exceeds the levels of out migration for tenants and landless labourers. This is predominantly due to the type of migration. The vast majority of 'migrants' from this group involve educated children of farmers who have moved to urban areas for employment, usually in the professional sector. This is due in part to the higher levels of education amongst this group, where university education is often prioritized.

Landlords

At the apex of the agrarian structure are the households with more than 5ha of land, who I will term landlords. This primarily refers to those households who have had historical dominance in the village, and historically were at the top of the agrarian tax administration hierarchy. The division between 'large owner cultivators' and 'landlords' in this context is not clear, with some large owner cultivators hailing from members of the landed elite whose estates have dwindled due to fragmentation amongst sons. The primary working definition for now though is those households with land which far surpasses the needs of their household.

The number of landlords is small, representing just 0.69% of the total survey for Madhubani and Saptari combined (see Table 6). The proportion is below 1% in all villages with the exception of Bhagwatipur where these households represent 2.07%. However, the number is higher when one considers that not all landlords are captured in the survey. Although survey is a census of the entire village, it only includes those who are resident. There are a considerable number of absentee landlords, who reside in urban centres or even in nearby villages, yet still own land in the community and extract surplus through rent or usury. It is difficult to accurately measure the proportion of land belonging to absentee landlords, but Table 14 offers some insights. There is a big discrepancy between the total area of land cultivated and the total area of owned land reported in the survey – had all land owners resided in the village, one would expect this to be similar. This may be due to reporting error, but the majority of the difference is explained by tenants renting land from owners who do not reside in the community and are thus not included in the sample. In Koiladi, a village well known for its absentee landlords, it is estimated that more than half (51.40%) of the land belongs to outsiders, while in Mahuyahi it is 27.48%. Both these villages have powerful landed families of Rajputs and Brahmins respectively, with many occupying positions of power in the government or private sector, while still owning estates in the village. In Koiladi the estates are managed by a local agent or *kamtiya*, who is usually a local farmer.

Out of those who live in the village though and are captured in the survey, they still own a substantial proportion of the land. In Mahuyahi, surveyed landlords own 16.14% of the land, in spite of being just 0.64% of the sample, and 34.37% of the rented land out land in the survey belongs to them (see Figure 12 and Figure 11). In Bhagwatipur they own a substantial 40.85% of the land and 73.03% of the rented out land. In Koiladi they own just 9.16% of the land, but this is unsurprising given that absentee landlords are dominant here. In Kanakpatti, landlords are less powerful overall, and they own just 5.31% of the land.

Landlord income (and even income of large owner cultivators) is difficult to calculate, as it is not always disclosed, particularly income sources considered ‘sensitive’ such as money lending. The large landlords are known, particularly in Madhubani, to be important money lenders, particularly for large loans of more than 1 lakh rupees (\$1600). There is notable recorded income from professional work, but this may not include income from sons or daughters working outside Figure 14 and Figure 16. Landlords engagement in buying labour is also relatively limited (see Figure 20) given that most land is rented out.

Table 14: Estimated ownership of land by absentee landlords

Village	Total cultivated area (ha)	Total area of land owned by residents of community	Area not accounted for in sample	% area of land belonging to land owners not in community
Khoksar Parbaha	128.92	110.49	18.43	14.29
Koiladi	270.77	131.61	139.17	51.4
Bhagwatipur	154.65	90	64.65	41.8
Mahuyahi	192.79	139.83	52.96	27.47

Agrarian structure at a glance

In sum, it is clear that the biggest gulf is between the labour selling and tenant households and the medium, large owner cultivators and landlords who are net buyers of labour, and who often rent out their excess plots. Landlords and large and medium owner cultivators together own 55.95% of the owned land captured in the sample, although the monopoly over land amongst the upper layers will be higher still if one considers absentee landlords. As we will see below, they also tend to dominate the ownership of agricultural and irrigation equipment.

However, when it comes to labour, rural class relations are more complex. Table 12 makes it clear that the vast majority of labour ‘bought’ is from other poor, marginal and tenant farmers. This is unsurprising

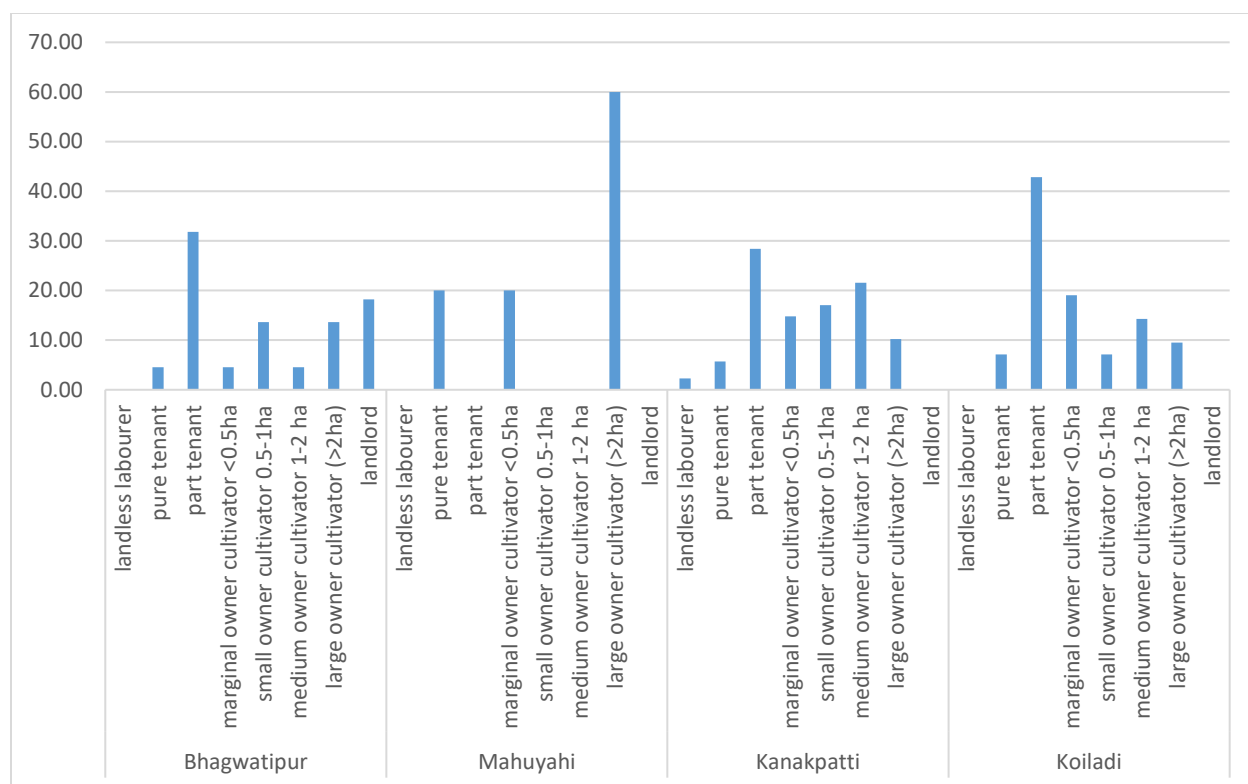
given their numerical majority, and the fact that a considerable exchange of labour takes place within the poorest socio-economic groups, particularly amongst tenants who often operate a slightly larger plot to compensate for what is lost in rent. There are also micro level class relations, with landless labourers working for tenants. This does not mean that medium and large owner cultivators are not important employers of labour. They hire labour extensively, particularly in villages such as Mahuyahi, although they by no means absorb the rural farm labour force. This is primarily due to the fact that surplus land is often rented out rather than being used for direct cultivation.

4.3 Irrigation in Madhubani and Saptari

Ownership of irrigation equipment

It is now a pertinent time to observe what these class divisions and interrelationships mean for irrigation and water access. In what is a largely groundwater dependent region, the primary irrigation source is the shallow tubewell. Pure tenants are rarely able to access their own tubewell (see Figure 21). Only a tiny percentage of pure tenants own wells, and these are likely to include wells next to their homesteads. Landlords are often not supportive to bear the costs of fixed investments on rented out land. Furthermore, few tenants have formal documents, making any investment in a tubewell or other infrastructure risky. By contrast, ownership of tubewells amongst part tenants is relatively high, given that they have the security of some owned land.

Figure 21: ownership of tubewells by farmer category



It is important to note though that more than ownership of tubewells, it is ownership of pump sets which is essential for irrigation. Pump sets are a considerable expense, and from Figure 22 it is clear that very few marginal or tenant farmers own pump sets in Bhagwatipur, Mahuyahi and Koiladi, where ownership is negligible for tenants and mostly below 10% for part tenants or marginal owner cultivators. Only in Kanakpatti are there higher levels of ownership. In contrast, the majority of large owner cultivators and many medium owner cultivators own their own pumps. Some landlords own pumps which are rented out, while others do not own them as they are not engaged in direct cultivation.

The implication is that marginal and tenant farmers have to depend on groundwater markets to access groundwater irrigation, whereby they rent a pump set and tubewell from a better off farmer who has his/her own equipment. Over three quarters of part tenants and tenants rent pumps in Koiladi, Bhagwatipur and Mahuyahi. Rental charges include not only the cost of diesel or electricity but an additional 'rent' for the pump set owner. The level of this rent depends very much on the bargaining power the farmer has with the pump set owner. No relationship was found between one's farmer category and the rate received, although it ranges from just \$0.5 an hour (usually for electric pumps) to a substantial \$2 per hour. Table 15 shows that the costs on the whole appear to vary according to the village, and it appears notably higher in Madhubani compared to Saptari. Pump rental charges on average appear higher in Madhubani. This may be due to the fact that there are fewer pump sets in Bhagwatipur and Mahuyahi with a notably lower pump set to household ratio, leading to a more concentrated water market.

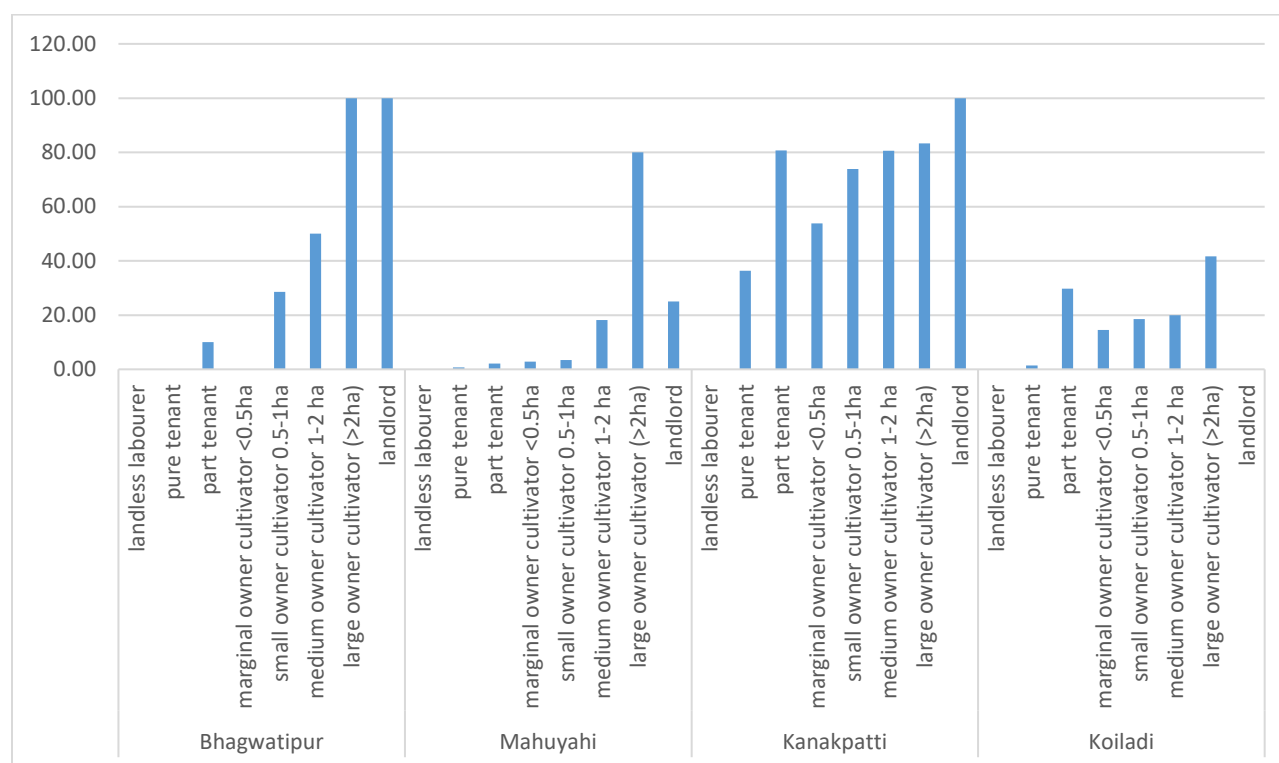
The cost is a considerable disincentive for farmers to invest on the land during the dry season, or to irrigate paddy during monsoon dry spells. Furthermore, water is not always available when required, with farmers often having to 'wait their turn' to use the limited number of pumps in the village. At a time when it is

critical to irrigate a crop, such as a paddy nursery, lack of access to a pump can have serious consequences on productivity. This also renders marginal and tenant farmers without their own pumps, particularly vulnerable to climate change and droughts – particularly during the increasingly frequent ‘dry spells’ in the monsoon.

Table 15: Pump set availability by village and cost of pumping

District	village	Agv paid per hour to rent a pump (US\$)	Total no pumps	total no hhs	ratio of pumps to households
Saptari	Kanakpatti	1.44	87	177	0.49
	Koiladi	1.42	57	528	0.11
	TOTAL	1.43	144	705	0.20
Madhubani	Bhagwatipur	1.92	23	193	0.10
	Mahuyahi	1.81	5	626	0.03
	TOTAL	1.85	28	819	0.04

Figure 22: ownership of pump sets by farmer category



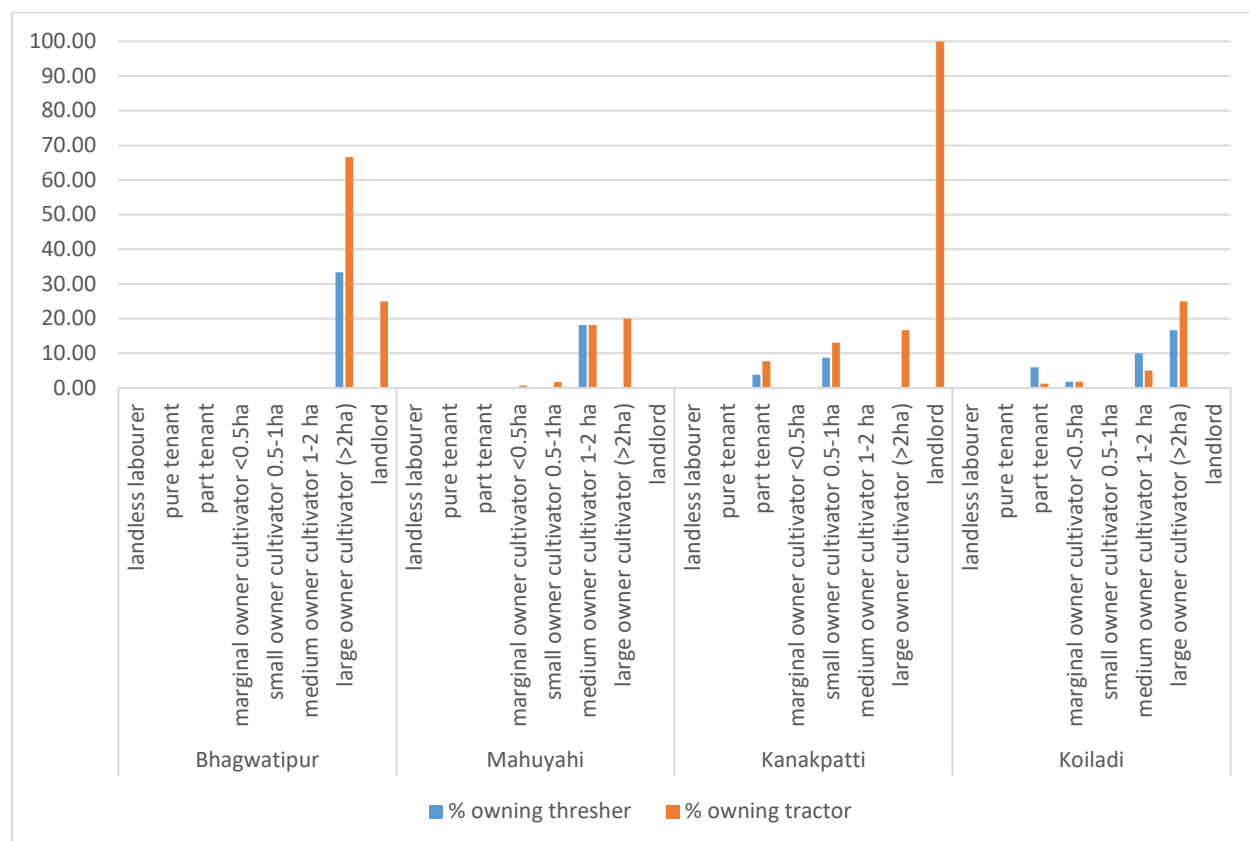
Ownership of other farm equipment

When it comes to other types of farm equipment, ownership is even more skewed. Threshers and tractors are critical labour saving technologies at a time of high out-migration. Use of these forms of mechanization are widespread, regardless of wealth, but ownership is concentrated amongst large owner cultivators and landlords, as **Figure 23** shows. Ownership of equipment as well as land is another way in which these two groups have been able to maintain economic dominance in the village. It should be noted that there is

limited evidence that investment in equipment is a sign of capitalistic tendencies amongst richer farmers. Equipment is used on their own land, but often an important incentive is the additional rents such equipment offers. High value investment in any other type of farm equipment for personal use was very limited.

There are a few isolated cases of part tenants owning threshers and a tractor in Kanakpatti and Koiladi, but these represent households who have purchased the equipment as an enterprise, to sell their services to other farmers. The equipment has not been bought to service their own farm.

Figure 23: Ownership of other equipment by farmer category



4.4 Irrigation, agrarian structure and productivity in Madhubani and Saptari

Cropping intensity

It is clear that equipment ownership, particularly irrigation equipment, is concentrated amongst better off owner cultivating farmers. What is critical to understand in this context, is the implications for agricultural productivity. A first measure is the cropping intensity, and the proportion of land which is left fallow. Given the high seasonality of rainfall, the presence of fallow land is almost always a consequence of a lack of irrigation, or a conscious decision not to invest in irrigation for a second season. As shown in

Figure 2, almost all land is cultivated with paddy during the monsoon, and fallow land is only present if the fields are waterlogged. For the dry season though, the cropping intensity (0 – 200%) which is the % area cultivated for the winter + the % cultivated for summer) can give some indication as to farmers

irrigation and dry season cultivation decisions according to their economic position in the agrarian structure. However, Figure 24 fails to show a clear relationship. On the whole cropping intensity is lower amongst the larger farmers. This is unsurprising given that few of the middle or larger owner cultivators display any capitalistic tendencies, with most of the agricultural ‘income’ being from rent of land and equipment, not to mention additional income from salaried work. In the context of high diesel and fertilizer costs, and a terms of trade considered to be stacked against agriculture, many richer farmers noted in interviews that they preferred to leave land fallow during the dry season or give out more land to sharecroppers.

Winter cropping intensity appears to be higher amongst poorer segments of the farming population. In cases such as Koiladi, and Bhagwatipur winter cropping intensity is actually higher amongst tenant farmers and marginal-small owner cultivators. Given the fragility of livelihoods, cultivating multiple seasons is often an important means for households to meet food security, even if the costs of cultivation are considerably higher than their richer counterparts from whom they must rent irrigation equipment.

Figure 24: Dry season aggregated cropping intensity by farmer category

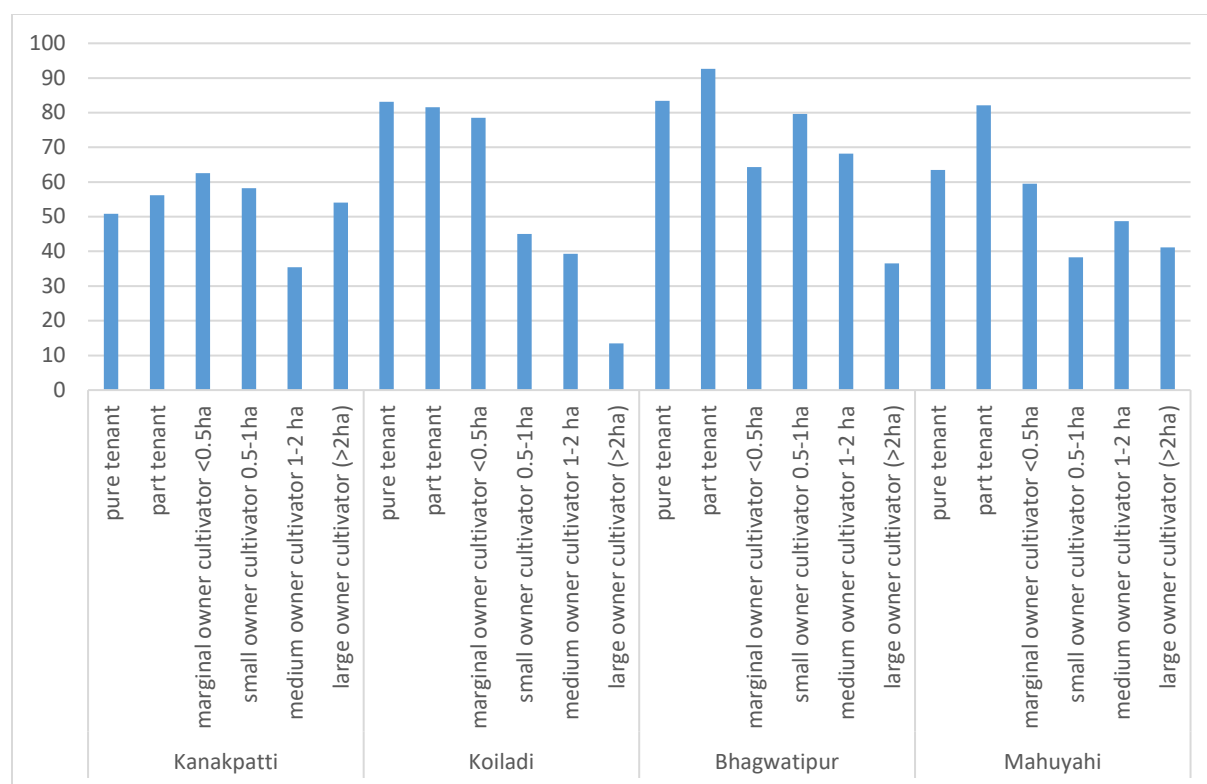
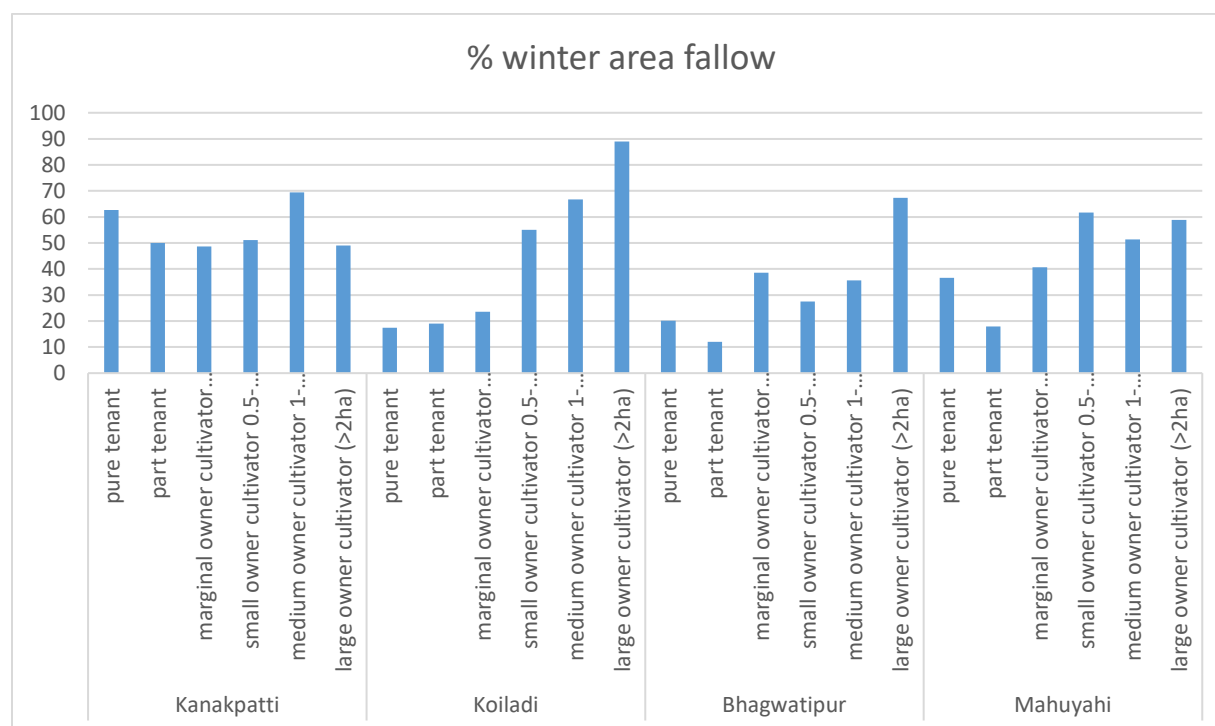


Figure 25: Aggregate fallow land by farmer category in winter



Yields and wealth

While it does not appear that better off farmers have a higher cropping intensity, when one looks at yield, one notices a clearer relationship, although it is not directly linked to one's position in the class structure per se, but whether or not one owns a pump set. Data on the total yield on land cultivated by different farmer categories, like data on cropping intensity, noted no clear relationship (see Table 16). In Table 17, however, it appears that yields of the two main staple crops, paddy and wheat are closely related to the irrigation source of the plot and whether the farmer owns the pump set, with privately owned pump sets drawing water from shallow tubewells or ponds consistently leading to higher average yields. In fact, plots cultivated by farmers with rented pump sets appear to have paddy yields similar to plots without irrigation at all in Bhagwatipur and Kanakpatti. In Mahuyahi there are only five pump owning farmers so it was not included in this analysis as the data could be misleading.

It appears from Figure 26 that this can be partially explained by the fact that pump owners will irrigate their fields more often than non owners. The number of average applications for rice and wheat appears notably higher for pump owners when compared to those without pumps. Not only do the former group have a pump to hand to supply water on demand during any dry spell, they have a greater incentive to use the pump given that they only need to pay the operating costs and not an additional 'rent' for the

pump set owner. Pump set ownership as noted above, is intricately connected with one's class position, and the vast majority of pump set owners are from the middle to large owner cultivator group.

Table 16: Yields of wheat and paddy per ha by farmer category

Village	Wealth category of hh who cultivates plot	Aggregate yield of paddy per ha	Aggregate yields of wheat per ha
Kanakpatti	pure tenant	1414.77	1194.03
	part tenant	1776.48	1733.44
	marginal owner cultivator <0.5ha	3380.78	1480.10
	small owner cultivator 0.5-1ha	1960.76	1558.87
	medium owner cultivator 1-2 ha	1721.94	2103.33
	large owner cultivator (>2ha)	1361.30	1233.56
	landlord	2388.06	NA
Koiladi	pure tenant	2538.55	1267.81
	part tenant	2718.08	1507.07
	marginal owner cultivator <0.5ha	2782.56	1427.00
	small owner cultivator 0.5-1ha	2579.74	1274.58
	medium owner cultivator 1-2 ha	3103.11	1661.57
	large owner cultivator (>2ha)	1857.38	1910.45
	landlord	NA	NA
Bhagwatipur	pure tenant	1883.04	32.45
	part tenant	2008.78	60.58
	marginal owner cultivator <0.5ha	2039.52	0.00
	small owner cultivator 0.5-1ha	1829.94	242.95
	medium owner cultivator 1-2 ha	1731.22	545.81
	large owner cultivator (>2ha)	2264.00	323.21
	landlord	1904.76	143.33
Mahuyahi	pure tenant	2663.20	103.76
	part tenant	2355.40	128.13
	marginal owner cultivator <0.5ha	2666.09	101.18
	small owner cultivator 0.5-1ha	2441.67	534.80
	medium owner cultivator 1-2 ha	2323.17	525.56
	large owner cultivator (>2ha)	2180.36	588.70
	landlord	1831.50	1923.08

Figure 26: No of irrigation applications by pump set ownership

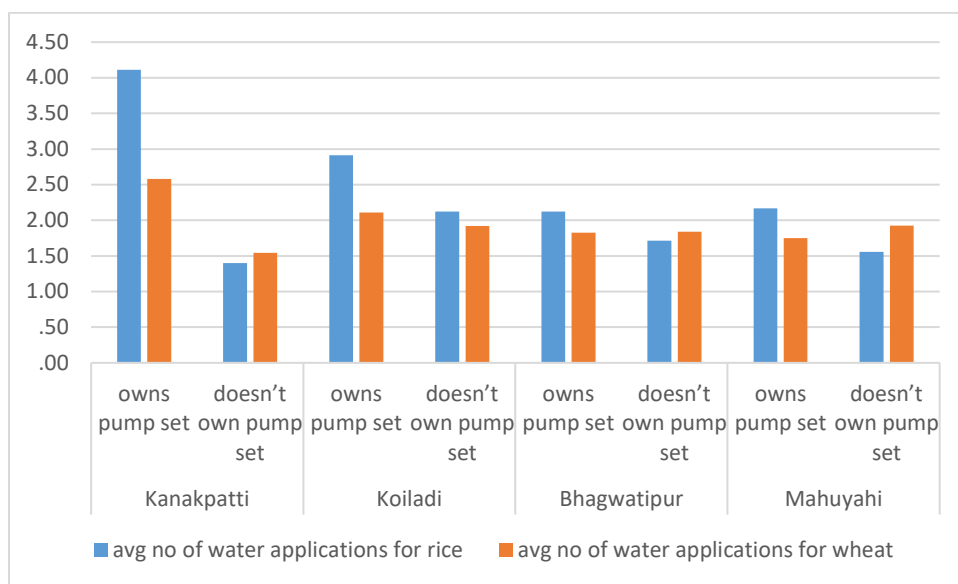


Table 17: Yield per ha of paddy and wheat on land irrigated by different sources

Village		Aggregate yields of paddy per ha	Aggregate yields of wheat per ha
	Irrigation source and ownership		
Kanakpatti	owns pump set (STW)	1825.20	1998.90
	rents pump (STW)	1555.02	1287.31
	owns pump set (pond)	1791.04	0.00
	rents pump (pond)	958.17	1204.64
	Public canal	1581.48	1569.85
	no irrigation	1935.68	1084.82
Koiladi	owns pump set (STW)	3203.73	1729.28
	rents pump (STW)	2628.47	1436.94
	owns pump set (pond)	3681.59	0.00
	rents pump (pond)	2735.41	728.59
	Public canal	2622.13	1696.46
	no irrigation	1931.65	1313.43

Bhagwatipur	owns pump set (STW)	2171.67	1533.81
	rents pump (STW)	1902.90	1484.84
	owns pump set (pond)	NA	NA
	rents pump (pond)	1098.90	NA
	Public canal	1999.44	NA
	no irrigation	2197.80	NA

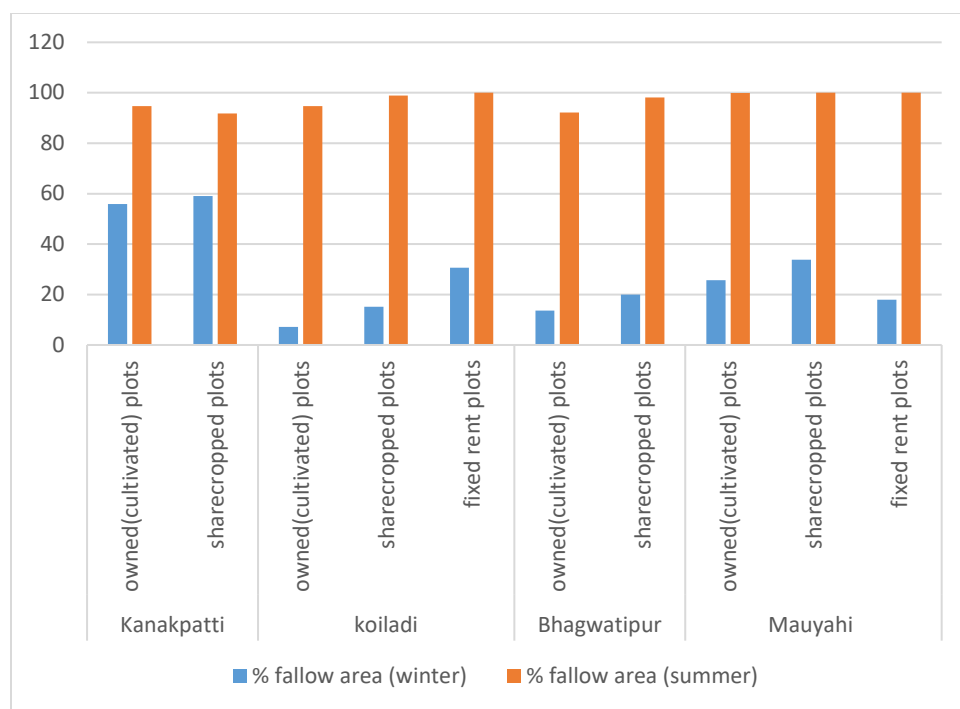
Cropping intensity and sharecropping

It is important to not only look at the formal farmer categorization to assess the relationship between economic status and irrigation and cropping outcomes, but also look at the tenure of the land. The biggest differences in both cropping intensity, yields and irrigation use appear to be between plots where the land is owned and plots where the land is rented.

Tenancy itself represents a commonly cited disincentive for increased production or investment in inputs, including irrigation. The most common constraint relates to the incentives for sharecropping, which is the predominant form of tenure in Bihar and the Nepal Tarai, as it was in Rangpur and Rajshahi⁹. For each additional unit of investment by sharecroppers, the landlord will keep half, and this has been argued to significantly reduce incentives for investment (Marshall, 1907, Nabi, 1986). Focus groups and interviews with farmers highlighted this incentive constraint – although in spite of this,. Even for fixed rent tenancies, the rent burden increases the cost of production significantly, resulting in reduced farm output, as shown in an earlier study from Morang of Nepal, which borders Sunsari (Sugden and Gurung, 2012). Many famers preferred to sharecrop the land rather than take land on a fixed rent, as despite the low incentives for investment, at least in the event of a harvest failure, the landlord would bear half the loss. Figure 27 demonstrates that the area left fallow in summer and winter does appear slightly higher on sharecropped plots when compared to owner cultivated plots. the differnces are not large though. For example, the winter fallow area in Mahuyahi is 25.69% on owner cultivated plots, and 33.79% on sharecropped plots – while for summer, most land is fallow anyway, regardless of tenure.

Figure 27: Fallow area by land tenure

⁹ Until it began to lose ground to fixed rent systems, though it still persists in some areas, but only because landlords are unwilling to rent land for periods longer than a single growing season, according to focus groups



Yields and sharecropping

Cropping intensity is not always a strong measure of how much tenants and owner cultivators are investing in inputs and irrigation, as a tenant farmer may cultivate a crop but use only minimal irrigation. Yields therefore provide a more accurate measure.

Table 20 suggests that yields appear variable in accordance with the tenure of the plot. Aggregate sharecropped land yields are notably lower for paddy in Kanakpatti and Koiladi, and lower for wheat in Koiladi, Bhagwatipur and Mahuyahi.

To better understand this relationship, it is worth looking at whether land which is actually cultivated in each season, has been irrigated for in each season, and the type of irrigation. Table 19 provides some insights into the type of irrigation by plot, for land which is cultivated (i.e. not left fallow). There does not appear to be a notable difference between owned and sharecropped plots for the during the monsoon – suggesting that whether or not the plot is irrigated does not explain lower yields for paddy. Neither is there a clear relationship between tenure of the plot and the irrigation type. One may expect rented plots to be more dependent on communal irrigation resources such as canals. However, such plots are also more likely *not to be rented out* by landlords, as they provide low cost irrigation with reduced risk.

In winter by contrast, when irrigation has a far greater impact on yields, it does appear that the area of unirrigated cultivated land is higher for rented plots – and this is not surprising given that poorer tenant farmers reportedly plant wheat or other crops on the land, hoping for some limited winter rainfall, but often cannot afford to invest in costly tubewell irrigation. In Kanakpatti for example, 31.17% of the owner cultivated area is not irrigated as compared to 54.95% of the sharecropped area. In Mahuyahi this difference is 43.52% and 57.66%, and in Bhagwatipur it is 80.80% and 70.55%.

The fact that land is irrigated however, only gives a partial picture of the level of irrigation investment by marginal and tenant farmers. The number of irrigation applications is also relevant, as is the overall level of labour and input allocation on the land for activities such as weeding or nutrient application. Taking irrigation application for example,

Table 20, although not showing a strong relationship, does suggest that the average number of irrigation applications for paddy and wheat is slightly higher for owner cultivated plots when compared to sharecropped plots. This may be in part due to the fact that no tenants own pump sets, as well as the reduced incentives for sharecroppers.

Table 18: Aggregate per ha yields of paddy and wheat according on land under different forms of tenure

Village	Tenure	Aggregate yields of paddy per ha	Aggregate yields of wheat per ha
Kanakpatti	owned(cultivated) plots	1842.30	1470.64
	sharecropped plots	1465.55	1814.93
Koiladi	owned(cultivated) plots	2913.63	1465.93
	sharecropped plots	2513.40	1189.84
	fixed rent plots	2609.49	1486.09
Bhagwatipur	owned(cultivated) plots	1956.99	1538.98
	sharecropped plots	1935.19	1460.58
Mauyahi	owned(cultivated) plots	2425.42	1778.30
	sharecropped plots	2515.31	1540.16

Table 19: % of farmed area by irrigation source according to tenure of plot

Village	tenure status of plot	monsoon				winter			
		no irrigation	tubewell	pond and other	canal	no irrigation	tubewell	canal	pond and other
Kanakpatti	owner cultivated	59.55	27.26	6.10	7.08	31.17	44.04	1.82	22.97

	sharecropped	61.59	25.34	13.07	0.00	54.95	32.67	9.90	2.48
	fixed rent tenancy	91.30	8.70	0.00	0.00	43.48	4.35	0.00	52.17
koiladi	owner cultivated	3.66	58.21	7.59	38.58	29.38	52.67	9.81	8.14
	sharecropped	6.45	44.96	9.75	54.48	28.45	54.38	9.16	8.02
	fixed rent tenancy	3.22	59.42	7.50	43.51	41.65	50.88	4.39	3.08
Bhagwatipur	owner cultivated	3.06	89.46	6.77	0.71	19.20	80.80	0.00	0.00
	sharecropped	13.09	83.59	3.32	0.00	29.45	70.55	0.00	0.00
	fixed rent tenancy	0.00	100.00	0.00	0.00	22.73	77.27	0.00	0.00
Mahuyahi	owner cultivated	32.65	25.66	41.10	0.59	5.45	43.52	0.00	51.03
	sharecropped	32.64	34.47	31.85	1.04	0.39	57.66	0.00	41.96
	fixed rent tenancy	61.79	38.21	0.00	0.00	11.54	88.46	0.00	0.00

Table 20: Aggregate per ha number of irrigation applications for paddy and wheat on land under different forms of tenure

Village	Tenure of plot	avg no of water applications for rice	avg no of water applications for wheat
Khoksar Parbaha	owned(cultivated) plots	3.94	2.26
	sharecropped plots	3.10	2.33
koiladi	owned(cultivated) plots	2.51	2.05
	sharecropped plots	2.49	1.81
	fixed rent plots	6.61	1.87
Bhagwatipur	owned(cultivated) plots	1.86	1.90
	sharecropped plots	1.67	1.77
Mauyahi & Lohapipar	owned(cultivated) plots	1.61	1.91
	sharecropped plots	1.53	1.94

Cropping intensity, yields and fixed rent tenancies

A final issue worth exploring, is the role that the type of tenancy plays in shaping cropping intensity, yields and irrigation. Figure 27 shows that in Kanakpatti, Mahuyahi and Bhagwatipur, the fixed rent fallow area

is lower than on sharecropped land, or equivalent to the cropping intensity on owner cultivated plots, backing up the argument that sharecropping is inherently unproductive and carries weak incentives to invest. It should be noted though that the measurements for fixed rent fallow area are more reliable in Koiladi, given that this is the only village with a substantial rented area under fixed rent tenancy. Interestingly, the winter fallow area for fixed rent plots appears higher here. This may be due to the fact that the winter unirrigated area appears to be higher on fixed rent plots when compared to sharecropped plots, at 41.65% versus 28.45% respectively (see Table 19) (there is no difference in the monsoon).

This is unusual given that sharecropped land usually attracts less investment, although there may be other compounding factors such as the tendency of fixed rent landlords to be absentee, and thus play a less active role in encouraging investment in irrigation. It may also be due to a preference for landlords to give out land with access to tubewells or canals on a sharecropping basis in the hope of better yields. In spite of this, winter yields are actually lower on sharecropped land

Table 18. This suggests that even though fixed rent plots are less likely to be irrigated, the land which is irrigated may receive more water, and other inputs may be used more productively, suggesting that the sharecropping is indeed less productive overall. If one observes the number of irrigation applications in

Table 20, it seems that there is no big difference for wheat, although there is a big difference for paddy, with fixed rent plots receiving a far greater number of applications compared to sharecropped plots. This difference may however be due to reporting error, and more analysis is however needed here to understand these trends.

5. Agrarian Structure in North Bengal

5.1 Concentration of land and area under tenancy

The agrarian structure in Uttar Chakoakheti and Dholaguri is vastly different from Madhubani and Saptari. Due to the land reforms in the 1970s which broke up the estates of the *jotedars*, there are few large landlords in this region, and small and marginal owner cultivators represent the majority of the rural population, at 18.67% and 36.59% respectively (see Table 15). In both the villages, there are only a small number of 'large owner cultivators' with between 2 and 5 ha, and just two households with more than 5ha, although whether they could be considered as landlords in the Cooch Behar context is debatable. The larger farmers with more than 2ha represent 3.26%, and own 18.09% of the cultivated land (see Table 21), which suggests moderate inequality, although at levels which are far lower than in Bihar. and small owner cultivators with less than 1ha together own just over half the land (51.97%) which is roughly

corresponds with their actual population (58.65%). It is thus clear that while the majority of the land is with the smaller farmers, holdings are small.

Table 21: Concentration of land in the survey for North Bengal: Dholaguri and Uttar Chakoakheti

Farmers Category category	Aggregate area of land owned by this category (ha)	No of households in group	% of total cultivated land owned	% size of group
landless labourer	0.00	51.00	0.00	12.78
pure tenant	2.01	30.00	0.87	7.52
part tenant	14.53	40.00	7.19	10.03
marginal owner cultivator <0.5ha	33.95	146.00	18.67	36.59
small owner cultivator 0.5-1ha	61.10	88.00	33.30	22.06
medium owner cultivator 1-2 ha	40.66	31.00	21.88	7.77
large owner cultivator (<2ha)	35.73	13	18.09	3.26
Total	187.97	399	100.00	100.00

The area under tenancy in Dholaguri and Uttar Chakoakheti is a moderate 17.42% and 20.16% respectively (see Figure 26). Some of this land is also under seasonal tenure whereby land is rented out only for winter or summer cultivation, after which the land owner takes back the land for monsoon paddy. While some of the households renting out land to tenants are large farmers, who descend from the former landed elite, some are also small farmers themselves who now work outside for labour, and the tenants are often relatives.

Table 22: % of households with migrants

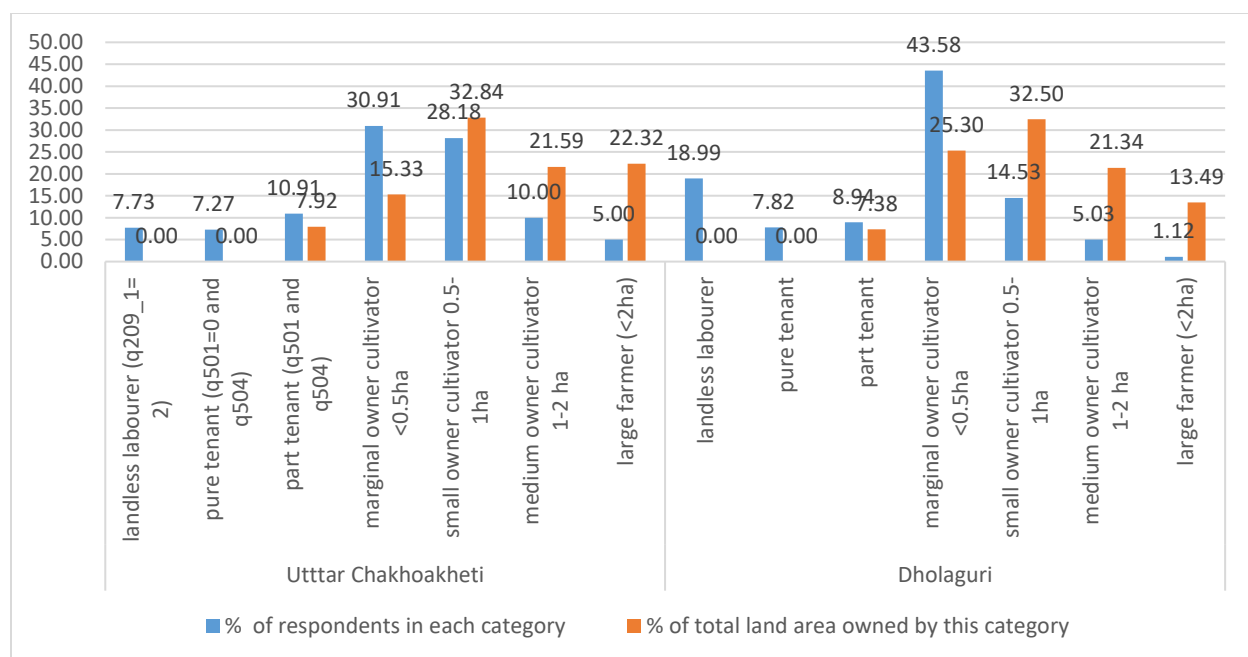
Village	Farmer category	% of hhs with seasonal migrants	% of permanent migrants in each category
Utttar Chakoakheti	landless labourer	5.00	27.50
	pure tenant	0.00	6.25
	part tenant	0.00	25.00
	marginal owner cultivator <0.5ha	7.35	16.18
	small owner cultivator 0.5-1ha	1.61	25.81
	medium owner cultivator 1-2 ha	0.00	54.55
	large owner cultivator (<2h)	0.00	0.00
Dholaguri	landless labourer	2.59	18.97
	pure tenant	0.00	0.00
	part tenant	12.50	6.25

	marginal owner cultivator <0.5ha	3.75	12.50
	small owner cultivator 0.5-1ha	0.00	3.85
	medium owner cultivator 1-2 ha	0.00	0.00
	large owner cultivator (<2h)	0.00	0.00

Table 23: Ownership of land in study communities

	Total cultivated area (ha)	Area of land cultivated owner cultivated (ha)	Area under tenancy (ha)	% area under tenancy
Dhaloguri	63.97	53.60	11.14	17.42
Uttar Chakoakheti	141.03	122.46	28.43	20.16

Figure 28: Size of each farmer category and proportion of land owned in North Bengal



Landless labourers

There is a modest population of landless labourers in Uttar Chakoakheti and Dholaguri, at 7.73% and 18.99% respectively (see Figure 28). Landless labourers work on others farms on average for 142 days a year in agricultural work in Uttar Chakoakheti and 101 days in Dholaguri. Off farm labour however, is more limited. In Dholaguri this small group of landless labourers provides 60.31% of the total labour days in the village, although their contribution is more modest in Uttar Chakoakheti. While on average, wages are similar to Bihar and Saptari (see Figure 29), there is no notable difference in wages between landless labourers and better off households. In Dholaguri, 29% own cattle and other livestock, although this is more limited in Uttar Chakoakheti. Unlike in Madhubani and Saptari, the burden of debt to private lenders is limited here, and when loans are taken, the interest rates are lower (see Figure 32). Migration is high amongst this group. In Uttar Chakoakheti, 5% and 27.5% of households have seasonal and permanent migrants respectively. It is 3.75% and 12.5% in Dholaguri. Livestock raising is particularly important in Dholaguri, and around 30% of households keep cattle (see

Figure 31), which are grazed in the extensive pastures.

Tenants and pure tenants

Unlike in Bihar and Saptari, the tenancy system in North Bengal is very different. Many tenants only lease the land on a seasonal basis, with most farmers cultivating their own land during the monsoon. Longer term leases were reported to have been common in the past, but they have recently shifted to seasonal leases. The reason for this change is hard to pin down, but in Uttar Chakoakheti it was reportedly due to the rising population and the increasingly fragmented holdings of even the large farmers. Very few land owners yield a significant surplus from the land, and ensuring household food security in rice is a priority. It is mostly in the dry season therefore is land leased out, as not all farmers choose to invest in winter crops, often pursuing alternative livelihoods either such as labour. In Dholaguri, two thirds of tenants pay rents as a fixed cash sum in advance and vary according to the season for which the land is being leased

(see Table 25). This pre-payment system is very different from in Bihar and Nepal where rents are paid after the harvest. For the rabi season for example, Rs2000 per bigha (0.13ha in North Bengal) is paid. For leases during the monsoon paddy season in Dholaguri, a fixed grain payment is sometimes made. Some households do lease out land on a longer term basis such as a year or more, although this usually involves making a one off down payment to the landlord in advance. This is usually Rs 5000 – 7000 per bigha (0.13ha in North Bengal) per year.

There is however some sharecropping, particularly in Uttar Chakoakheti where 50% of the harvest goes to the land owner (see Table 24). this can be for land leased on a seasonal or longer term basis, although unlike in Bihar and Nepal, it is often leased out to farmers of a similar economic status.

Table 24: Tenure type by area in each village: North Bengal

Village	% rented area under sharecropping	% rented area under fixed kind tenure	% rented area under fixed cash tenure
Uttar Chakoakheti	71.43	8.66	19.92
Dholaguri	26.28	7.3	66.42

There is only a small population of pure tenants and part tenants in each village (see Figure 28). The pure tenants often work for others during the monsoon, although their average off farm labour contribution is a lot lower than for landless labourers (see).

Figure 30 shows a high recorded income from ‘salaried work’ for landless labourers alone – more field analysis is necessary to uncover what this may refer to. shows that many tenants and part tenants buy in labour as well (see Figure 33). Tenancy systems are mixed. Seasonal leases are often paid in a fixed amount of cash per season, whereas longer term leases are either in cash or on a sharecropping basis. As in Bihar, contracts are mostly informal, and just 3% of tenants in Dholaguri and 15% in Uttar Chakoakheti have formal tenancy papers. Salaried, business and pensions/allowance income is present for some households (see

Figure 30), along with income from off farm labour such as collecting stones from the rivers or work in tea gardens (particularly in Uttar Chakoakheti). Some of the salaried work includes work for the Forest Department in the case of Uttar Chakoakheti, such as working as a forest guide. There is high migration, particularly in Uttar Chakoakheti where 25% of part tenants and 6.25% of pure tenants have permanent migrants.

Marginal and small owner cultivators

Marginal owner cultivators with less than 0.5ha and small owners with 0.5-1ha form the backbone of the rural population in both communities. The former group represent 30.91% in Uttar Chakoakheti and 43.58% in Dholaguri. The latter form 28.18% in Uttar Chakoakheti and 14.53% in Dholaguri. Together these two groups own around 51.97% of the land in the two villages. While they do not suffer surplus appropriation through rent or indebtedness they are still relatively poor. However, their income appears

to be more dependent on the land when compared to their counterparts in Bihar and Nepal. Agricultural labour participation is variable, although given the security of their land, it is lower than for tenants or landless labourers. Nevertheless, they still sell more labour on average than they buy (see Figure 33), and around a quarter of the total labour days on others farms in both villages is carried out by marginal owner cultivators (<0.5ha), and in Uttar Chakoakheti, close to another quarter is carried out by small owner cultivators (0.5-1ha). Their small farms mean that the need to purchase labour is low. In terms of overall wealth there does not seem to be a significant difference between marginal owner cultivators and part tenants. The latter simply rent in some additional land, often on a seasonal basis, often due to a larger family. This group engages also in some salaried and small business work.

Medium owner cultivators

Medium owner cultivators with between 1 and 2 ha are a small group at 10% and 5% respectively in Uttar Chakoakheti. Their engagement in farm or off farm labour is limited, and in Dholaguri none of this group engage in any labour for others. With slightly larger farms, some do buy in labour, but this is more prominent in Dholaguri compared to Uttar Chakoakheti (see Figure 33).

Figure 30 suggests that alternative income sources are limited. While many derive much of their income from the farm, there may well be other sources which are not captured in the survey. Migration is particularly significant in the case of Uttar Chakoakheti, where 12 out of 22 households have permanent migrants (54.55%) (see Table 22).

Large owner cultivators

There is a small group of larger land owners with more than 2ha, although only 2 households have more than 2ha. Some large owner cultivators are often the descendants of the former *jotedars* who have lost land now due to fragmentation and the land reforms. The larger farmers represent 5% in Uttar Chakoakheti and just 1.12% in Dholaguri. As one would expect, they retain proportionately a far greater share of the land, at 21.59% and 13.49% respectively, although the levels of concentration are far lower compared to Bihar. They also do not have anything like the same degree of political and economic power as their counterparts in Madhubani and Saptari. Table 25 shows that they even engage in some labour on other farms in the case of Uttar Chakoakheti, and it is actually slightly more than the labour which is bought. What is notable in the case of Dholaguri is the high level of salaried income (see

Figure 30). There is no migration amongst large owner cultivators.

Table 25: Labour contributions by farmer group

Village	Farmer category	Average no of labour days in the last year	total no of labour days	% of labour days in sample	Average no labour days by family in last year	total no of labour days	% of labour days in sample
Utttar Chakoakheti	landless labourer	142.32	5693.00	26.44	76.00	76.00	18.67
	pure tenant	69.87	1118.00	5.19	112.62	112.62	27.67
	part tenant	96.583	2318.00	10.77	63.25	63.25	15.54
	marginal owner cultivator <0.5ha	83.04	5647.00	26.23	58.23	58.23	14.31
	small owner cultivator 0.5-1ha	80.586	4996.00	23.20	38.87	38.87	9.55
	medium owner cultivator 1-2 ha	62.45	1374.00	6.38	56.000	56.00	13.76
	large owner cultivator (2-5ha)	38.60	386.00	1.79	3.00	3.00	0.74
Dholaguri	landless labourer	104.56	12443.00	60.31	93.66	93.67	20.41
	pure tenant	85.85	1202.00	5.83	70.50	70.50	15.36
	part tenant	95.87	1534.00	7.43	102.62	102.63	22.36
	marginal owner cultivator <0.5ha	67.98	5303.00	25.70	85.11	85.12	18.54
	small owner cultivator 0.5-1ha	4.26	111.00	.54	67.69	67.69	14.75
	medium owner cultivator 1-2 ha	.00	.00	.00	40.00	40.00	8.71
	large owner cultivator (2-5ha)	no data	no data		.00	.00	0.00

Figure 29: Average wages for farm and local off farm labour: North Bengal

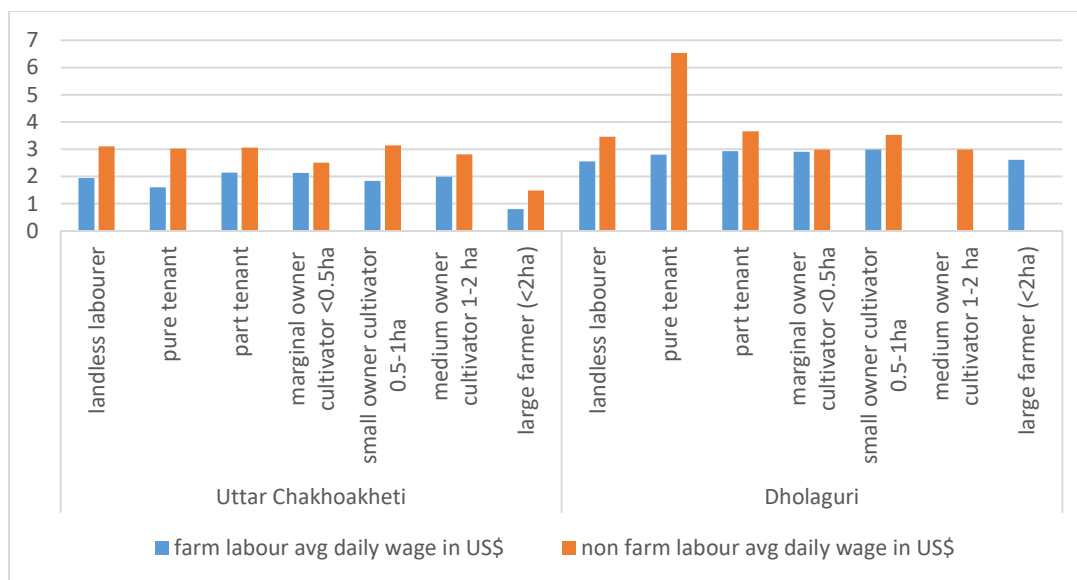


Figure 30: Income from salaried work, business or pension in North Bengal (US\$)

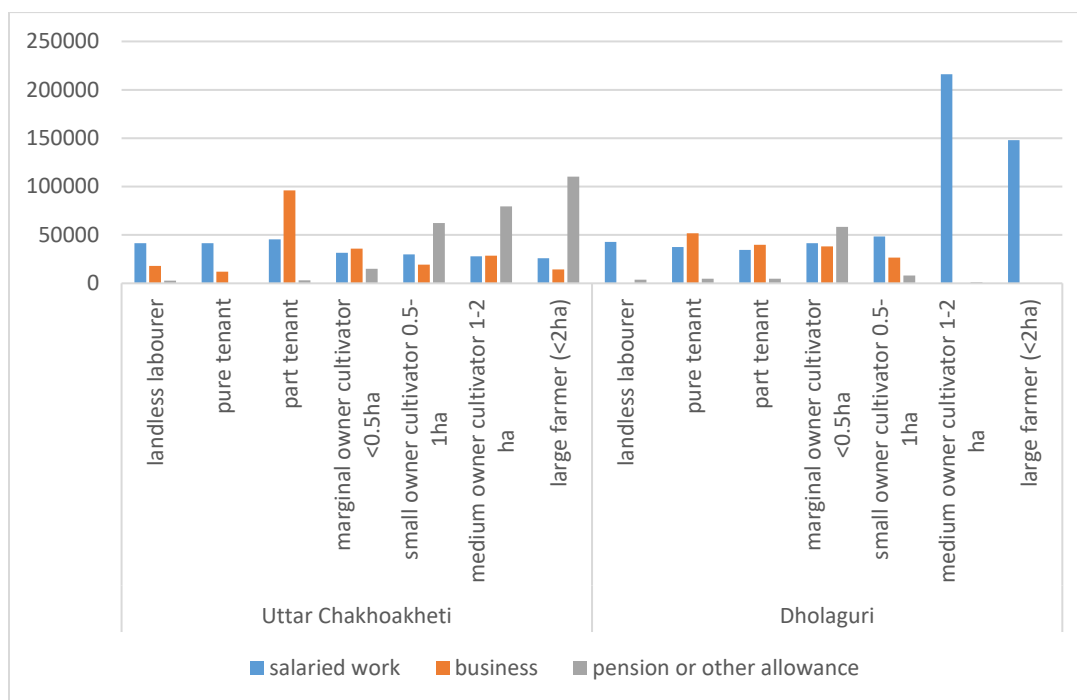


Figure 31: Ownership of cows, oxen and buffalo by farmer category

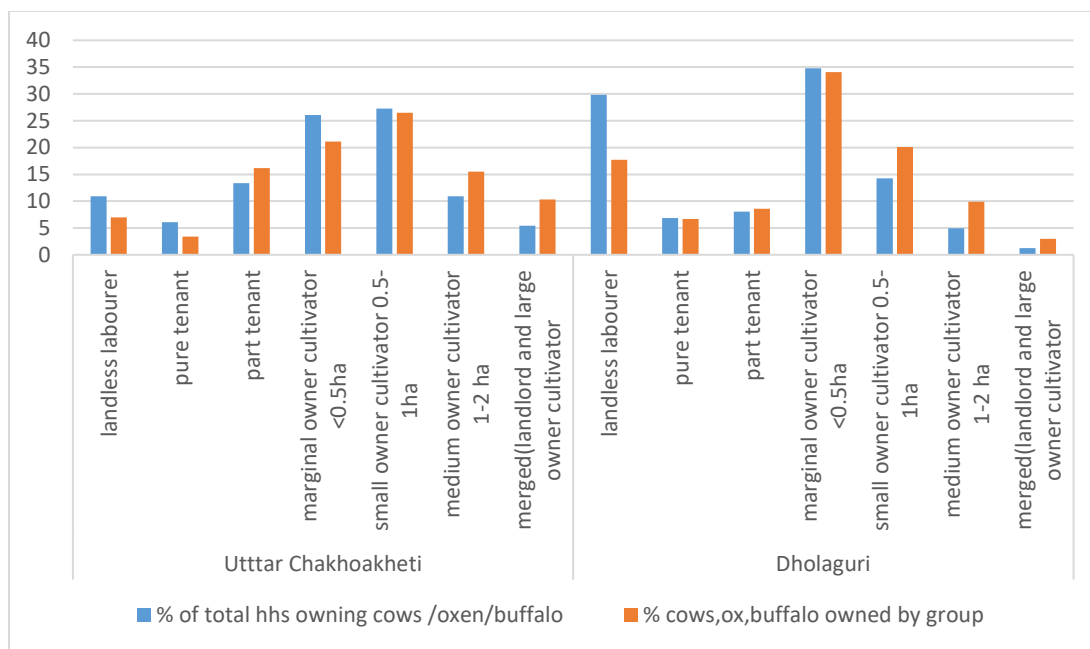


Figure 32: Average Outstanding debt to private lenders: North Bengal

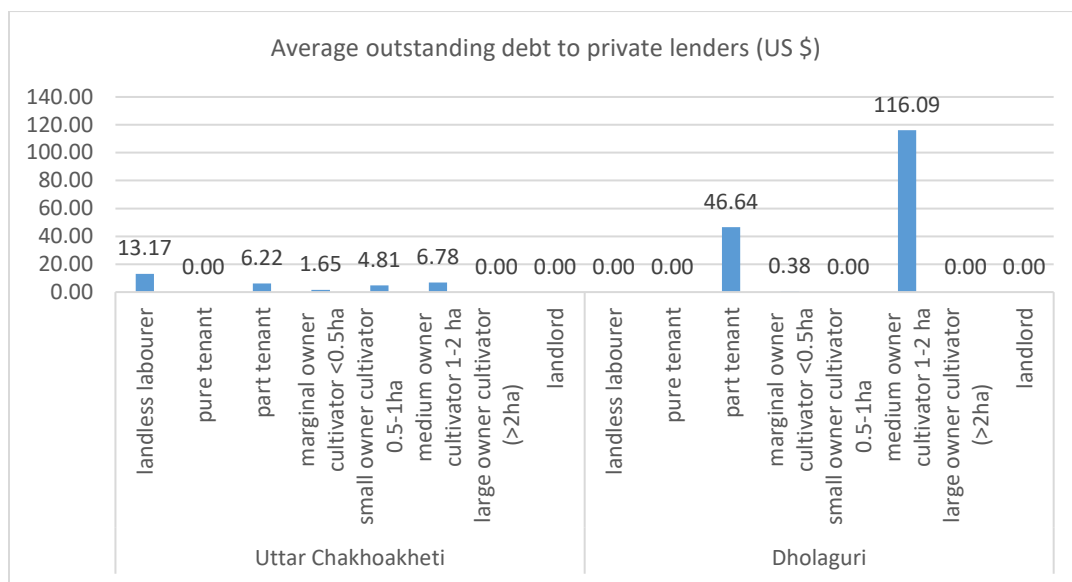
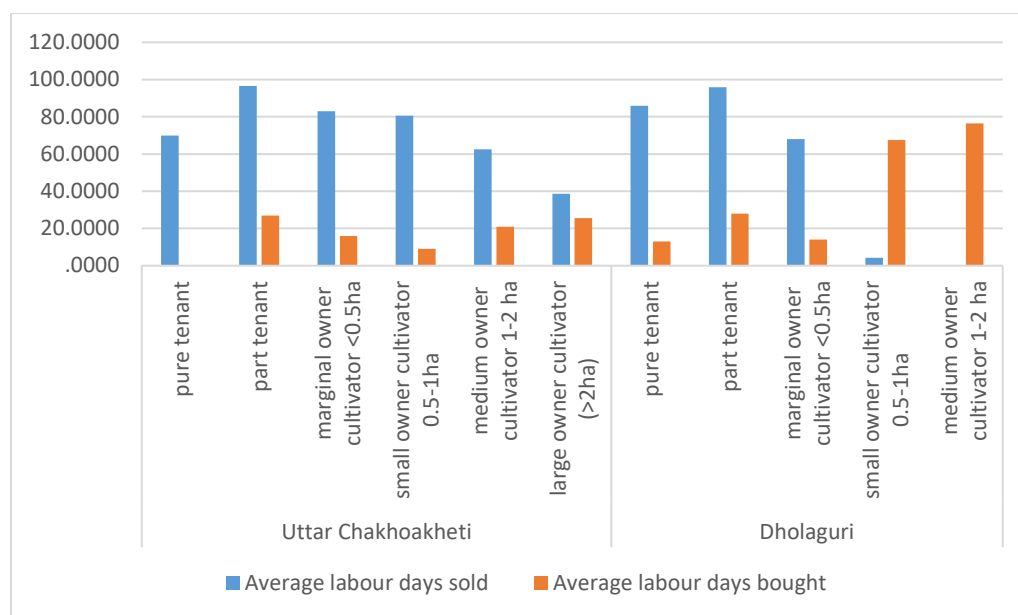


Figure 33: Average labour sold and bought in North Bengal



6. Irrigation and agrarian structure in North Bengal

6.1 Ownership of irrigation equipment in North Bengal

As with Bihar, the ownership of agricultural equipment is more limited for marginal and tenant farmers. Figure 34 for example, shows how in Dholaguri all the large owner cultivators own pump sets, compared to just 12.5% for part tenants and only 3.75% of marginal owner cultivators. However, 34.62% of small owner cultivators own pump sets, and 22.22% of medium owner cultivators. The remainder rent pumping equipment for dry season and occasionally for monsoon cultivation.

In Uttar Chakoakheti, where groundwater irrigation is poorly utilized overall, pump set ownership is very limited across all farmer categories. The distribution of tubewells bears less of a clear relationship to wealth (see Figure 35) and in Uttar Chakoakheti a handful of farmers (varying from 16% to 33%) who own land (part tenants up to medium owner cultivators) are reported to have a tubewell installed on their land. In Dholaguri half the small owner cultivators own tubewells, and few are owned by large and small owner cultivators. It is likely that there is a considerable sharing of tubewells between farmers. While farmers often use their own tubewell or that of a neighbour for minimal cost, if one doesn't own a pumpset, there is a market for renting this equipment, like in Bihar and Nepal. It costs Rs150 per hour for a diesel pump in the case of Dholaguri. In Uttar Chakoakheti by contrast, there is limited evidence of an active pump rental market at all, and many farmers without their own equipment appear to not irrigate the land at all.

Figure 34: ownership of pumpsets by farmer category: North bengal

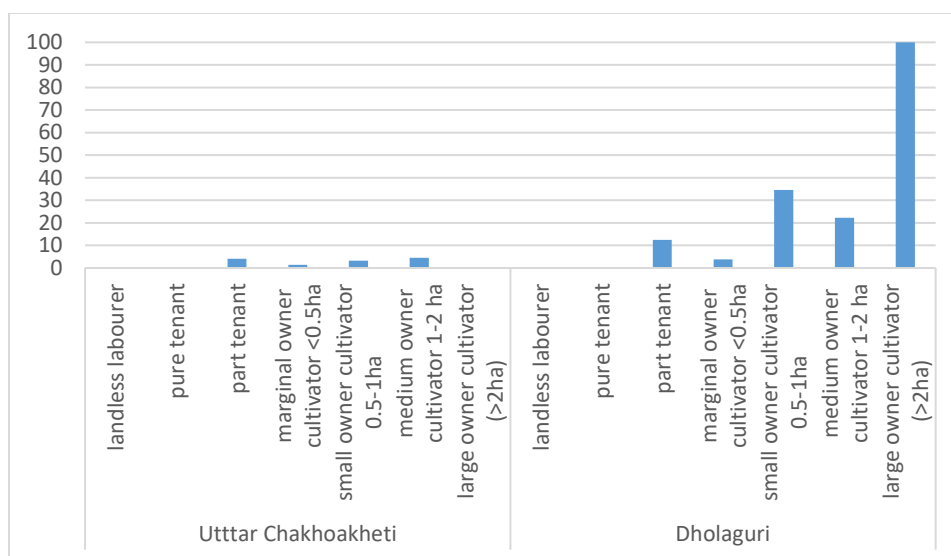
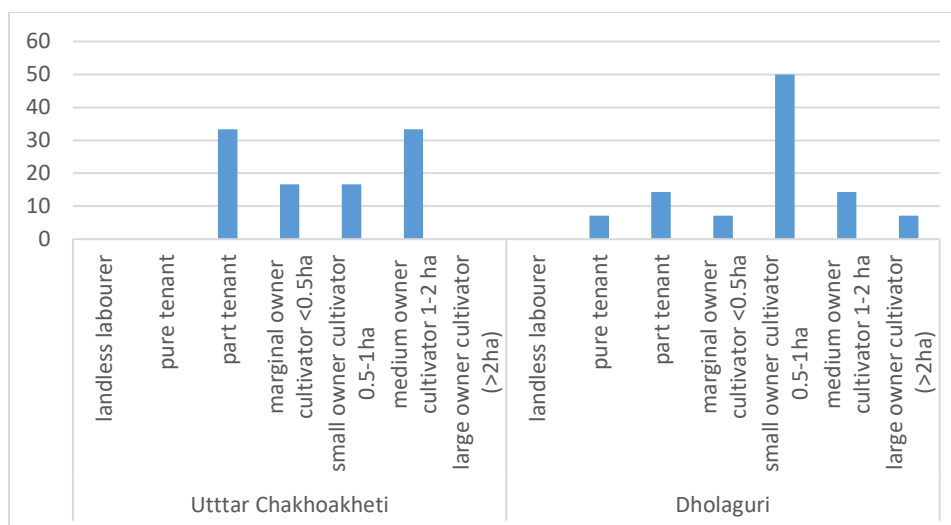


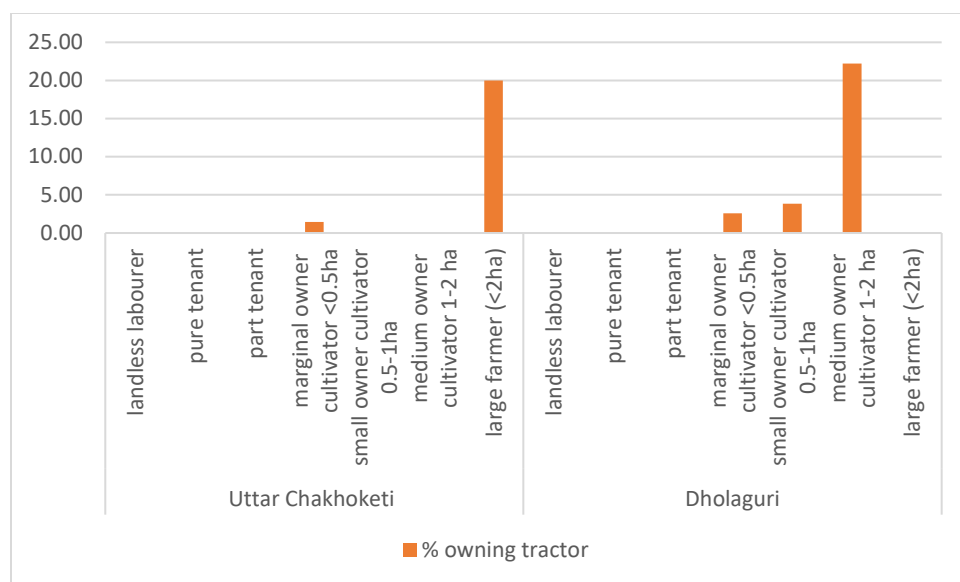
Figure 35: ownership of tubewells by farmer category: North Bengal



6.2 Ownership of other farm equipment in North Bengal

Other farm equipment such as threshers and tractors does appear to predominantly belong to the wealthier farmers (see Figure 36). 20% of large owner cultivators own tractors in Utttar Chakoakheti, with just one other household owning one, and they hail from the marginal owner cultivator class. In Dholaguri it is mostly medium owner cultivators who owned tractors (22.22%). Thresher ownership is limited, with only one thresher owned in each of the two villages. These two threshers are both owned by marginal owner cultivators, but it is likely to represent an investment in equipment, which can then be rented out, rather than being investments for use on one's own land to maximize productivity.

Figure 36: Ownership of tractors by farmer category



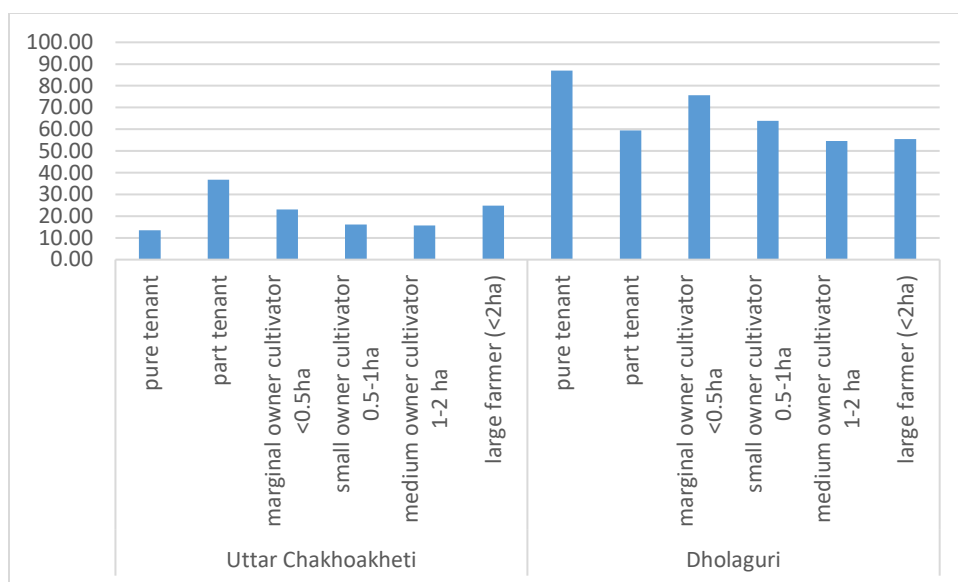
6.3 Irrigation, agrarian structure and productivity

Cropping intensity

While irrigation pump sets are largely concentrated amongst wealthier cultivators, it is again necessary to understand how this affects agricultural yields. In Dholaguri, just over half of the land is cultivated in the winter, with less than 10% of the land cultivated in the summer. In Uttar Chakoakheti, less than 10% of the land is cultivated in both winter and summer (see Figure 2). In terms of the influence of farm size and cropping intensity, there is limited evidence of any relationship. When both winter and summer are taken together for the whole dry season (see

Figure 37). There is no clear relationship between cropping intensity and wealth. While it is low across the board in Uttar Chakoakheti, in Dholaguri the two season cropping intensity for the dry months is above 50% for all farmer categories. It actually appears that dry season cultivation is slightly higher for tenants and marginal owner cultivators, as with Bihar and Nepal.

Figure 37: Dry season aggregated cropping intensity by farmer category



Yields and wealth

As with cropping intensity, it does not appear that larger land holders have higher yields overall. Table 26 suggests some variability in paddy yields per ha between land cultivated by different farmer categories, although what is most apparent is the far higher yields in Dholaguri, which is likely to be due to the greater access to irrigation, which allows farmers to avoid dry spells within the monsoon (see Table 26). It is difficult to compare yields for the winter and summer season, given the diversity of cropping patterns between households – there is not a sufficient number of households cultivating the same crops to draw reliable yields. The exception is potato which is widely cultivated in Dholaguri in the winter. It does appear that yields are lower for tenants and part tenants when compared to marginal and small owner cultivators (see Table 26). However, yields are also low for larger owner cultivators, suggesting they use the land less intensively.

Table 26: Yields per ha of paddy and potato on land farmed by farmer categories

Village	Wealth category of hh who cultivates plot	Aggregate yields of paddy per ha	Average hh yields of paddy per ha	Aggregate yields of potato per ha	Average hh yields of potato per ha
Uttar Chakoakheti	pure tenant	1075.79	1416.29	NA	NA
	part tenant	1307.79	1352.33	NA	NA
	marginal owner cultivator <0.5ha	1368.98	1333.09	NA	NA
	small owner cultivator 0.5-1ha	1223.19	1271.71	NA	NA
	medium owner cultivator 1-2 ha	1125.88	1244.42	NA	NA
	large owner cultivator (>2ha)	1067.34	1204.52	NA	NA
Dholaguri	pure tenant	3569.60	3901.03	21463.71	25357.68
	part tenant	3608.89	3360.01	20940.01	24185.35
	marginal owner cultivator <0.5ha	3485.57	3381.44	18894.50	34909.68
	small owner cultivator 0.5-1ha	3193.82	3059.81	28619.06	36594.58
	medium owner cultivator 1-2 ha	4350.80	2626.80	5047.66	14017.90
	large owner cultivator (>2ha)	1494.77	2834.52	21463.71	22421.52

As in Bihar and Nepal, it is useful to identify whether tubewell and pumpset ownership affects yields, as this was found to be a much stronger predictor of yields. There is only sufficient data regarding paddy to draw firm conclusions. In Dholaguri Table 27 suggests that those with their own pump set yield 3836.57 kg per ha of paddy, as compared to just 3210.31kg for those with no irrigation. Interestingly, those who were renting pumpsets had even lower yields on average at 2790kg per ha. Again, the number of households renting pumps is too low to draw concrete conclusions, but it may be the case that these plots are upland fields which require some irrigation, so are less productive than lower lying rainfed plots, particularly if irrigation applications are insufficient. In Uttar Chakoakheti only one household with their own pump irrigated paddy during the year the survey was completed, so it is not possible to draw conclusions about yields. Nevertheless it is clear that plots using no irrigation have lower yields on average when compared to those irrigated by pumpsets which are rented in. It is clear from both villages that access to irrigation significantly increases paddy yields, but particularly if one has access to their own pump set.

Table 27: Yields per ha of paddy on land irrigated by different source

Village	Irrigation of plot	Average yields per ha
Uttar Chakoakheti	owned pumpset for tubewell/pond	NA
	Rented pumpset for tubewell/pond	1980.57
	No irrigation	1279.96
Dholaguri	owned tubewell and pumpset	3836.57
	rented tubewell and pumpset	2790.23
	none	3210.31

7. Conclusions

It is clear that the project region for DSI4MTF is diverse and complex in terms of the patterns of agriculture and social structures. There are however, striking similarities between the Mithila region which includes the Nepal villages (Saptari) and the Bihar site (Madhubani). Both these regions are characterized by high levels of land inequality, dominance of a small class of landlords, and heavy concentration in the ownership of irrigation equipment. While this is a generally dry area compared to North Bengal, the aquifers of the region are rich, and a shallow tubewell irrigation is widespread, with irrigation also available from ponds and to a lesser extent from canals. However, the level of irrigation is generally associated with one's economic status, and the deeply inequitable social structure grounded in class, class and gender relations has acted as a considerable constraint for the sustainable intensification of agriculture. While marginal and tenant farmers often do go ahead and invest in dry season irrigation as they seek to meet their minimum subsistence needs in the context of a changing climate, the costs and risks entailed are higher. In some cases this can lead to lower yields and cropping intensities, although most importantly the costs of renting tubewells, pump sets and other equipment add to the economic stress on already fragile livelihoods.

This region thus has strong potential for interventions which can encourage lower cost and more efficient pumping technologies and group ownership of equipment, while also addressing land inequality and fragmentation through farmer collectives. The collective leasing model is therefore the preferred system of collectivisation for DSI4MTF.

In West Bengal by contrast, a very different series of challenges are present. This is a higher rainfall region, and rainfed dry season agriculture has more potential in villages such as Dholaguri and Uttar Chakoakheti. However, there is a limited big farmer class or even landlord class. Land reforms in the 1970s mean that most farmers have at least some land, and tenancy often occurs between farmers of a similar economic status as a way of managing land and labour deficits. The lack of a progressive large farmer class at all in villages such as Uttar Chakoakheti mean that there is very limited exposure to new irrigation systems, and even the use of pump sets is rare, with most farmers cultivating a single paddy crop. Even the water market for pumps is limited. In these villages, improving all around access to irrigation is a priority, particularly given that the groundwater is plentiful – not to mention the need to look into cropping patterns which can utilize the residual post monsoon soil water in this high rainfall region. The feasible model of collectivization is however very different, and for this reason DSI4MTF is experimenting with the voluntary consolidation of land amongst small holders, rather than collective leasing.

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