

Agrarian Structure, Stagnation and Growth in Bihar, 1960-2000

अग्रेरियन स्ट्रक्चर, स्टैगनेशन एंड ग्रोथ इन बिहार, 1960-2000

Rakesh Ranjan
राकेश रंजन

Supervisor
Dr. Rohit
डॉ. रोहित

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Centre for Economic Studies and Planning
School of Social Sciences
Jawaharlal Nehru University
New Delhi 110067
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CENTRE FOR ECONOMIC STUDIES & PLANNING
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI- 110 067 (INDIA)

Phone : 91-11-26742575, 26741557,
26742676 Ext. 4421
Direct : 26704421
Fax : 91-11-26741504, 26741586

Dated : 09th December 2022

DECLARATION

This is to certify that this thesis titled "**Agrarian Structure, Stagnation and Growth in Bihar, 1960-2000**" submitted by me in partial fulfilment of the requirement for the award of the degree of Doctor of Philosophy (Ph. D.) of Jawaharlal Nehru University is my original work and it has not been previously submitted, in part or full, for the award of any other degree or diploma of this University or any other university.

Rakesh Ranjan

We recommend that this thesis be placed before the examiners for the evaluation.

Dr. Rohit
Supervisor

Supervisor
CESP, SSS, JNU
NEW DELHI- 110067

Prof. Shakti Kumar
Chairperson

सम्यक / Chairperson
आर्थिक अध्ययन और नियोजन केंद्र
Centre for Economic Studies & Planning
सामाजिक विज्ञान संस्थान / School of Social Sciences
जवाहरलाल नेहरू विश्वविद्यालय / Jawaharlal Nehru University
नई दिल्ली 110037 / New Delhi 110037

Dedicated to
my grandparents Late Sh. Rajeshwar Singh & Late Smt. Indrasani Devi
who lived their lives toiling
and who always had hopes of comforting times

and to
the unflinching perseverance
of those who work to see
Indian villages happy and prosperous

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CHAPTER ONE

Introduction

1.1 Contextualising agricultural growth

The motivation for the present study comes from the importance of agricultural growth in starting and sustaining the process of "modern economic growth", to borrow from the pioneering work of Prof. Simon Kuznets by the same name (Kuznets, 1966). The later experience of many countries, particularly of the underdeveloped and the developing world, has defied the projections contained in his writings. Some of the explanations offered by him to understand the underlying trends have subsequently also been questioned. But his basic premise has established itself as a major departure while studying patterns of economic transformation of countries. Later contributions to the field of Development Economics have enriched the understanding of economic transformation and also given rise to crucial debates. Markets versus planning, import substitution versus export promotion, balanced versus unbalanced growth, and consumer goods industry-centric versus capital goods-centric industrialisation are some of the prominent debates that shaped the evolution of the new sub-discipline of Development Economics.

What is common to all these debates and contributions is the importance of agricultural growth in overall economic transformation. The connections between the agricultural growth on the one hand and the modernisation of the economy as a whole on the other have been visualised differently by different scholars. Some have emphasised the direct contributions of the agricultural sector in the process of economic transformation, and others have visualised indirect channels through which the former plays a role in the process of economic development. Today, it is an indisputable fact that no country has been able to modernise without transforming its agricultural practices and achieving a significant productivity increase. There is rich literature establishing this widely held perception. A range of writings from economic historians have shed light on this process, starting from the pioneering experiences of Britain, the first industrial nation.¹ A case much closer to the Indian

¹ (Deane, 1979), (Mathias, 2001) and (Hobsbawm, 1999) are some of the scholars who have worked on this aspect.

experience, as far as the traditional set-up of agrarian society is concerned, is that of Japan. Japan managed to begin industrialisation without significantly altering its agrarian structure. The only major break from the past, in this case, was the modification and implementation of a new agricultural tax system. Hayami has given a comprehensive overview of Japanese agrarian transformation starting from the Meiji Restoration in 1868 up till the second half of the 20th century (Hayami, 1975). Another perspective is provided by E. Herbert Norman, who details the structural breaks and continuities from the Tokugawa period and the consequent implications for the emerging political economy of Japan (Norman, 2000). In the tumultuous world order of the 1930s and 1940s, the traditional agrarian structure, which largely remained unaltered till the end of the Second World War, remained an obstacle to further growth of Japanese agriculture and, by implication, of her overall economic progress. Even the historical experiences of countries of the "Asian Miracle", i.e. South Korea and Singapore, suggest a similar pattern. Agrarian transformation in both these countries precedes a successful industrialisation drive.

The crucial role of agrarian transformation has been demonstrated by the fact that it remains at the centre of the policy-making of nations starkly different in terms of their social-political set-up. Whether a country follows, generally, a liberal market regime or planning as a strategy for economic development, it makes no difference to the centrality of agrarian transformation. The Soviet Union, a country that followed one of the most centralised methods of economic planning, was forced to acknowledge the limitations of sustainable development without a robust agricultural sector. The policy vacillation of the "New Economic Policy" period (from 1921 to 1927) and the hard constraints that the agricultural performance put on industrial recovery marks the centrality of agrarian transformation.² The

² The problem of the agrarian transformation in Marxist literature was initially postulated in terms of the "Agrarian Question". The origin of the *Question* was political in nature and first formulated by Friedrich Engels in the "The Peasant Question in France and Germany" in 1894 (Marx and Engels, *Selected Works*, Vol. 3, Progress Publishers, Moscow). In the Soviet Union, the role of agricultural transformation in overall economic transformation was located within the framework of the Agrarian Question. The failure to achieve a political balance (maintaining class collaboration that characterized the period of the New Economic Policy) with price stability was perhaps instrumental in the sudden decision to go for the collectivisation drive. The very tight situation regarding the domestic food grain supply was capable of completely derailing the marcoeconomic planning. To protect the planning exercise, it was necessary to ensure the minimum food grain supply from the agricultural sector to non-agricultural work force. Before collectivization, the food grain supply was largely determined by the marketed surplus of rich farmers, *kulaks*. In order to do away with this dependence, collectivisation became the official policy by which the individual and fragmented peasant holdings were brought together, also involving coercive measures, facilitating farming with modern agricultural machinery and other inputs, attempted at reaping large economies of scale. This was supposed to increase the food grain putput substantially. But the most crucial aspect behind this was a mandatory food grain procurement target. The privately managed collective farms, *Kolkhozy*, were required to handover a stipulated quantity of grain output to the authorities after each harvest. The state farms,

polarised debates in the USSR during this period centre on the question of raising surplus from agriculture to meet investment financing for industrial development. The collectivisation drive of post-1927 was to ensure that the agricultural sector met the requirements of the massive industrialisation programme to be undertaken. Thus it has been generally demonstrated that all countries have faced similar challenges of agrarian transformation if they wish to economically modernise and develop their respective economies, irrespective of the political nature of the leadership. Of course, the political nature of the leadership, whether bourgeois liberal, authoritarian, or socialist, profoundly influenced the way this challenge was met (the Agrarian Question is resolved) in different countries. These differences have also profoundly impacted the course of industrialisation and overall economic development. This historical experience, varied yet with a fundamental commonality of crucial aspects in all countries' experiences, constitutes the context of the present study.

1.1.1: The importance of agricultural performance in the process of sustained economic development

One of the central concerns of policy-makers in developing countries after the Second World War, when most of these countries secured political independence from their colonial or semi-colonial status, has been to transform or modernise "backward agriculture" in their respective countries. Although the broader objectives and corresponding understanding of backwardness and the dynamic processes reproducing it over time have been varied, the compulsion to transform their traditional system of agriculture was common to all. This was a compulsion for many reasons, the most important of which was the sheer size of the agricultural sector both in terms of the proportion of the population dependent on it as well as the preponderance of agricultural activity in total economic activities. Increasing productivity in this sector, both of land and labour, became the immediate task of the government. This, in turn, was expected to have a beneficial impact in at least two ways. First, from the supply side perspective, it would generate the much-needed surplus of food, raw materials, financial resources, or labour to be transferred to the newly developing industrial sector that was to become the leading sector. From the demand side perspective, it was expected that the agricultural sector would provide a large domestic market for industrial products. It was

Sovkhozy, were completely managed, and the entire output was procured, by the state. This further highlights the impact that the agricultural sector had over the course of the economic evolution through the availability of marketable surplus of food grains and its prices even under the most centralized planned economy.

thought essential given the emphasis on the strategy of "nationalist" development wherein limitations of earnings from foreign trade were understood to be binding. Therefore, the generation of resources from within the economy was thought to be the only reliable alternative.

1.1.1(a): Studied through inter-sectoral dynamics

There are numerous ways in which scholars in economic theory have outlined the crucial role of the agricultural sector. The most influential has been one explaining this in terms of inter-sectoral dynamics: agriculture and industry interacting in ways that shape the respective country's developmental trajectory. The understanding of the process of this sustained interaction between the two sectors, at least in the initial phases of their economic development, contained many vital aspects. The role of the agriculture sector, accordingly, has taken many forms. It has primarily hinged on four crucial aspects. First, as a supplier of food (wage goods) and necessary raw materials for industries. Second, as a supplier of cheap labour to industries and other associated services. Third, as a creator of economic surplus (financial contribution), that needs to be channelised to industrial investments. And fourth, as constituting a large domestic market for industrial commodities. Different economic theories and models have taken one or more of these aspects as their basis to formalise a dynamic process of transformation. These models have been built to emphasise the role of the agriculture sector as a supplier of one or many of these inputs or as a source of growing demand for increasing industrial supplies. In the process, there have also been attempts to identify the key variables to be examined carefully, the most important being agricultural prices. In the context of a primarily private agricultural sector, the role of price formation and price movement in the economy has been much discussed. Agricultural prices, often in relation to industrial prices, have become the key variable influencing the exchange between the two sectors. The entire "terms of trade" literature testifies to the importance of agricultural prices. In this industry-agriculture interaction, however, the distinction between two types of price formation, namely, 'cost-determined' in the industrial sector and 'demand-determined' in the agricultural sector, has to be acknowledged for a complete understanding of inter-sectoral dynamics.

This aspect has attracted much scholarly attention as the movement of prices has been a key concern of policy-makers for both political and economic reasons. Kalecki (1955) has clearly highlighted the importance of agricultural prices in sustaining the industrialisation

drive. Failure of the agricultural sector to meet the growing food demand emanating from a growing industrial sector would lead to a wage-price spiral, causing industrialisation drive to get caught in the inflationary trap. Rising wage good prices and falling real wages would diminish the demand for industrial goods for mass consumption by workers. Further, if the benefit of increasing food prices does not accrue to the small proprietor peasants but to the small sections of landlords, traders or moneylenders instead, then demand for industrial mass goods would not increase even in the agricultural sector. Therefore, a cautious hand is needed to make sure that the economy and the industrial sector do not get caught in these traps. The government has to ensure that the agricultural sector grows at a sufficiently high rate to meet the wage good demand. Further, it also has to keep an eye on income distribution so that the market for industrial goods for mass consumption does not stagnate/shrink on account of monopoly elements in the agricultural or industrial sector. Land reforms, therefore, constitute a core element in the industrialisation drive.

In cases where planning was adopted as a strategy of economic development and where agricultural prices were not entirely market prices for the reasons mentioned above, this posed an additional challenge, that of devising principles for price regulation. The Indian experience is one such case. Administered prices often pose a challenge to policy-making because they require that such decisions remain compatible with multiple policy goals. As they no longer remain entirely "demand-determined" in the usual sense of the term, they become a mix of cost-determined (from the policy of Minimum Support Prices (MSP)) and demand-determining (to make it affordable to the poor as practised in the Public Distribution System). It is crucial, however, to highlight that the nature of agricultural prices remains "demand-determined", too. This aspect is often brought to the fore by the recurring episodes of inflation, not induced by a rise in the minimum support price but by a demand-supply mismatch. This adds to the complexity of the agriculture-industry interaction far beyond the simple postulates of early developmental writings. In India, for example, major food grain prices have been mainly regulated through Minimum Support Prices (MSP) and Procurement prices. But these prices are a part of a broader set of agricultural price policy goals, that of ensuring food security in the country. Issue prices of the Public Distribution System are another element in the same set. The Indian experience suggests that having a balance between the twin goals of increasing food grain production and ensuring food grain supply to all through a system of regulated prices has been a challenging task. Historically, the failure of policy-makers to acknowledge interconnections between these regulated prices and an

attempt to independently set these prices has either led to the burgeoning of undesired food grain stocks or jeopardised food security of the vulnerable sections of the population.³

1.1.1(b): The role of the state in the above-mentioned process

But the above-mentioned inter-sectoral dynamics were not to follow automatically without any state intervention/regulation mechanism. It was realised that the state had an important role to play in the whole process. Leaving the entire inter-sectoral interaction to the free play of market forces was considered too risky. Several factors that might cause the process to slip away from the anticipated growth path were outlined by policy-makers. Structural reasons like market imperfections or incompleteness of the markets, primarily emanating from a backward agrarian structure, were some concerns that forced them to take recourse to market regulations. Given the socio-political context, for most countries, the distributive concerns were prominent. The "size of the cake" versus "pie in the cake" debate testifies to this powerful concern. But it was realised that besides these endogenous factors, certain 'external' factors could also derail the whole process. Failure of the agricultural sector on account of climatic factors has been one such chronic source of panic among policy-makers.

The sensitive nature of agricultural prices has been a lingering concern, and close monitoring of these prices remains an obsession, even if not entirely unjustified. These factors forced the governments to intervene in the agricultural markets. Over time these interventions grew with a growing economy and its complexity and remained substantial for a long time.

Agricultural prices remained the most critical policy variable in the hands of the government. Historical experiences have also shown that the policy-makers have gone beyond managing the economy through these administered prices alone, often venturing into areas of physical control over the stock of agricultural production, mostly food grain stock. Structural reforms aimed at incentivising investment and for distributive considerations (which, in turn, were necessary for political reasons as well as for a sustained expansion of the home market for industrial commodities) also became essential ingredients. All these measures of state intervention were designed to keep the economy on the desired growth path. The extensive debate around 'planning versus 'markets' was a clear reflection of these pressing concerns. It was not surprising to see that a large number of backward/developing

³ (Rakshit, 2001) presents an analysis of this problem.

countries, including India, chose the path of directly or indirectly *planning* their respective economies.

The preference for planning over market-led growth strategy was well understood and accepted by scholars of wide-ranging perspectives, given the structural and economic realities of a post-colonial economy.⁴ Both economic and political factors shaped the consensus that was arrived in India. It was not considered to be just or prudent to depend on the market for a large vulnerable population on commodities with demand-determined prices. The importance of Kaleckian insights in this respect could not be underestimated. The rapid pace of industrialisation, as targeted by the Indian government, required an adequate food supply.

Further, the ambitious industrial targets could not have been realised if one relied merely on food price regulation. *Increasing* the food supply was necessary. Kalecki's critique of Indian planning was grounded in his understanding that the agricultural sector is at least as important as the industrial sector, even if the target was to achieve a massive industrial base. The failure of Indian planning showed up quickly, which essentially was a failure of the agricultural sector to grow at a sufficiently high rate to sustain the pace of industrial investment, reflecting the importance of Kalecki's insights. Despite this point being made at the beginning of the planning exercise itself, the reluctance of the Indian government to *structurally* reform the agricultural sector perhaps shows a lack of political will to do so. Spiralling inflation emanating from chronic food shortages, lack of sufficient public investment in agriculture and reluctance of those who controlled surplus agricultural income to invest in agriculture for structural reasons ensured that the conditions remain hostile to sustain industrial growth. It was under these conditions that the Indian economic planning was derailed, and the economy entered into a period of long industrial stagnation.⁵ Post-1980, when industrial growth revived, almost every element of the ambitious industrial planning aimed at creating a massive capital good base was discarded. With it, the import-substitution strategy of the initial phase was also discarded, and the economy was taken on a different strategic path.

⁴ There is a vast literature on the theory and experience of Indian Planning. Sukhmoy Ckravarty remains the best among mainstream economists to enunciate the theoretical and pragmatic elements of Indian planning. Chakravarty (1987) is a brief but classic writing on the subject by the most authoritative scholar. Byres (1995) is a collection of alternative perspectives where the failure of Indian planning is judged from a more comprehensive political economy perspective. The latter collection is more mindful of the Kaleckian insights.

⁵ Nayyar (1994) is an important collection of mainstream and alternative perspectives on industrial stagnation in India.

Following the trajectory of Indian planning, particularly its failure, one can clearly identify areas in which such state intervention/regulations were the most crucial. The subsection below notes down some of these areas.

1.1.2: Locating state intervention in the agricultural sector to obtain productivity increase

The vast areas over which governments felt the need to take control reflected the overwhelming urgency to increase land productivity (as labour was abundant, increasing labour productivity was not considered that urgent). The physical-technical aspect of productivity-raising activity was evident. But historical experiences have shown that in the absence of a facilitating socio-economic environment, attempts of such technical improvements may not bear fruit. Therefore, for the policy-makers, the task was clearly laid out. On the one hand, they were supposed to lead a *technological revolution* of sorts as the overwhelming majority of cultivators lacked any means to do the same. On the other hand, the governments were also expected to create an institutional support system with which productivity-raising investments could take place. Thus, there were three fronts on which they had to work.

1.1.2(a): Land reforms

The first was to devise and implement appropriate measures of land reforms aimed at altering the traditional agrarian structure inherited from the colonial past. This would mean that the feudal/semi-feudal relations of the rural economy have to be removed. This removal would, in turn, do away with disincentives working against the interests of a large number of peasants. It involved (i) removing the unproductive, rent-seeking class of absentee intermediaries between the state and the cultivators (abolition of *zamindari* in the Indian context), (ii) regulation and control of rent extracted from the tenant farmers, (iii) providing security of tenure to the tenants, and (iv) consolidations of scattered landholdings.

1.1.2(b): Other institutional reforms

The state had the responsibility of providing other kinds of institutional support like the provision of cheap credit (that in turn required reforms in the banking sector establishing agriculture as a priority sector for lending through commercial banks), subsidised inputs, developing and spreading appropriate agricultural extension services (establishing many agricultural universities and their extension wings were part of this programme), and better

marketing facilities. The latter included state procurement of food grains and establishing state-designated agricultural markets. Developing and financing a system of cooperative societies ranging from credit to marketing societies was also part of the same comprehensive institutional reform. A system of regulated prices was a part of this institutional set-up. Free market prices would undermine many of the stated objectives of these institutional reforms. Therefore, it became imperative for the state to control agricultural prices.

1.1.2(c): Direct investment in agriculture

Increasing land yield levels require a substantial improvement in the physical infrastructure of irrigation and drainage. This would be impossible to ensure if left to private investment by small or marginal farmers. Gradual degradation of this infrastructure in the late colonial period was also noticed, and corrective measures to restore and augment these were considered imperative. Further, improved infrastructure in the form of better transportation, electricity, etc., was also necessary to take full advantage of the newly developed technological potential. For the latter, the state was already investing in agricultural research and development. In all this, it was evident that there was a need for substantially augmenting public investment in agriculture. The complementarity between public and private investment formed a policy basis to opt for a public investment programme.

Given that the result of these reforms and other facilitative steps would have taken some time to make a difference, maintaining stability in the agrarian macro-dynamics in the interim became an inevitable challenge. Historically poor and neglected physical infrastructure meant that the agricultural output would remain at the mercy of weather conditions. Such vagaries of nature would have completely derailed the agricultural growth if the impact of such natural sources of instability were not mitigated if not completely controlled. It is in this context that we see that agricultural prices took centre stage as the key policy variable to continue with these steps. In many cases, such price controls/regulations were accompanied by policies of physical control over agricultural surplus (mainly of major food grains). These controls were essentially aimed at achieving the twin objectives of price stability and food security; the former necessary for the overall sustainability of economic growth in the country and the latter for immediate and lingering reasons of food insecurity.

These steps were basically targeted at altering the agrarian structure in such a way that a large number of peasants would start taking advantage of newly emerging opportunities to produce more and more marketable surplus by undertaking investment. These opportunities

were essentially mediated through markets, though not wholly free of state regulations. Yet, it was understood that the above-mentioned measures would not necessarily bring about the desired changes. The success of these measures required specific conjunctures located within and outside the agrarian economy. To what extent these countries, where the agrarian structure has taken centre-stage in their post-colonial developmental thinking, have fared well regarding increasing land and labour productivity itself is a matter of investigation, and only a comprehensive study of the dynamics of the agrarian economy in the context of a highly differentiated peasantry, imperfect and/or incomplete markets, particular ways of state intervention, and other conjunctures modifying the usual course of events can do justice to this investigation. A concrete understanding of the successes and failures in their entirety will provide valuable lessons.

1.2 The case of Bihar

The case of Bihar remains a challenge, interesting but complex. The irony remains that despite its immense geographical size and vast population, it has been deprived of the attention that it deserves both by policy-makers and scholars in the "mainstream". Except possibly for pejorative references of being a BIMARU state thanks to the mainstream typification, Bihar has received inadequate attention from successive central governments. It was left to a dedicated lot of alternative scholars to explore the roots of its *stagnation* or its potential for growth.⁶ It is indeed perplexing to see that the political importance of the state has not translated into any serious effort to achieve economic transformation. Perhaps, this aspect is important to factor in to analyse the present status of backwardness of the state. To that extent, it requires locating the current state of backwardness in its proper, even if brief, historical perspective.

1.2.1: Nature of backwardness in a historical perspective

Bihar, as part of the Gangetic basin, has been agriculturally productive since ancient times. The history of the region in the last two and a half thousand years shows that it has witnessed

⁶ A. N. Sharma and Shaibal Gupta have produced a handy compilation of writings of immense importance regarding the growth potential of Bihar located in its diverse social setting (Sharma & Gupta, 1987). Contributors to this volume have enriched the understanding of the backwardness of Bihar's economy in its proper perspective. D. M. Diwakar's edited volume also contains many valuable writings about Bihar (Diwakar, 1994, 2000). These are not the only works produced by dedicated authors. There are many who, through their writings, have contributed immensely to our understanding of Bihar despite remaining marginal to the scholarly discourse.

the rise and fall of great empires. The backbone of all such political powers of the ancient and medieval eras has been agricultural prosperity. The region had also experienced significant growth in trade during the Mughal period. But with the Battle of Plassey in 1757 and the Battle of Buxar in 1764, the region fell into the hands of the British East India Company, which quickly built upon this victory to colonise other parts of the country. The subsequent pattern of economic development, or rather lack of it, demonstrates a peculiar transformation. One source of this transformation lies in an attempt by the British to establish a stable and secure source of revenue that became and remained the largest source for the colonial government. The motivation for this was not purely economic as there were political factors too, mainly of maintaining the political subjugation of a revenue-generating population in the Gangetic plain. These political and economic factors eventually ensured that the agrarian society of the whole country was transformed in a manner that suited the system of surplus extraction for the benefit of the British Empire.

This process, however, has both elements of continuity and elements of change from the past. We cannot fully comprehend the transformation by overemphasising either elements of continuity at the cost of elements of change or vice versa. The variations in the system of land revenue collection instituted in different parts of the country testify to the fact that the process was neither smooth nor static. Historians have discussed and debated the reasons for these variations and have come to different conclusions, but there is a consensus that historical specificities of different regions and British interests (primarily to maximise land revenue without causing much social-political unrest) together shaped the evolution of land revenue system of colonial India.⁷

Three different forms of land revenue assessment and collection came to exist in colonial India. Eastern India (Bengal Presidency, of which Bihar was a part) was largely under the system of *Permanent Settlement*. Under this arrangement, the land revenue was settled with the landlord, who either had acquired or inherited the right to collect land revenue from the estate under the crumbling Mughal empire or under the kingdoms independent from the Mughal empire. The British East India Company (EIC) fixed a monetary sum, in perpetuity, on all such estates as land revenue (hence the term *Permanent Settlement*). The management of the estate, including rent extraction from the tenant peasants, was left to the estate holder (the *Zamindar*). A failure to pay the settled amount would lead to

⁷ There is a rich collection of writings on this topic. Some notable are (Kumar, 1982), (Tomlinson, 1998) and (Habib, 2013). A recent addition is a textbook by (Banerjee-Dube, 2015).

stripping the landlord from holding and managing the estate and auctioning the estate to someone else who could pay the same or higher amount. This directly turned such estates into commercial entities trying to maximise 'profit' from estate holding (a *property* that can be owned, inherited and disposed of) under a newly emerging market for landed estates. As there were no rental regulations or agreements, formal or informal, it invariably led to a proliferation of rack-renting in all such regions. Not only did the *zamindari* system ultimately become the most monstrous when it came to exploiting peasantry and the most unproductive system with leadership vested with absentee landlords who were least interested in productive efforts, the increased commercialisation only deepened these tendencies.

Southern and western India under Madras and Bombay Presidency got settled under the *Ryotwari system*. Under this system, individual cultivators who could prove their occupancy status under the then-existing revenue system were recognised as *occupancy ryots*. They were required to pay a fixed monetary sum every year to the EIC. As many actual tillers of land could not prove their occupancy, they continued tilling the land but with a subordinated legal status. They became the tenants of the *landlord* with whom the land revenue was settled. As in the *zamindari* system, the land relations between the landlords and the tenants were left unregulated. Over time, therefore, these regions under the *ryotwari* system also became similar to the *zamindari* system in terms of land relations. These regions also saw the growth of impoverished peasantry reeling under rack-renting.

The North-Western Provinces, United Provinces and most of the Central Provinces came under the *Mahalwari system*. Under this system, the land revenue was settled with a *Mahal*, the village community, with an understanding that the land belongs to the community. Payment of land revenue became the collective responsibility of the cultivators with land rights, the erstwhile *taluqdars*, and resident peasants whose rental obligation had to be fixed and placed on record. There would usually be a person, head of the community (often called *lambardar* even today), who would be responsible for collecting and paying revenue on behalf of the community. As it was a mix of *ryotwari* and *zamindari* systems, demanding a much more complicated system of land surveys. This, coupled with an arbitrary and high revenue demand, made it an unviable system. Under the pressure of the 1828 agricultural depression, the colonial administration was forced to revise it thoroughly, making it a more flexible system (Banerjee-Dube, 2015, pp 107-08). Initially, tillers of the land without proprietary land rights could exist under this system also, but over time, the extent of tenancy

of this kind was much limited under the *mahalwari* system in comparison with the other two types of land revenue settlement systems.

These systems of land revenue collection were not only more systematic than the erstwhile political dispensations but were instrumental in bringing entirely new dimensions to the agrarian life of the Indian populace. First, with definite quantitative measures of land and output, the land revenue administration tried to take control of the revenue transfer process in a far more comprehensive way than anything in the past. Second, fixed responsibilities of collection and payment of land revenue on definite bodies, individuals (in case of Permanent settlement and Ryotwari system) or communities (in case of Mahalwari system), brought the most significant change in the land relations of the country, that is, the land now essentially became a marketable commodity. Failure to pay the revenue resulted in auctioning of the landed *property*, making it transferable between private entities. This had a far-reaching impact of dismantling old communitarian ties between the peasants and non-resident members of upper classes of nobility (different types of lords or overlords) and between the members of the village community.⁸ Third, the monetisation of land revenue ushered in a *generalised* process of commercialising agrarian life that was hitherto unseen.

The combined impact of all these changes shaped the future evolution of agrarian India. Bihar, as a part of the Bengal Presidency, was tremendously influenced by these structural shifts. The system of Permanent Settlement ultimately evolved into a system of uncontrolled proliferation of intermediaries between the land revenue administration and the actual tiller of the land. This vastly augmented the rent burden for actual tillers without benefitting the agrarian system in terms of productive investment. At the bottom, it rid the peasantry of any means to invest in cultivation productively and at the top, it rid the surplus appropriating classes of any incentive to invest in productive investment. This also meant that the expanded network of market exchanges came without channelling surplus into productive agrarian accumulation.

The initial objective of land revenue maximisation fulfilled the mercantile interests of the East India Company by providing a sizeable financial surplus for investment in mercantile operations across the globe, including the slave trade. But, with a gradual political

⁸ This does not mean that the old agrarian system was harmonious and without conflicts between the superior and subordinated classes. The new land revenue system changed the nature of class conflicts, simultaneously expanding the scope and intensity of conflicts, as the numerous peasant rebellions of the late nineteenth and early twentieth centuries show.

shift in the home country, that is, with the growing influence of the industrial capitalists in Britain on matters of state policy regarding colonies and foreign trade, the dynamics of surplus appropriation in India also underwent a structural shift. This added an entirely new dimension to the evolution of the Indian economy. With mercantile interests giving way to the industrial interests of the home country, the colonial government in India deliberately pushed trade and tariff policies that eventually destroyed the flourishing handicraft industry in India. Bihar was also affected by this. Bagchi (1976) has recounted the extent of loss of handicraft production in the Gangetic plains of Bihar.

It is in this context of twin deprivation during the colonial rule - of investible resources in agriculture and of the native industry - that we have to locate the historical backwardness of contemporary Bihar. The new agrarian system, far more comprehensively integrated into the network of world commerce, instead of bringing increased prosperity, divested agriculture of investible resources. The fixity of land revenue could not bring economic incentive to the cultivators as it did in some other cases, for example, Japan in its early phase of economic growth during the Meiji period. There the new land tax system was accompanied by the state's decisive role in promoting new scientific methods and investment. In contrast, the *zamindari* system allowed and intensified rack-renting with a proliferation of intermediaries extracting and living off land rent. There was no control over this proliferation, and the colonial government left the control of land rent entirely in the hands of the parasitic class of *zamindars*. In fact, the situation in Bihar was somewhat similar to the late Meiji, Taisho or Showa period before the First World War, when the agrarian situation in Japan also turned parasitic. The landlords during this period, instead of relying on productivity growth for their income, started relying on their privilege and exercised their pressure to manipulate the government's policies aiming at increasing incomes- not through productivity growth but through continuously pushing rice prices up. This resulted in a prolonged agrarian stagnation in Japan during this period that continued till 1945. Similar elements of parasitic control and disposal of agrarian surplus continued through the entire colonial period in Bihar. A potential that could have been created with the fixing of land revenue was completely destroyed by letting feudal/semi-feudal relations dominate the agrarian life. A large agricultural surplus was extracted by the social elite and disposed of in unproductive ways. Given the *permanent* nature of land revenue settlement, the colonial government remained disinclined to intervene. This does not mean that old landlordism remained intact. There is considerable evidence to suggest that there was an entry of *new elites* into the folds of the *zamindars*. Chaudhuri

(1982b) meticulously notes examples from Bihar showing the pattern of new landholding estates.

Despite the retention of old agrarian relations, Bihar also entered the vast network of colonial trade and commerce. The penetration of commerce into the everyday life of the Bihar peasantry became increasingly deeper and stronger. The nineteenth century witnessed the increasing importance of the cultivation of cash crops. Indigo, jute and mesta, hemp, opium, etc., started appearing in the production basket of the state of Bihar in unprecedented proportions. In normal circumstances, such developments would be seen as a reflection of a healthy trend of agricultural diversification with growing industrialisation. But during the nineteenth and early twentieth centuries, the primary stimulus for this "diversification" came from channels of colonial trade and commerce. Demand for jute came mainly from the burgeoning trade volumes of British manufacturing (and later of continental Europe and the United States). The benefits of increasing demand for jute, however, were not accruing to the peasants involved in the cultivation of the crop. It was primarily appropriated by the landlords, or moneylenders, and often both. With trade under the complete control of the British companies, the surplus generated through jute cultivation was transferred to mercantile activities to expand colonial cropping patterns further. The British domination of the jute industry only deepened the dependence of domestic networks of trade on the British capital, with surplus expropriated for the expansion of the latter (Sethia, T., 1996).

In the case of indigo cultivation, the role of the British capital was far more direct and its consequences far more devastating, both ecologically and economically, for the Bihar peasantry. East India Company officials directly took control of its cultivation, often forcing the cultivators to switch to indigo plantations substituting food crops. This was done to fulfil the demand of the rapidly expanding dye industry in Britain- an industry whose fortunes were closely related to the cotton textile industry of Manchester. The abject conditions of indigo cultivators were reflected in many *indigo revolts* that dotted the Eastern Indian agrarian landscape during this period.

Bihar was one of the important regions for opium cultivation during the eighteenth and nineteenth centuries.⁹ The underlying dynamics of opium cultivation were mainly determined through two factors - firstly, the determination of the area under opium cultivation

⁹ The latter part of the nineteenth century witnessed the Malwa region in North-western India emerging as a competitor to the Eastern region, including Bihar.

and prices by the colonial government and, secondly, the integration of opium cultivation in the infamous "triangular trade pattern" involving India, China and Britain. Illicit domestic trading of opium modified the above dynamics to some extent. In this triangular relationship, Britain sought to finance her trade deficit vis a vis China (mainly on account of the import of tea from China) by using the trade surplus of India vis a vis China (opium was the most important commodity in this trade surplus). Strict government control over opium cultivation and trade became necessary for this peculiar arrangement in the British balance of payments. Cash advances made to opium growers by the government incentivised it to a certain extent. This was also different from the case of indigo, where the degree of coercion to enforce its cultivation was far more significant. However, the use of force was not entirely absent from opium cultivation. The government exercised control over output mainly through prices at which it purchased opium from the growers. The control over its trade was through a government monopoly.¹⁰

These are some of the illustrative examples of how despite the growing commercialisation of Bihar agriculture and diversification of agricultural output, it still lacked either the necessary economic resources to invest back in agriculture or the incentive to do the same. This is not to say that Bihar agriculture remained stagnant in an absolute sense. Chaudhury (1982b) notes that there is some evidence of agricultural expansion after the first two decades of Permanent Settlement. But this expansion was modest, mostly arising out of area expansion, and did not involve any improvement in the economic condition of the actual cultivators.

The expansion of commercial agriculture did not create a favourable environment for sustained productivity growth. Bhattacharya (1982) and Chaudhury (1982b) both record emergence and expansion of cash crops in Bihar from the beginning of the nineteenth century. But both conclude that the integration of Bihar agriculture in the worldwide network of trade in agricultural commodities and complete domination and control of international trade by the British capital effectively divested local agriculturists of any surplus for productive accumulation. In the same essay, Bhattacharya further notes that Indian capital could survive mostly in the mercantile channels as a strictly subordinated entity. He cites some evidence to suggest that the destruction of the traditional industry also ensured that the

¹⁰ The importance of this item can be gauged from the fact that the colonial government made every effort to maximise its exports to China, despite the ban on opium trading in China.

agrarian surplus was diverted to mercantile and other non-productive domains. The extent of this could be gauged from the following observation made by him:

"The decline of export industries in the first half of the nineteenth century restricted opportunities further. Indian capital was perforce confined mainly to internal trade and unorganised banking, servicing petty commodity production in agriculture and artisanal industry.

...It has been pointed out that according to Buchanan-Hamilton's 1809-13 survey in Patna-Gaya, Bhagalpur, Purnea and Shahabad the percentage of industrial to total population, at a conservative estimate, would be about 18.6; the corresponding figure for that region in 1901, after adjustments to establish comparability of census data was 8.5 per cent... The biggest component in this decline in proportion of population dependent on secondary industry, was the number of people dependent on cotton spinning and weaving; the proportion of that population to total industrial population fell from 62.3 per cent in 1809-13, to 15.1 per cent in 1901."(Bhattacharya, 1982, p. 290).¹¹

Overall, it appears that the pattern of revenue settlement under British rule had a lasting impact on the emerging dynamics of Bihar agriculture. The revenue was extracted ruthlessly, even in the backdrop of crop failures and famines. It also led to the growth of intermediaries intensifying the rent burden on the peasantry. Even the penetration and expansion of commercial cropping did not have a positive impact on productivity growth. The surplus with the peasantry was, at best, meagre. The overwhelming profit in the commercial system ended up in the hands of the merchants and the colonial government. This left the peasants under endless duress.

The fortunes, or rather misfortunes, of Bihar agriculture during the colonial rule were tied with the vagaries of the international trade on the one hand and revenue demands by the colonial government on the other. Even when the revenue demand declined by the late nineteenth and twentieth century in real terms, the wretchedness of the Bihar peasantry remained intact. The ups and downs of international trade- itself a result of the instability of the capitalist world order in general but of British industries in particular- were reflected in the instability of prices of commercial crops as well as the price of land. Rental extraction remained a favoured and frequently deployed method to rob the peasantry of any potential gains arising from the favourable movement of prices. There are numerous instances to show

¹¹ The estimates of this decline are quoted from Bagchi (1976).

that the landlords switched between sharecropping, fixed produce rent and fixed cash rent as would benefit them when prices fluctuated sharply (Chaudhuri, 1982b).

Bihar, as a result, inherited a ravaged agriculture from colonial rule. By the late colonial period, agricultural infrastructure in the state witnessed further neglect and decline. On the eve of independence, Bihar presented a picture of a stagnating agrarian economy, a mass of the impoverished peasantry, a rural elite disinterested in productive investment with rent and usury as their preferred method of extracting surplus and a shattered agricultural infrastructure. The vacillating rural elite dominated the political leadership and remained an added challenge for turning the wheel towards sustained prosperity.¹²

1.2.2: Characteristics of backwardness

How do we look at and judge the backwardness of Bihar? The present sub-section tries to present a broad picture that will have a bearing on the developmental status of the state. Starting with the crude yet powerful parameter, we can see that the state net domestic product per capita in Bihar is the lowest among Indian states at just Rs. 31,017 (at constant prices) in 2020-21.¹³ This is about one-third of the national average of Rs. 86,659 (Provisional estimate of net national income for the same year as given in the *Economic Survey 2021-22*, Statistical Appendix, p. 3). The very low level of per capita income has also been associated with a very high degree of regional disparity within the state. If we look at the district-wise variation in per capita incomes, the disparity has not only been staggering, but it does not show any sign of decline. If we measure this disparity by taking the per capita income level of the lowest income district as a percentage of the highest per capita income district, then between 2007-08 and 2011-12, it has declined from 12.75 per cent to 11.25 per cent, showing a slight increase in disparity.¹⁴

A look at the labour force and its employment status also reveals that the labour force participation rate and the worker population ratio both are lower than the all-India average (Table 1.1). Consequently, the unemployment rate in the state is also much higher at 6.8 and 9.0 per cent, respectively, for rural and urban areas in 2017-18. This also has a very strong

¹² Jannuzi (1974) meticulously notes the reluctance of the political leadership to reform the agrarian structure. The delayed abolition of *zamindari* and almost absence of other elements of land reforms robbed Bihar agriculture of any real opportunity to take the lead in modernisation and productivity growth.

¹³ Source: *Handbook of Statistics on Indian States, 2020-21*, Reserve Bank of India, page 40.

¹⁴ Calculated from Table A 1.6 (Government of Bihar, 2020), page 19. In the absence of direct data on income levels, the per capita gross district domestic product at constant prices has been used as a proxy to measure disparity.

gender bias. The labour force participation rate for females in the state is less than one-sixth of the all-India rate in the rural area and less than one-third in the urban areas. The same extent of under-participation of women can be seen in the worker population ratio. The lower female unemployment rate is a direct result of the absence of women from the potential and actual workforce.

Table 1.1: Labour Force Participation Rate (LFPR), Worker Population Ratio (WPR) and Unemployment Rate in Bihar and India (2017-18)

	Rural			Urban		
	Male	Female	Persons	Male	Female	Persons
LFPR, Bihar	68.8	3.9	38.2	66.5	6.4	38.2
LFPR, India	76.4	24.6	50.7	74.5	20.4	47.6
WPR, Bihar	64.0	3.8	35.6	60.3	6.0	34.6
WPR, India	72.0	23.7	48.1	69.3	18.2	43.9
Unemployment rate, Bihar	7.0	2.3	6.8	9.3	6.2	9.0
Unemployment rate, India	5.7	3.8	5.3	6.9	10.8	7.7

Source: Periodic Labour Force Survey (MoSPI) NSO, 2018, cited from *Bihar Economic Survey, 2019-2020*, pp. 168-170.

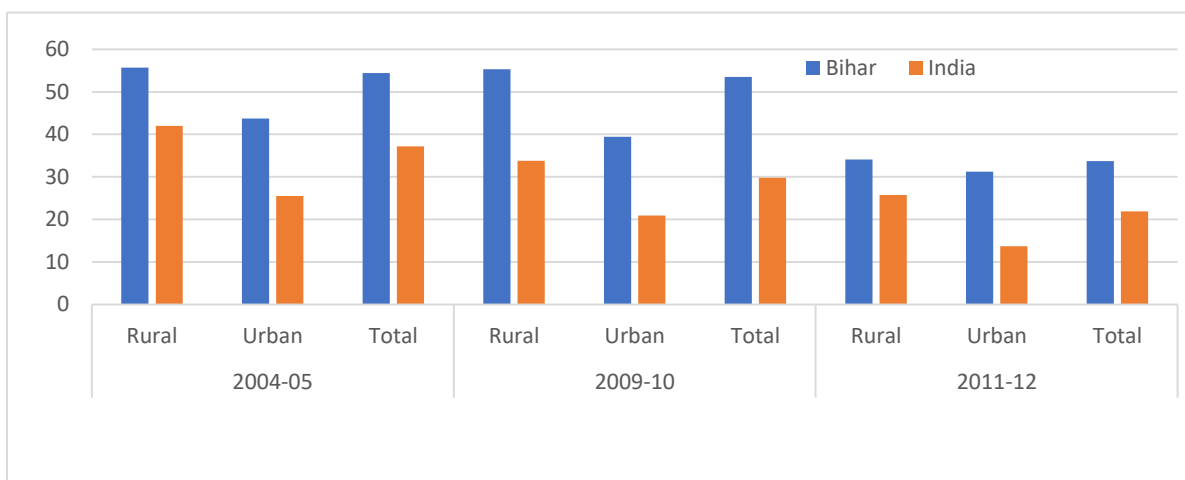


Figure 1.1: Poverty Head Count Ratio in Bihar and India

Source: Author's own representation

As a result, there has been no respite from staggering poverty which has consistently been above fifty per cent. In 2009-10, 53.50 per cent of the state's population was below the poverty line against the Indian average of 29.80 per cent.¹⁵ Figure 1.1 shows that poverty, registering an increase during the second half of the first decade of this century, declined afterwards. But it still remains higher than the 2004-05 level. It is also visible that this

¹⁵ Source: National Sample Survey Organisation, NITI Aayog. Figure 1.1 sourced from NITI Aayog cited from *Agricultural Statistics at a Glance, 2019*.

decline, seen after 2009-10, is entirely because of a significant reduction in rural poverty as the urban poverty ratio in relation to India has increased further. This decline in rural poverty, if sustained, shows improvement in the income of the rural population, an overwhelming majority of which are peasants.¹⁶ This also requires that we look at the trends in agricultural income. Performance of crop production will show us whether there is a commensurate increase that matches with a decline in rural poverty.¹⁷

Bihar's lack of economic dynamism is most prominently displayed by its abysmal record in industrial activity. If we look at the share of the secondary sector in the state's total income, it stood at a mere 3.8 per cent during the triennia 2003-06. Even the subsequent increase in this share to about 20 per cent remains vacuous as it was not a result of manufacturing which has remained very low, currently hovering around a mere 8 per cent (Table 1.2). It is distressing to see that the share of the secondary sector has been effectively stagnating for the last six years.

Table 1.2: Sectoral Composition of GSDVA in Bihar at Constant (2011-12) Prices

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18 (P)	2018-19 (Q)
Agriculture, forestry and fishing	27.0	22.8	22.0	21.2	21.6	21.0	19.3
Of which crop production	18.9	14.2	13.1	12.3	12.7	12.1	10.6
Secondary sector	15.6	19.3	20.9	19.7	20.6	19.7	19.1
Of which manufacturing	3.9	7.2	9.6	8.2	9.4	8.7	8.2
Services	57.2	57.3	56.9	58.5	57.3	59.0	61.2

Source: Directorate of Economics and Statistics, GoB, cited from *Economic Survey of Bihar, 2020*.
Note: (P): Provisional Estimates (Q): Quick Estimates.

If we look at the workforce distribution across different sectors of the state, it shows that 45.1 per cent of the total workers are engaged in the agricultural sector. 25.3 per cent are working in the secondary sector, of which only 8.9 per cent are part of the manufacturing segment. The largest segment within the secondary sector is the construction segment, where 16.3 per cent of the state's total workforce is engaged. 29.5 per cent of total workers rely on

¹⁶ This may also be a result of remittances as suggested by many studies, including (Datta et al., 2014).

¹⁷ The income from livestock rearing can be another important source of farm income. But given the small scale of the livestock rearing, income from crop production will remain the most significant influence on farm income.

the services sector for their livelihood (Government of Bihar, 2020, p. 173, *Table 5.6*). This makes the agricultural sector's relative labour productivity (defined as the percentage share of the concerned sector in the value-added divided by its share in the workforce) very low. Interestingly, the relative labour productivity of the secondary and manufacturing sectors is also less than 1. The extremely low level of labour productivity suggests that the core of underdevelopment may be located in the backward agricultural sector.

The state of the infrastructural network also remains a laggard in Bihar. However, in the last two decades, the road network density has improved. Between 2003 and 2017, the length of existing roads per thousand square kilometres increased from 84 kilometres to 223 kilometres, which is better than the national average. But when compared to its vast population, it is dwarfed as the road network density measured in terms of length of roads per lakh of the population has remained at less than half of the all-India average even after doubling between 2003 and 2017.¹⁸ Despite the vast geographical area and its population, Bihar's share in expenditure on national highway development has increased from a meagre 1.18 per cent in 2010-11 to 3.07 per cent in 2017-18.¹⁹ When comparing the national highways and state highways network expansion, it appears that between the two, most of the recent growth in road density has been accounted for by the former, with the state highway density registering modest growth.²⁰ The poverty of transportation is also reflected in the number of registered vehicles per lakh population which is at just five and is the lowest among all Indian states.²¹ Even the apparently more accessible mode of communication via telephones seems poorer in the state. Its teledensity is 60 per hundred of the population against the all-India average of 90 in the year 2019.²² Despite more than doubling the per capita electricity consumption between 2012-13 and 2018-19, Bihar remains a chronic deficit state. Its deficit as a percentage of its requirement has remained close to 9 per cent.²³

The state performs poorly on developmental parameters as a result of (but not necessarily exclusively because of it) the above-mentioned macro variables. The literacy rate is the lowest among Indian states at 61.8 per cent, against the Indian average of 73 per cent in

¹⁸ *Op. cit.*, Table 6.3, page 203.

¹⁹ *Op. cit.*, Table 6.7, page 210.

²⁰ *Op. cit.*, Tables 6.5 and 6.9.

²¹ *Op. cit.*, page 225.

²² *Op. cit.*, page 239.

²³ *Op. cit.*, page 250.

2011.²⁴ The gross enrolment ratio in the year 2017-18 at the senior secondary level stands at just 31.5 per cent against the average of 56.5 per cent in India. The state of higher education remains dismal, with a gross enrolment ratio of 13.6 per cent in 2018-19. On health parameters, it remains poor, particularly in infant mortality rate, under-5 mortality rate, and neonatal mortality rate. On these parameters, it is much lower than the national average.²⁵ It is primarily a result of the highly neglected state of health infrastructure in Bihar. Between 2012 and 2017, the number of health centres (all types combined) per ten thousand was one, and there was a marginal decline from 1.09 to 0.99.²⁶ With a projected population growth rate of more than 1.5 per cent per annum, these health facilities, already strained beyond their capacity, will possibly crumble under extreme duress unless a massive drive to expand them is undertaken.

As a result of these abysmal state of health and educational standards, the state fares poorly on the human development index. A recent paper has demonstrated that the historical record of Bihar in terms of its Human Development Index (HDI) has remained dismal. Out of the 28 Indian states studied, its rank has remained bracketed in the last 2nd or 3rd position between 1983 and 2010-11 (Mukherjee et al, 2014, p. 15). The poor performance of Bihar in terms of HDI in 2011 was largely on account of its extremely low levels of per capita income and educational standards. On the parameter of health, the UNDP report places it above many large states, including Rajasthan, Uttar Pradesh and Madhya Pradesh (UNDP 2011, pp. 18-21). Further, in terms of HDI, its rank is second-lowest among the 19 major states of India. But when inequality-adjusted HDI is considered, it fares better, even if only slightly, as its rank rises slightly to 16. It indicates that the reach of developmental parameters as incorporated by the HDI is relatively equally distributed in Bihar, or more correctly, one may say that the lack of development is relatively equally spread in the state of Bihar.²⁷

Bihar is one of the least urbanised states, with the overwhelming majority residing in its villages and drawing their income from agriculture. Only 11.3 per cent of its population lived in urban areas in 2011, as against 31.2 per cent for India as a whole. The state of agricultural backwardness would determine its overall backwardness, given that more than 45

²⁴ Source: Office of the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India.

²⁵ Government of Bihar (2020, p. 361).

²⁶ Government of Bihar (2020, p. 364).

²⁷ Bihar loses about 32 per cent of the value of its HDI score on account of inequality, which is roughly equal to the percentage loss of the country as a whole. Some of the larger states like Madhya Pradesh, Rajasthan, Uttar Pradesh, Odisha, Jharkhand and Uttarakhand lose more than this percentage.

per cent of its workforce is still engaged in agricultural activities. With this observation in mind, the present study seeks to explore the nature of agricultural growth or stagnation in Bihar. In the next chapter, the same is attempted using the time series data on agricultural performance.

1.3 Plan of the study

The chapter has tried to locate the present work within the broader theoretical strands of development economics. It has also attempted to understand the historical location of Bihar in this context. Given the overwhelming agrarian and rural nature of the state, the next chapter will discuss the agricultural growth experience of Bihar since the 1960s. This will be done with the limited purpose of identifying the chief sources of growth. This exercise will determine some broad conclusions regarding the nature and character of the growth experience. This should also indicate the possible future direction of agrarian progress, at least in the next decade or so. The third chapter will present a snapshot of the theoretical debates around agrarian structure and stagnation. The focus will be on the Indian context.

This will serve as a stepping block to analysing the relationship between the agrarian structure and growth in Bihar. The fourth chapter will look into the structural features of the agrarian economy of Bihar through secondary sources. This will be done to give a structural context to the growth story. The fourth chapter will also present the results from the field visits to supplement the findings from the secondary sources. The fifth chapter will try to give a theoretical explanation for agrarian stagnation in the context of Bihar as observed in recent times. The sixth chapter will focus on irrigation and its control, a factor likely to determine the future evolution of agricultural growth in the state. This chapter will supplement the primary survey data with secondary sources to complete the story of irrigation in Bihar's agriculture. The final chapter will present the summary of findings, the core analytical argument, and some policy implications coming through it.

CHAPTER TWO

Agricultural Growth in Bihar since the 1960s

It is important to briefly look at the agricultural growth experience of Bihar to understand both extent and nature of agrarian stagnation. Using the secondary sources, this is attempted in the following sections. It is important to note that the spread of the Green Revolution to this state has remained limited compared to other states outside northwestern India. We need to look at the overall growth performance of Bihar's agriculture to ascertain if there is any structural break. We also need to look at the evolution of cropping patterns and productivity increase to understand fully the nature of agricultural growth or stagnation, whatever the case may be.

2.1 Identifying sources of agricultural growth

The present study will attempt to decipher the broad trends in agricultural output growth in Bihar starting from the sixties. The next task is to decompose the total agricultural production into its three component parts – area expansion, yield increase and changes in cropping pattern. A further decomposition is suggested (Narain, 1977) to identify the contribution of locational shifts²⁸ (though it has been accepted that its significance has reduced in the latter part of the sixties for the Indian agriculture). This will help identify particular growth patterns and then make comparisons across periods. The following discussion will present a brief summary of empirical findings.

It is needless to restate that the scope of production growth through area expansion had already been exhausted during the colonial period itself. The figures for the net sown area testify for the same. Though the increase in cropping intensity, and consequently in the total cropped area (gross sown area), is usually seen as a possible source of expansion of area under different crops. Interestingly, the data for Bihar shows stubborn inertia in this regard. As can be seen from Table 2.1, the cropping intensity had remained in its 130 to 135 range

²⁸ This refers to shifting the cultivation of a particular crop from a region with low land productivity to a region with high land productivity.

before 1980 and marginally increased to hover between 135 and 139 during the 1980s.²⁹ It falls back to its pre-1980s range during the 1990s, recovering to the 1980s level during the first decade of this century. Between 1960 and 2010, it remained trapped below 138. It appears that it is breaking the ceiling of 140 only during the second decade of this century consistently.³⁰ It would be interesting to explore the factors behind this turnaround. Irrigation expansion should be the first potential facilitator in this regard.

Table 2. 1: Net sown area, Total cropped area and Cropping intensity in Bihar

Year	Net area sown (Thousand Hectares)	Total cropped Area (Thousand Hectares)	Area cropped more than once (Thousand Hectares)	Cropping intensity
1960-61	8032.1	11106.8	3074.7	138.28
1970-71	8454.4	11026.1	2571.7	130.42
1980-81	8314.5	11148.1	2833.6	134.08
1990-91	7702.5	10483.9	2781.4	136.11
2000-01	5663	7992	2330	141.13
2010-11	5258.7	7194	1935.3	136.80
2017-18	5241.97	7525.18	2283.21	143.56

Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Government of India.

Table 2. 2: Share of different crops in total cropping area

Year	Area under different crops as a percentage of total cropped area					
	Rice	Wheat	Maize	Cereals	Pulses	Food grains
1962-63	46.90	6.46	7.54	68.61	20.55	89.16
1970-71	47.84	11.93	8.99	74.94	14.92	89.86
1980-81	49.79	15.74	7.92	77.66	12.27	89.93
1990-91	51.42	18.74	6.34	78.71	11.21	89.93
2000-01	45.75	25.87	7.76	80.08	8.97	89.06
2010-11	39.37	29.24	8.97	78.17	8.51	86.68
2015-16	42.69	27.87	9.31	80.20	6.58	86.77
2017-18	43.98	27.92	9.00	81.20	6.77	87.97

Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Government of India.
Note: Figures for the years 2017-18 for rice, wheat and maize are taken from the Department of Agriculture, Govt. of Bihar. The rest are as mentioned in the source below.

If we look at the area under different crops during this period, it suggests an almost stagnant pattern (Table 2.2). The diversification that is usually associated with agrarian progress does not seem to be affecting Bihar agriculture. Not only did it remain exhaustively

²⁹ Detailed year-wise estimates are given in Appendix Table A2.1.2 at the end of the chapter.

³⁰ This decade seems to be a potential turning point if this increase in cropping intensity is seen together with many other positive changes. Some of them are discussed below in different sections.

centred around food grain production, but it also lost some of the diversity that existed during the decade of 1960s. The food grain production did contain a significant area that was devoted to the production of pulses. There is a precipitate decline in this area, and food grain production grew more cereal centric. The share of pulses became one-third of its initial value. The loss was essentially a result of the expansion of the area under cereals.

The broad pattern of crop cultivation is, therefore, remarkably stable. The area under other crops, other than food grains, as a result, remains broadly unchanged. However, this may hide some minor changes in the cropping pattern. As it is seen, the area under wheat has increased significantly over time, mainly at the cost of pulses. But the increase in the share of rice and wheat together also suggests that within the cereals, there is some loss suffered by other coarse cereals- their cultivation has gone down from already what was a very small share. Paddy – wheat cycle has effectively dominated the cultivation cycle.

Table 2. 3: Area under Sugarcane, Fruits and vegetables

Share of the area under different crops as a percentage of total cropped area					
Year	Fruits & Vegetables	Sugarcane	Year	Fruits & Vegetables	Sugarcane
1991-92	10.94	1.43	2010-11	15.87	3.45
2000-01	12.21	1.17	2015-16	15.10	3.22

Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Government of India.

Recently there have been some signs of change in the cropping pattern, appearing insignificant right now but containing the potential to transform the nature of the cropping pattern. Table 2.3 shows that in the last two and half decades, the share of fruits and vegetables has increased by about four percentage points, though not in a linear fashion. But this increase has tapered out, and the share is stable after 2003-04. Sugarcane, whose cultivation area has not changed in the last five decades since 1960, suddenly more than doubled its share in the year 2010-11 and afterwards maintained this level. Perhaps, this is in response to a new initiative of the state government to re-start some of the sugar mills closed for a long time. It is, however, essential to note that both these crops are highly irrigation intensive. Their growth and stagnation may be related to expansion in irrigation. Interestingly, the area under maize cultivation has also shown a reversal of trend in recent times.

Thus, looking at the land use and cropping pattern, the pattern of Bihar agriculture suggests a few things. One, like many other states, there is no scope for increasing the net sown area. In fact, the proportion of net sown area in the total geographical area of the state shows that it is already higher than the national average. In all likelihood, it may fall further. It has already declined considerably in two phases – the first time it is witnessed is during the 1980s and then again at the beginning of this century. Given the pressure of growing urbanisation and of a growing real estate market, the competing usage may easily push the cultivation area down.³¹

Second, the total cropped area, in the absence of any change in cropping intensity, has also reflected the same tendency as shown by the net sown area. In tune with the latter, showing the same time pattern, it has also gone down significantly. Given these two observations, it is clear that overall agricultural growth in Bihar, which has been very modest at best, has been marked by an absence of an increase in the area - neither has it seen a rise in the net sown area nor the gross cropped area.

Third, the broad cropping pattern exhibits a certain conservatism. Share of the area under different crops reflects a stagnant pattern at best. Not only does it remain food grain centric, but within that, it is overwhelmingly cereal dominated. There is even a loss of diversity within the cereal category, with coarse cereals losing ground over time. Over the decades, Bihar agriculture has acquired a more pronounced "monoculture" character dominated by the paddy–wheat cycle. Therefore any analysis of agricultural growth has to take into account the fact that it is overwhelmingly influenced by the performance of these two crops, even when paddy has lost some ground to wheat.³²

Therefore, it leaves us to believe that most of the increase has come from yield improvements, though considerable variation is found across crops. It is clear that food grain production has registered a decline in the area during the entire period despite retaining its share. Wheat, however, has expanded substantially in terms of the area during the period, with the late 1960s and 1970s witnessing the maximum increase. It exhibits an almost

³¹ It should be kept in mind that presently Bihar is one of the least urbanised states in India. But it cannot be expected to remain in the same situation any further. Consequently, there will be a loss of cultivable land to growing urbanisation.

³² This loss could only be in the area under the paddy of *garma* variety. The loss of *garma* paddy is also closely related to declining public irrigation cover. There may be other factors at work. One possible factor could be the late harvesting of paddy during the kharif season.

stagnant area in the last two decades. Among the cash crops, it was essentially fruits and vegetables which increased their share in total area.

2.2 Unevenness of growth performance

An increase in yield remains the most critical contributor to growth. In fact, the negative growth of the area in many cases was more than offset by a significant increase in yield levels. Crop-wise performance in this regard, however, is varied, with some crops registering huge increments in yield levels. It is noted that the overall increase in the value of production may also be due to the increased production of high-value crops to an extent possible under the evolutionary pattern of crop mix in Bihar agriculture, which allows only a small change. Once again, this is a combined effect of the area expansion of these crops as well as an increase in yield levels. A disaggregated picture is, therefore, required to bring to the fore the relative contribution of each of these effects.

2.2.1: Identifying periods of growth spurts or stagnation

The discussion on agricultural growth in India remains heavily influenced by the experience of the Green Revolution. The same is the case with Bihar's agrarian studies. The fact that the Green Revolution came to the state, even in its limited sense, only in the 1980s, that it has become a fashion to compare the performance of the decade of eighties with the preceding decades. The apparent validation of the popular perception of a booming technological experiment seems to be also the case in Bihar. In the first three decades starting from the 1960s, the value of total agricultural production has grown at an average rate of 2.3 per cent per annum - the 1980s registering the highest rate of 3.03 per cent and the decade of seventies witnessing the worst performance, with the value of output growing merely at an average rate of 0.3 per cent (Appendix Table A2.1.4). Among the major crop groups, food grains, including cereals and pulses, correspond to this pattern, pulses witnessing a positive rate of growth during the 1980s. In the case of cash crops, their most impressive increase has been registered during the sixties, with oilseeds being an exception growing rapidly during the nineties. If we look at the growth of agricultural output in the sixties, it appears that this was led by cash crops which grew at an average annual rate of 9.38 per cent against a growth rate of only 0.89 per cent in the value of food grain production. Their overall impact, however, could be little because of the very small area under their cultivation. The dismal performance in the 1970s was due to an almost stagnant production in all major groups, further aggravated

by a negative growth rate registered by pulses. In the decade of the eighties, when the value of the agricultural output grew at a relatively faster rate, it was mostly accounted for by a rapid increase in cereal production, growing at an average annual rate of above five per cent. The period which saw the onset of the Green Revolution in the northwestern parts of the country witnessed a poorer performance in Bihar. The growth rate was depressed to the extent that the decades of the 1970s and 1980s taken together experienced a modest average rate of 1.6 per cent per annum as against 2.2 per cent in the case of India as a whole.³³ Looking at the compound rates of growth of food grain production in India and in Bihar during the 1980s, we find that in Bihar, it grew at a relatively faster (as compared to earlier period) rate of 3.1 per cent, but was still below the overall Indian rate of 3.4 per cent.

These trends in the value of agricultural production, however, will be influenced by the price movements. It is necessary to look at the physical production data to understand the growth dynamics of real output. To that end, the agricultural performance is being looked at in real terms in its decadal decomposition. Keeping in mind the observation that almost all the increase in overall agricultural production has come through yield increments, we proceed to look at the decade-by-decade story. The detailed charts for individual crops (or groups of crops) are given at the end of the chapter in Appendix 2.2.

In the 1960s, agricultural production, heavily dominated by food grain production, grew very moderately. But there was a significant shift in the crop mix. This shift heralded a new pattern of cropping where wheat cultivation started increasing very rapidly. Amidst the very modest growth of all other major crops, wheat registered a phenomenal increase in all aspects – area, production and yield. The gain of wheat in terms of the area was a catastrophic loss for pulses, the cultivation of which has not recovered from the decline that it witnessed in the decade of sixties. To a smaller extent, rice also suffered a loss in the area. The decisive shift that took place in cropping patterns in that decade still dominates Bihar agriculture and can be a serious cause of concern. Overall, this decade's growth performance was heavily influenced by wheat, so much so that it saved the state's crop production from a potentially distressing experience.

The decade of 1970s witnessed a downturn in the fortunes of food grain production when it could barely manage to keep the production level from falling from its earlier level. It still remained heavily influenced by growth in wheat production. But as compared to the last

³³ Triennial average rates, CSO, Govt. of India.

decade, wheat cultivation has lost some sheen, and its growth was largely a result of area expansion and not much coming from yield improvement. Pulses continued their downslide – this time much more pronounced as the loss in the area was also accompanied by a lowering of yield. Whereas wheat replaced pulses on more land to keep its production growing, pulse production was shattered in this decade. Alongside, the little diversity in Bihar agriculture also came under further strain when sugarcane cultivation saw a major decline in its area, production, and to some extent in, yield level.

The decade of 1980s saw a moderate revival of food grain production. Not only did rice production show a slight improvement in yield (though very little) as compared to the previous decade, but wheat production also revived itself by regaining significant yield improvements alongside the continued area expansion. Coarse cereals also managed to grow moderately despite a loss of area under cultivation. Pulse production managed to just stop the downward slide by increasing yield levels while the area under pulse cultivation continued to suffer losses. Cereal production, as a result, saw impressive growth in production on account of equally impressive yield improvements. Overall, food grain production increased moderately despite losing area under cultivation. Sugarcane production also saw significant improvement emerging from yield increases. Overall this decade saw a turnaround in agricultural production based on yield improvement after the stressful decade of the 1970s.

In the last decade of the century, there was a decline in the area under rice cultivation. In fact, the land use statistics had already indicated that this process started in the decade of 1980s itself when the area under cereal cultivation showed a decline. Cereal production growth also got moderated in this decade because of both factors – a reduction in the area coupled with a smaller increase in yield levels. Overall, food grain production reflected the same trend with a more pronounced stagnation as pulse production, which saw some improvements in the yield levels in the 1980s, again collapsed under a loss of area and yield levels. Sugarcane production also witnessed a general decline – in area, production and yield. Interestingly, to compensate for the progressive loss of diversity, vegetable production grew because of a very impressive increase in yield levels.

By the end of the century, Bihar's agriculture entered a phase of a complete downturn. This stagnation was witnessed across all food grain production. Wheat production, which was leading the growth experience so far, stagnated in the first decade of this century. Rice production collapsed, experiencing a decline in area, production and yield levels. Overall

coarse cereals could barely manage to stay at the levels they had already attained. This was made possible by very modest growth in maize production. Overall cereal production saw a decline, mostly accounted for by a loss in the area, but also possibly a very slight decline in yield levels. The continued downward slide of pulses made overall food grain production also go down. This decline reached a disturbingly low level in the middle of the decade, after which there was a modest and very short-lived revival that collapsed again after 2008-09.

The revival and resumption of growth started after 2011 in the present decade. In fact, it turns out to be the best phase of Bihar agriculture as the growth momentum has not only returned but has picked up pace too. The disaggregated picture shows some breaks from the past trends. This time the growth is led by yield improvements of significant scale. Despite the disappointing story of pulse production, this has lifted food grain production to an impressive level, driven mainly by significant yield increases, particularly in rice production. Moreover, the yield improvement is happening outside wheat production, most notably in rice production. Given that rice is the largest grown crop in terms of area, it has a much better potential to improve the agricultural prospects of the state. The yield increment is also diversified as the yield of coarse cereals, most importantly maize, has increased impressively. As a result, overall cereal production has shown impressive performance.

This time pattern of growth has some important elements. First, there is never a sustained long-term improvement in agricultural production. It is characterised by both short-term year-to-year fluctuations, as well as longer-term swings of growth and stagnation. The decade of sixties had some growth, but it was followed by a distressing decade in the 1970s. The 1980s witnessed some revival, but yet again, it was short-lived and was followed by a moderation of growth in the nineties. By the end of the nineties, it goes into a serious decline and is revived towards the end of that decade. The degree of yearly fluctuations is also very high throughout the period.

Second, there appears to be a four-phased growth pattern. A very low growth phase till the beginning of the 1980s, then a moderate growth phase till the end of the century, a declining phase since the late nineties, and a phase of rapid growth afterwards. This is shown by the food grain production data that primarily reflects cereal production trends.

2.2.2: Identifying crops leading growth

If we look at different crop groups, we find asymmetric patterns of growth for individual crops within a particular crop group. It is evident that the growth of food grains is essentially led by cereals while pulses register a negative growth over the entire period. In the case of cereal production, most of the increase can be accounted for by a spectacular increase in the production of wheat, which consistently maintained a high growth rate, even in the seventies when all other crops fared poorly.³⁴ The most important cereal in terms of area as well as value, rice, witnessed relatively better performance during the eighties, otherwise almost stagnating. The other important cereal grown in the state, maize, registered a negligible rate of growth. In the case of pulses, there are contradictory trends for individual crops. Whereas the production of all pulses taken together has fallen considerably over the period of three decades, the output of *moong*, *masoor*, and to some extent, *urad* has increased (*moong* registering a very high growth rate largely due to very small value of production in the beginning). Production of *gram*, *arhar* and other pulses suffered the most, almost getting halved in the course of three decades.

The major cash crops grown in the state are fruits and vegetables, sugarcane, oilseeds and fibres (mostly *jute* and *mesta*). It is clear from Appendix Table A2.1.4 that a very rapid increase in the production of fruits and vegetables in the sixties had a significant impact on boosting the overall growth of cash crops. The importance of fruits and vegetables in the group of cash crops has also increased over time to constitute about 75 per cent of the total value of cash crops at the end of the eighties from a little over 50 per cent in the beginning. Other crops that grew relatively appreciably are rapeseed and mustard, contributing to most of the modest increase experienced by all oilseeds. The value of production of sugarcane and *gur* has generally fallen only to achieve the initial level by the end of the 1980s, though still contributing more than total oilseeds and fibres taken together in value terms. But sugarcane production has grown at a rapid rate during the present decade. This increase has come by way of both – area expansion as well as significant yield increases. In fact, the share of area under sugarcane cultivation has more than doubled in the year 2010-11 and has maintained that share afterwards.

³⁴ Initially, the production base of wheat as compared to rice was very low, which resulted in a very high rate of growth of production of wheat as compared to rice in the sixties. The ratio of wheat to rice production in value terms was roughly 0.10 in 1961-62 (taking the triennium average). This ratio grew roughly to 0.35 in 1970-71.

The crop-wise disaggregation also has some interesting patterns. First, it should be evident that given the overdependence of crop production on food grain production, and within food grain, it is cereal production that dominates food grain production, the growth or stagnation in Bihar agriculture is essentially a result of individual cereal crop's performance. Till the end of the century, when the state's agricultural sector had experienced modest growth, it was wheat that dominated the trends. In the post-1990s, the declining phase was primarily caused by a collapse in rice production. The recent revival is also a result of the revival of rice production. The picture that emerges from this analysis is that of the emergence of a rice-dominated performance. Given that rice has the largest area under cultivation, the centrality of its performance could not be over-emphasised.

Second, the overall cropping pattern between major crop groups remains unchanged. Given this trend, the growth is essentially either a result of switching from one crop to another within the same crop group or a general yield improvement in all crops of a given crop group.

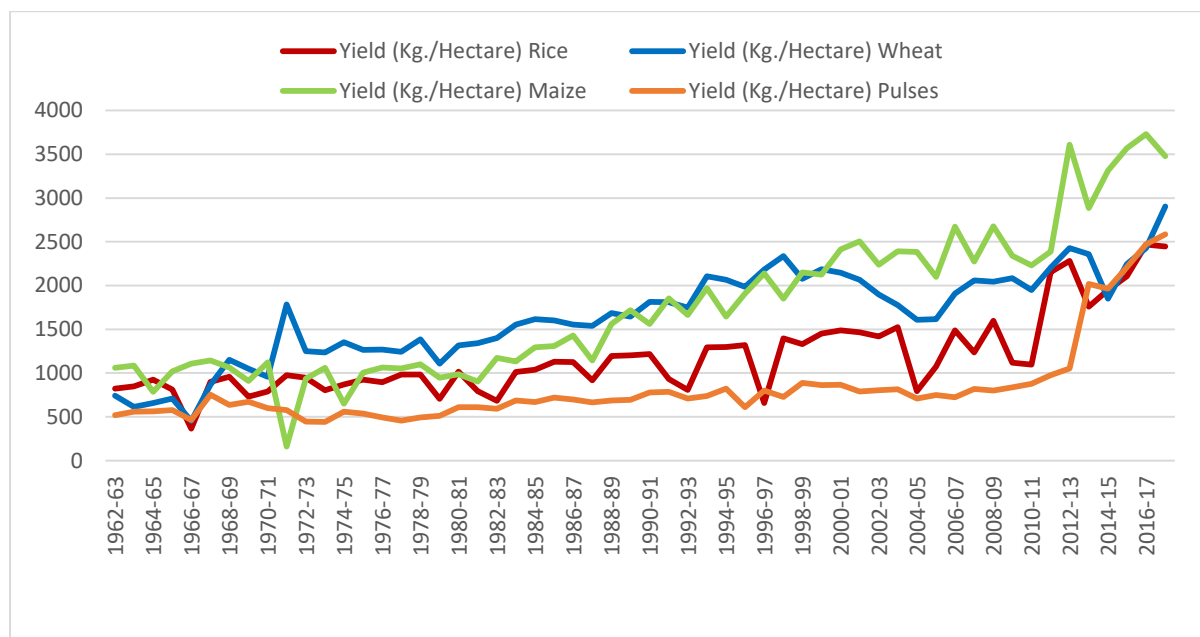


Figure 2. 1: Yield of food grain crops
Source: Author's own representation

Third, following the second point, sugarcane offers a break from stagnation if we look at the non-food grain crop groups. Of the recent growth spurt, it is indeed a part of the success story. Oilseed production so far has not produced any growth. Its production, viewed over the longer term, has remained stagnant for the last five decades with much shorter term

variation. Vegetable and fruit production in the last fifteen years has increased only very moderately. Fibre crops also offer not much hope as they have only grown at a modest rate, mostly in the eighties, now showing a declining trend.

Therefore, the picture that emerges from the above analysis of trends is that of heavy reliance of Bihar's agricultural performance on food grains, particularly wheat and rice. Of late, rice cultivation seems to be influencing the overall growth more directly. As the growth has come to be determined by the yield improvements, it would be interesting to see the time trend of yield levels of different crops. This can be seen in Figures 2.1 and 2.2, where comparative yield is plotted for major crops.³⁵ These trends may also reveal the growth potential for different groups. In the food grain crops, a general improvement is seen during the current growth phase. At a disaggregated level, the rice and pulses yield has caught up with the wheat yield that has remained higher for longer. The yield level of maize has significantly increased in relation to wheat. The current growth phase, therefore, appears more broad-based in terms of crop diversity in the food grain category.

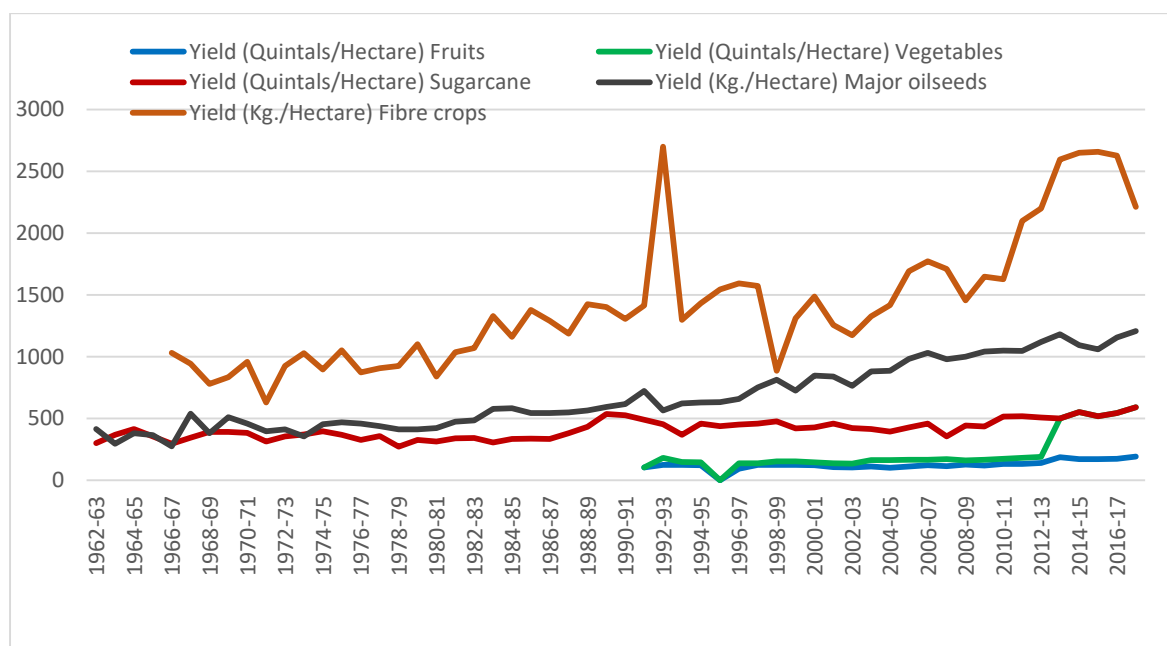


Figure 2. 2: Yield of major cash crops in Bihar
Source: Author's own representation

Within the major cash crops category, if we take sugarcane yield as the benchmark, oilseeds and fibre crops have increased their yield levels relatively faster. Recently fruits and vegetables have also registered somewhat better performance. Depending upon the

³⁵ A detailed table for yield levels of major crops is given in Appendix Table A2.1.7.

possibilities of area expansion of these crops, they offer faster growth potential. Needless to say, area expansion under these crops would depend on many other factors if it is not to be jeopardised by vagaries of nature. Many of those factors would entail active government initiative to materialise the gains.

A comparative picture of yield level is also helpful to make yet another kind of comparison. These yield levels and changes therein can be compared to yield levels of these crops in other states to judge the potential for future growth. However, this is not attempted right now, but it is discussed when the growth potential is discussed later.

2.2.3: Nature of agricultural growth in Bihar

From the above discussion, there are a few broad observations that can be taken forward. These pointers will help characterise the nature of growth in the state. First, overall the growth performance is very moderate, if not marked by absolute stagnation. Second, the growth has happened in spurts that remained short-lived, not sustaining itself for two decades, even at a moderate scale. Therefore the nature of long-term growth in agricultural production has not been that of a sustainable character. Third, within the long-term "swings", there is a very high degree of year-to-year variability. Fourth, historically cultivation of crops in Bihar was characterised by the domination of a few crops. This tendency towards "monoculture" has intensified. Cultivation remains food grain centric. Within the food grain category, it is overwhelmingly cereal dominated. Cultivation of pulses suffered significant loss of area. Fifth, in terms of individual crops, it is heavily paddy-wheat cycle dominated. Even within the paddy category, other varieties of paddy have lost over time, leaving *agahani* rice as the most dominant variety cultivated in Bihar. Sixth, recently wheat appears to have reached a plateau in terms of area and yield improvement. Seventh, rice in the current growth phase appears to have gathered some pace by registering impressive yield improvements. Eighth, Sugarcane cultivation has revived itself after three decades of decline and stagnation. Ninth, other cash crops, notably fruits and vegetables, have shown some tendency to increase in yield and production and offer some potential for sustained growth.

As far as future prospects are concerned, it appears that Bihar has still a lot to achieve in terms of yield improvements, and therefore, this potential remains untapped. But, more importantly, the "monoculture" of Bihar agriculture has to be weakened to realise the possibilities of growth through diversification in the crop mix. Diversification in the cropping

pattern will undoubtedly release some land for cultivating high-value crops. But, given the institutional, economic and physical constraints, it can still only be achieved in the long run. In the immediate sense, the need to improve the yield of the dominant crops, particularly rice, becomes very pressing.

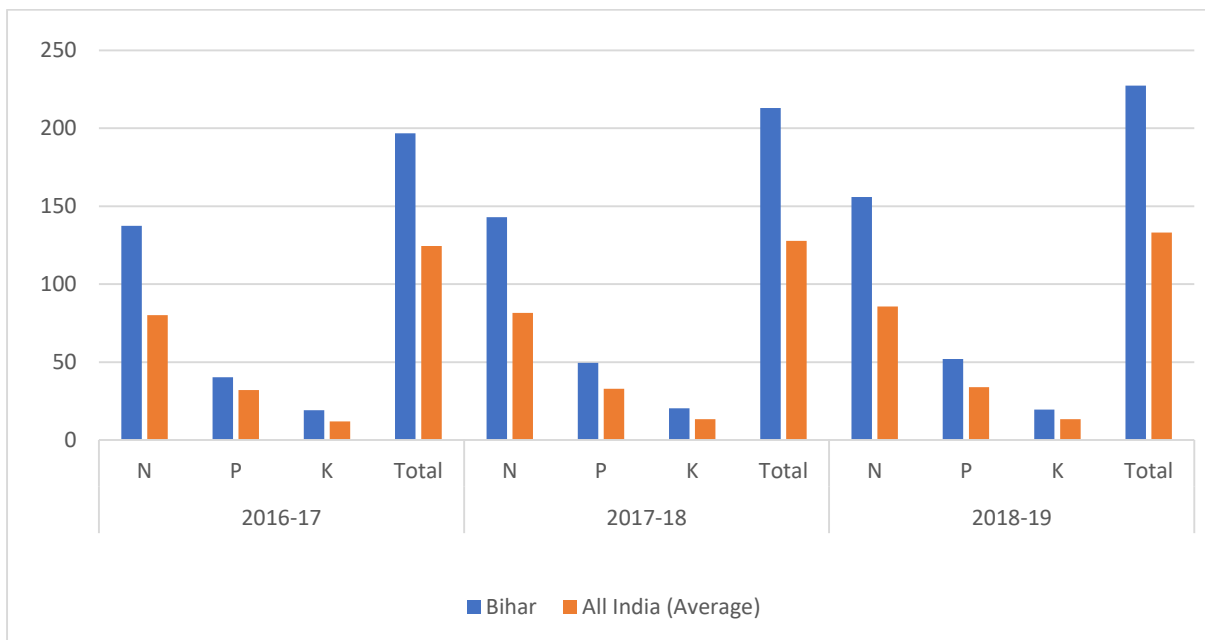
2.3 Technological constraints on growth: the role of irrigation

After noting that the yield improvements have been the source of agricultural growth, it becomes necessary to identify factors that have caused this improvement or are likely to cause it. In this context, it is a common observation that the most spectacular increase in yield levels in India was achieved through Green Revolution technology, which also altered the cropping pattern. This was initially concentrated in the northwestern part of the country but spread to other regions, including the Eastern and Southern regions, notably West Bengal and Andhra Pradesh, in the eighties. Two aspects of this development have to be recognised. First, there is a crop-wise concentration in the application of this technology. The initial jump in the yield was observed in wheat, the most important *rabi* crop in the country. The success of this new technology was not uniformly distributed across crops. In fact, there appears to be a close connection between the *existing* cropping pattern and the development of new technology (mostly high yield variety seeds) rather than the new technology resulting in a diversity of cropping patterns. Of course, this tendency has changed over time, and later phases have seen agricultural technological research more diversified in crop coverage.

Second, the Green Revolution technology, also referred to as the "new technology", has been alternatively known as HYV technology (referring to high yield variety seeds). However, the success of HYV seeds has always been dependent on other crucial inputs, most notably chemical fertilizers and controlled moisture. Thus, this technology fundamentally consists of a set of inputs with very well-defined technical relationships among them (where the production function looks more like a Leontief Production function). Given a relatively rigid optimal input mix to obtain the productivity increase, non-availability (or even limited availability) of particular input/s severely limits the realization of its full potential.

As long as the growth is sought within the technological framework of the "new agricultural strategy", the rigid complementarity of input use is bound to have serious constraints on efforts to improve yield levels. The state of technological research pertaining to crop production continues to be dominated by the same framework. Fertilizer use has

become not only pervasive, but it has progressively increased to increase and, in many instances, to maintain the yield levels. Bihar, over time, has also registered a significant increase in the use of chemical fertilizers. If we look at the intensity of use of fertilizers, it is one of the high-ranking states in its use of chemical fertilizers, though not the highest ranked. Figure 2.3 shows that Bihar uses a much higher dose of N, P and K fertilizers per hectare than the all-India average.³⁶ Though it is less than the level of fertilizer use in states like Punjab and Haryana, it cannot be said to be now severely lacking the capacity of fertilizer use. The lopsided use of fertilizer mix, however, remains a concern. But this problem of excessive use of Urea at the cost of other micro-nutrients is also prevalent in all other states. But the proportion appears to be more unbalanced in the case of Bihar. The portion of N:P:K in the year 2018-19 was 8:2.66:1 in Bihar, much disparate than the all-India proportion of 6.34:2.51:1.³⁷



*Figure 2. 3: Estimated Consumption of Fertiliser (N,P&K) (in Kg./Hectare)
Source: Author's own representation*

The limitation on land productivity growth on account of the bad fertilizer mix cannot be ignored. But the inter-state variation in the yield levels is not explained by a variation in the fertilizer mix. As the problem of improper fertilizer use is seen across all Indian states, the yield level variation must be explained in terms of something else. Figure 2.4 shows the yield

³⁶ Source: *Agriculture Statistics at a Glance 2019*.

³⁷ Calculated from *Agriculture Statistics at a Glance 2019*, Government of India (2020).

level of food grains in some major agricultural states in relation to Bihar.³⁸ It also depicts the use of fertilizers per hectare in different states in relation to Bihar. The method used to calculate the relative yield and the relative fertilizer application is the following.

The relative yield of the i_{th} state is given by $y_i^r = \frac{y_i}{y_b} - 1$; where y_i and y_b are yield levels of the i_{th} state and that of Bihar, respectively. Similarly, relative fertilizer intensity is given by $f_i^r = \frac{f_i}{f_b} - 1$, where f_i and f_b are fertilizer use per hectare in the i_{th} state and Bihar, respectively.

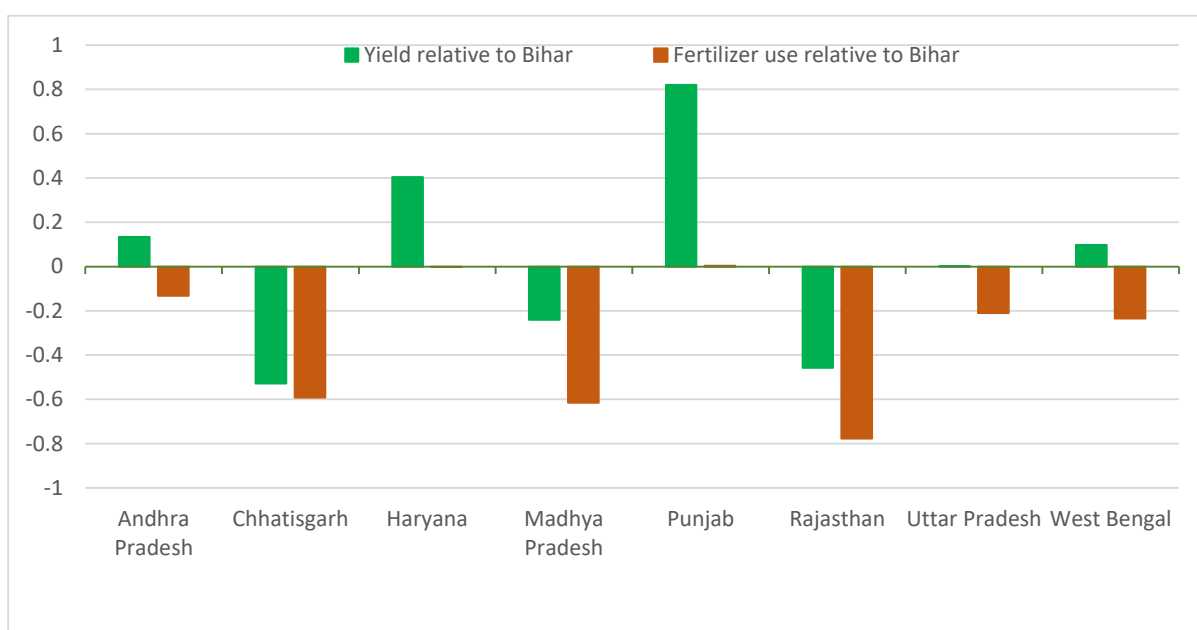


Figure 2. 4: Use of fertilizer and yield of foodgrains in relation to Bihar

Source: Author's own representation

The variation in yield level does not seem to conform to any fertiliser use pattern. First, all the five major states depicted in the figure having higher yield levels than Bihar have a *lower (or equal)* intensity of fertilizer application. These states are Andhra Pradesh, Haryana, Punjab, Uttar Pradesh and West Bengal. Second, the relative gap in the yield levels does not seem to be correlated with the magnitude of the intensity of fertilizer application. This is true for all states irrespective of better or worse performance in relation to Bihar.

This draws our attention to the other crucial input to raise yield levels through HYV technology, namely irrigation. The availability of timely and controlled moisture has always

³⁸ Tables of comparative yield levels and intensity of fertiliser application in different states are given in the Appendix Tables A2.1.5 and Table A2.1.6 at the end of the chapter.

been a pressing concern in the adoption of this new technology. This was the reason that the Intensive Agricultural District Programme of the mid-sixties had concentrated on two districts in each major state, which were identified as possessing the highest levels of assured irrigation, for the initial experimental introduction of the HYV "Borlaug" technology under the "new agricultural strategy". Subsequently, a number of studies were conducted to ascertain the actual variation of input application under assured irrigation conditions by farmers with varying resources, where resources were primarily measured by the size of the operated area under their control. Not surprisingly, it was a general finding in the initial days that large farmers applied the inputs for irrigated crops - seed, fertilizers, pesticides - at the prescribed rates. In contrast, smaller farmers with less investible funds applied inputs at sub-optimal rates.

Boyce (1987) found fresh evidence for this in West Bengal and Bangladesh. On the basis of agronomic reasons, it is expected that there is a strong complementarity between irrigation and other specified inputs constituting the "new technology". Boyce mentions the dependency of absorption of nitrogen, which is the primary nutrient supplied by chemical fertilizers, on water conditions. He quotes Chandler (1979) to demonstrate the differential found in the recommended levels of nitrogen application under assured water supply on the one hand and under rain-fed areas on the other. This reflects the nature of the technological paradigm where most research is directed toward inventing and developing seed varieties and related inputs that would give desired results under ideal water conditions. Adaptation to this will, in turn, increase dependency on assured sources of irrigation.

Some other studies (David & Barker, 1978; Herdt & Capule, 1983) have also found evidence that irrigation not only raises yield levels, but it does so by augmenting fertilizer responses to irrigation. Further, this increase is registered more in cases of HYVs as compared to the traditional varieties of seeds. Boyce further cites two more surveys, one conducted by NSSO in 1971-72 for West Bengal and another by National Council for Applied Economic Research in 1975-76 and 1976-77 at the all-India level, to show that not only was fertilizer consumption concentrated on irrigated lands, but the rate of application was significantly higher on irrigated lands. On the basis of these evidences, Boyce establishes (i) irrigation as a determinant of fertilizer and HYV intensities and (ii) relationships between irrigation on the one hand and agricultural growth, levels of yield, cropping intensity and

cropping pattern³⁹ on the other. The findings thus obtained make it possible to conclude irrigation is the binding constraint. The present study, therefore, takes it as given and proceeds accordingly. Giving special focus on irrigation becomes necessary. Further, the structural features of irrigation expansion, as mentioned by Boyce and many others, become crucial for further investigation.

Before we end this section, it is essential to point out certain aspects that have not been discussed in detail presently but have a significant bearing on the prospects of agricultural growth. The Green Revolution technology was not merely a technological innovation. It was correctly termed the "new agricultural strategy" for achieving higher growth rates in crop production and improving the farming sector's income. The adoption of this technology also required institutional support on two fronts. The first of these was in the sphere of production. It was developing a network to ensure timely and adequate availability of crucial inputs that could not have been guaranteed without government support. Massive import of chemical fertilizers was a necessary step in that direction as the country lacked sufficient production facilities for the same. The development and distribution of HYV seeds was another area that required the state's active involvement in the process. Establishing many agricultural research universities in the country was a direct outcome of this realisation. A massive network of extension services became indispensable for this technology's effective and faster dissemination.

But more importantly, the government was supposed to undertake a massive public investment in developing irrigation and drainage facilities. Most of the colonial irrigation network had gone into decline, and there was a need to ensure timely and sufficient water for crops grown under the new strategy. Given the preponderance of small and marginal cultivators, enough private investment in developing an irrigation network could not have materialised. The importance of public investment cannot possibly be overemphasised here.

Given the small size of cultivators, paucity of investible funds was also a serious concern. In the absence of a formal source, the dependence of small cultivators on usurious moneylenders for their credit needs could have been devastating for adopting the new technology. The state correctly visualised the need to provide cheap credit to the farming sector. The banking sector was reorganised to supply the necessary credit through "priority

³⁹ To measure the possible impact of irrigation on cropping patterns, he examines the share of gross cropped acreage under pulses, *boro* rice, potatoes, and wheat - all being dry season crops.

sector lending" practices. It resulted in establishing a multi-tier structure of banking institutions catering to the needs of the agricultural sector – primary agricultural credit societies at the bottom to regional rural banks in the middle to national banks (NABARD). This was yet another critical institutional set-up integral to the new agricultural growth strategy.

The second area in which institutional support was required was in the sphere of exchange, namely the marketing of the agricultural produce. Given that the agricultural product market has historically been monopolistic, distribution of the benefit of the new technology required control over the marketing of the produce. The two essential elements of these control were government procurement of food grains and establishing agricultural produce marketing societies governed by state regulations. Private trade was discouraged, at least in some areas. The configuration of agricultural marketing acquired a complex character when the objective of food security was weaved into the production support network.⁴⁰ The success of this strategy relied as much on state procurement as on the availability of crucial inputs.

Overall, it required an institutional innovation to materialise the gains of the new technology. The emerging institutional structure became indistinguishable from the new technology. The lessons from this historical experiment are still relevant today. Much of the institutional apparatus that accompanied the Green Revolution has either already been dismantled or is being undermined progressively under the new policy regime. The changed institutional context, therefore, requires that one looks at the economic context under which the presently pursued agricultural growth policies more closely. Whether a new institutional set-up has emerged to replace the old or not will largely determine the fate of the present policies too. The present work, therefore, would like to place the study in the present institutional context of Bihar agriculture. The compulsion to raise yields to achieve agrarian progress should not make us blind to the many unexpected twists and turns that a "normal" looking economic process takes when placed under different socio-economic structures. The presentation of the work undertaken is explained in the final section below.

⁴⁰ This often created a problem of imbalance in the twin mechanisms of procurement of food grains and their distribution through the public distribution system. This became very pronounced towards the end of the last century. For an analytical discussion of this policy inconsistency, one can refer to Rakshit (2001).

2.4 Conclusion: Nature of agrarian stagnation

The agricultural growth in Bihar appears to be quite dismal. The growth has been modest; it has happened in spurts rather than sustained phases, with its coverage limited to a few crops. Further, it has been characterised by a high degree of year-to-year fluctuations and wide spatial variation in yield levels. The poor land productivity is coupled with even poorer labour productivity reflected in an abysmally small amount of value added per capita. This creates the infamous vicious circle: poor yields and productivity generate a very small income, and low income is devoted chiefly to meeting subsistence needs leaving almost nothing to create surplus or savings. This leaves the agrarian economy with little or no scope for capital accumulation.

The prospects of future growth seem to be tied with the possibilities of yield improvements and its stability. There can be shorter-term and longer-term policy goals in this respect. Given the heavy dominance of the paddy-wheat cycle, the immediate focus should be on raising the yield of these crops. The importance of yield improvement in paddy cultivation appears more vital as it has the largest area under cultivation. Wheat yields in the state appear to be reaching a plateau, and further growth requires closer attention to the cultivation conditions, most notably irrigation. With the focus on privately owned and controlled ground water-based tube well irrigation, the present policy regime has left the private "water markets" to determine the future evolution of irrigation potential, except for the subsidised programme for installing shallow tube wells. It is necessary to look at the structural aspects within which such private initiatives will be undertaken.

In the longer term, there is a pressing need for crop diversification. The overdependence on paddy-wheat cultivation not only makes agricultural performance hostage to the prospects of these two crops it also deprives the cultivators of any significant improvement that may arise from the cultivation of high-value crops. There are signs of the emergence of new potential in the form of growing cultivation of some cash crops. If these are not to be a short-lived tendency, then every effort should be taken to encourage these by providing necessary institutional support.

The deplorable state of agricultural infrastructure adds to the story of stagnation. One crucial aspect of this is the abysmal state of storage capacity in the state for farm produce. With their poor resource base, small cultivators are generally forced to sell immediately with

no facility to hold back their produce when there is a willingness and capacity to do so. The problem of poor storage capacity is particularly crippling for the relatively bigger cultivators with a marketable surplus. If we look at a comparative picture, in the year 2015-16, the state's share in gross value added in agriculture (measured at current prices) in Indian value added was 3.78 per cent. Roughly a similar share of 3.84 per cent was observed in its share in the total cropped area. Compared to this, the state's share in storage capacity was a meagre 1.85 per cent.⁴¹ Credit support to overcome these difficulties also seems to be much lower than the national average. The state's share in total agricultural loans disbursed in the year 2018-19 was just 2.85 per cent, much lower than its share in the number of agricultural holdings at 11.21 per cent, according to the Agricultural Census for the year 2015-16. Similarly, its share in the total amount outstanding under the flagship Kisan Credit Card scheme as of March 31, 2019, was just 2.81 per cent. It was pathetically poor for the cooperative segment of this scheme, where its share was a meagre 0.33 per cent. It should be noted that cooperative banks are much easier to approach for loans and avail credit than other segments of the banking sector.

What are the opportunities that the present agrarian structure of Bihar offers to agricultural growth – this is the central question that is sought to be examined in the following chapters. Availability of irrigation and credit, use of other material inputs, labour use pattern and land ownership pattern will largely shape the evolution of the agrarian economy of Bihar. Given the preponderance of marginal holdings and their subsistence nature, the efforts to increase yields, in any case, meet a severe limitation. With very low or zero expected profitability, private initiatives are likely to be a non-starter. Without institutional support, it is expected that the existing pattern of stagnation will not only continue but will dig deeper roots in the state's farming sector.

⁴¹ Calculated from Government of India (2020).

Appendix 2.1

Statistical tables: Area, production, yield, cropping intensity and fertiliser consumption in Bihar

Table A2.1. 1: Area under food grain crops as a percentage of the total cropped area, Bihar

Year	Rice	Wheat	Maize	Cereals	Pulses	Food grains
1962-63	46.90	6.46	7.54	68.61	20.55	89.16
1963-64	48.18	6.17	7.44	68.90	20.37	89.27
1964-65	49.03	5.88	6.87	68.74	20.39	89.14
1965-66	48.78	6.28	6.91	69.05	20.03	89.07
1966-67	48.74	8.77	9.30	74.76	20.77	95.53
1967-68	48.24	9.68	9.08	74.69	15.64	90.32
1968-69	49.80	10.05	8.79	75.44	14.56	90.01
1969-70	49.65	10.35	8.62	74.84	14.88	89.72
1970-71	47.84	11.93	8.99	74.94	14.92	89.86
1971-72	50.65	13.08	7.71	76.78	14.45	91.24
1972-73	45.41	24.16	8.23	83.32	14.20	97.52
1973-74	48.12	12.39	8.72	74.68	14.46	89.13
1974-75	48.10	13.60	8.10	75.05	14.30	89.35
1975-76	46.58	16.08	8.29	76.08	13.57	89.64
1976-77	46.89	17.17	8.24	77.19	12.57	89.76
1977-78	48.33	15.97	7.69	76.56	12.72	89.29
1978-79	49.02	15.87	7.81	77.20	12.50	89.70
1979-80	48.97	16.33	7.96	77.48	11.95	89.43
1980-81	49.79	15.74	7.92	77.66	12.27	89.93
1981-82	50.50	15.43	8.00	78.03	11.87	89.90
1982-83	46.64	17.98	8.29	76.68	12.33	89.01
1983-84	47.77	18.43	7.60	77.56	11.87	89.43
1984-85	50.18	18.20	6.61	78.37	11.61	89.98
1985-86	50.73	17.44	6.37	77.70	11.72	89.42
1986-87	51.45	17.63	6.20	78.23	12.04	90.27
1987-88	49.40	20.49	6.38	78.91	11.47	90.38
1988-89	50.55	20.11	6.60	79.69	10.82	90.51
1989-90	50.73	19.08	6.72	78.90	11.58	90.48

Table A2.1.1:Continued...

Year	Rice	Wheat	Maize	Cereals	Pulses	Food grains
1990-91	51.42	18.74	6.34	78.71	11.21	89.93
1991-92	50.25	19.56	6.79	78.70	10.67	89.37
1992-93	48.28	21.10	7.46	78.90	10.47	89.37
1993-94	48.40	21.23	7.40	79.15	10.21	89.36
1994-95	49.19	20.98	9.02	81.15	9.72	90.87
1995-96	50.27	21.30	7.16	80.55	9.20	89.75
1996-97	49.97	20.60	7.70	80.05	9.18	89.23
1997-98	51.05	20.72	7.04	80.47	9.09	89.56
1998-99	50.60	21.10	7.07	80.30	8.89	89.19
1999-00	50.12	21.49	7.38	80.50	8.67	89.17
2000-01	45.75	25.87	7.76	80.08	8.97	89.06
2001-02	44.98	26.93	7.53	80.11	8.79	88.90
2002-03	45.05	26.78	7.59	80.08	8.77	88.85
2003-04	45.39	26.35	7.82	80.10	8.77	88.87
2004-05	42.20	27.40	8.30	78.46	8.89	87.35
2005-06	43.97	27.09	8.77	80.46	8.07	88.53
2006-07	43.49	26.55	8.32	78.97	7.86	86.83
2007-08	46.01	27.85	8.24	82.70	7.83	90.52
2008-09	45.57	28.14	8.35	82.57	7.64	90.21
2009-10	44.05	30.06	8.66	83.19	7.74	90.93
2010-11	39.37	29.24	8.97	78.17	8.51	86.68
2011-12	43.47	28.01	8.83	80.71	6.86	87.56
2012-13	42.42	28.39	8.82	79.98	6.63	86.61
2013-14	41.30	26.50	9.66	77.78	6.60	84.38
2014-15	42.53	28.08	9.21	80.16	7.49	87.65
2015-16	42.69	27.87	9.31	80.20	6.58	86.77
2016-17				84.88	6.76	91.63
2017-18	43.98	27.92	9.00	81.20	6.77	87.97
2018-19				87.10	6.94	94.04

Note: Figures for the years 2016-17 onwards are taken from the Department of Agriculture, Govt. of Bihar. The rest are as mentioned in the source below.

Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Government of India.

Table A2.1. 2: Net sown area, total cropped area and cropping intensity, Bihar

Year	Net area sown (Thousand Hectares)	Total cropped Area (Thousand Hectares)	Area cropped more than once (Thousand Hectares)	Cropping intensity (in percentage)	Year	Net area sown (Thousand Hectares)	Total cropped Area (Thousand Hectares)	Area cropped more than once (Thousand Hectares)	Cropping intensity (in percentage)
1960-61	8032.1	11106.8	3074.7	138.28	1989-90	7724.8	10419.1	2694.3	134.88
1961-62	8349.7	11133	2783.3	133.33	1990-91	7702.5	10483.9	2781.4	136.11
1962-63	8343.7	11081.7	2738	132.82	1991-92	7714.6	10147.6	2433	131.54
1963-64	8546.4	11048.8	2502.4	129.28	1992-93	7162	9356	2194	130.63
1964-65	8544.5	10831.4	2286.9	126.76	1993-94	7267	9748	2481	134.14
1965-66	8338	10759.5	2421.5	129.04	1994-95	7380	9871	2491	133.75
1966-67	7422.1	9224.7	1802.6	124.29	1995-96	7321	10020	2699	136.87
1967-68	8284	10895.3	2611.3	131.52	1996-97	7337	10141	2804	138.22
1968-69	8325.4	10898.6	2573.2	130.91	1997-98	7411	10014	2603	135.12
1969-70	8395.4	11063	2667.6	131.77	1998-99	7431	10053	2622	135.28
1970-71	8454.4	11026.1	2571.7	130.42	1999-00	7437	9979	2542	134.18
1971-72	8276.2	10683.6	2407.4	129.09	2000-01	5663	7992	2330	141.13
1972-73	8053.4	10383.3	2329.9	128.93	2001-02	5664	7897	2233	139.42
1973-74	8373.4	10766.7	2393.3	128.58	2002-03	5725.48	7957.4	2231.92	138.98
1974-75	8344	10869.4	2525.4	130.27	2003-04	5712.09	7882.37	2170.28	137.99
1975-76	8470	11286.7	2816.7	133.26	2004-05	5572.4	7399.32	1826.92	132.79
1976-77	8350	11324.8	2974.8	135.63	2005-06	5556.19	7396.49	1840.31	133.12
1977-78	8578.6	11565	2986.4	134.81	2006-07	5665.12	7718.95	2053.83	136.25
1978-79	8531.5	11380.8	2849.3	133.40	2007-08	5662.2	7764.65	2102.44	137.13
1979-80	7900.5	10413	2512.5	131.80	2008-09	5554.08	7670.93	2116.85	138.11
1980-81	8314.5	11148.1	2833.6	134.08	2009-10	5331.73	7295.81	1964.07	136.84
1981-82	7860.9	10628.4	2767.5	135.21	2010-11	5258.7	7194	1935.3	136.80
1982-83	7529.8	9643.3	2113.5	128.07	2011-12	5395.74	7646.76	2251.01	141.72
1983-84	7579.7	10259.2	2679.5	135.35	2012-13	5402.39	7777.52	2375.12	143.96
1984-85	7643.2	10309	2665.8	134.88	2013-14	5252.25	7580.14	2327.89	144.32
1985-86	7699.1	10517.2	2818.1	136.60	2014-15	5278.32	7672.95	2394.64	145.37
1986-87	7611.9	10431.9	2820	137.05	2015-16	5204.9	7572.42	2367.52	145.49
1987-88	7479.7	10326.7	2847	138.06	2016-17	5292.93	7654.36	2361.43	144.61
1988-89	7670.4	10501.7	2831.3	136.91	2017-18	5241.97	7525.18	2283.21	143.56

Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Government of India.

Table A2.1. 3: Share of areas under sugarcane, fruits and vegetables in total cropped area, Bihar, 1991-92 to 2003-04

Year	Fruits & Vegetables	Sugarcane	Year	Fruits & Vegetables	Sugarcane
1991-92	10.94	1.43	2004-05	14.77	1.41
1992-93	12.38	1.42	2005-06	14.63	1.37
1993-94	12.41	1.23	2006-07	14.30	1.68
1994-95	11.01	1.25	2007-08	14.30	1.40
1995-96	NA	1.25	2008-09	14.57	1.46
1996-97	8.83	1.28	2009-10	15.48	1.59
1997-98	9.02	1.08	2010-11	15.87	3.45
1998-99	9.15	1.06	2011-12	15.12	2.85
1999-00	9.37	0.98	2012-13	14.96	3.22
2000-01	12.21	1.17	2013-14	14.67	3.40
2001-02	10.78	1.44	2014-15	14.90	3.31
2002-03	11.37	1.35	2015-16	15.10	3.22
2003-04	14.24	1.31	2017-18	-	3.57

Note: 2017-18 figure is from Department of Agriculture, Govt. of Bihar.
Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Government of India.

Table A2.1. 4: Average annual growth rates (in per cent) of the value of agricultural production during the decades of 1960s, 1970s and 1980s, Bihar

Period (in triennium ending) →	1962-63 to 1971-72	1971-72 to 1981-82	1981-82 to 1990-91	1962-63 to 1990-91
Crop ↓				
Total Cereals	1.84	0.71	5.25	3
Rice	0.11	0.11	5.04	1.73
Wheat	25.98	2.87	6.89	21.28
Total Pulses	-2.3	-1.32	1.53	-0.77
Total food grains	0.89	0.37	4.73	2.13
Total cash crops	9.38	0.24	1.72	4.22
Fruits and vegetables	19.08	0.84	1.08	7.97
Total oilseeds	-0.84	0.08	3.76	0.88
Rapeseed and mustard	0.07	-0.9	9.9	2.61
Miscellaneous and by-products	0.37	0.17	0.08	0.21
Total agricultural production	2.83	0.3	3.03	2.3

Source: Calculated from *Statewise and Cropwise Estimates of Value of Output from Agriculture*, CSO, New Delhi.

Note: For the period 1960-61 to 1980-81 value of paddy is taken into account, whereas for the next ten years, the estimates are that of rice.

Table A2.1. 5: Yield level of some major crops for some states, 2017-18

	Food grains (in Kgs. Per hectare)	Rice (in Kgs. Per hectare)	Wheat (in Kgs. Per hectare)	Maize (in Kgs. Per hectare)
All-India	2234.97	2575.9	3368.21	3065.32
Andhra Pradesh	2934.31	3787.66	NA	6912.11
Bihar	2586.65	2447.29	2905	3476.1
Chhattisgarh	1219.79	1311	1289	2380
Haryana	3631.92	3181	4412	3167
Madhya Pradesh	1962.82	2026.48	2993	2614.52
Punjab	4709.11	4366	5077	3708
Rajasthan	1401.77	2365	3334	2062.97
Uttar Pradesh	2594.44	2283.11	3268.65	2207.86
West Bengal	2839	2926	NA	4805
Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Govt. of India.				

Table A2.1. 6: Consumption of N-P-K fertilisers in kgs. per hectare in some states, 2017-18

	N	P	K	Total
All India	81.55	32.96	13.36	127.88
Andhra Pradesh	108.67	50.03	26.11	184.8
Bihar	143.06	49.64	20.32	213.02
Chhattisgarh	52.02	26.64	8.1	86.76
Haryana	162.34	43.36	7.15	212.85
Madhya Pradesh	51.37	26.63	3.99	81.99
Punjab	169.08	38.16	6.56	213.79
Rajasthan	33.95	12.46	0.99	47.4
Uttar Pradesh	116.52	43.06	8.64	168.22
West Bengal	78.45	45.81	38.67	162.94
Source: <i>Agricultural Statistics at a Glance 2019</i> , Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation and Farmers Welfare, Directorate of Economics and Statistics.				

Table A2.1. 7: Yield of different crops, Bihar (Kgs. per hectare)

Year	Rice	Wheat	Maize	Cereals	Pulses	Food grains	Sugarcane*
1962-63	823.63	739.66	1058.49	808.77	518.31	741.83	300.8698
1963-64	846.82	611.64	1086.66	822.87	556.73	762.15	366.8395
1964-65	925.64	656.4	784.85	845.19	560.85	780.14	413.9288
1965-66	812.06	706.9	1018.56	794.48	577.89	745.77	355.5824
1966-67	365.93	450.95	1105.84	470.8	462.37	468.96	294.9832
1967-68	900.33	866.37	1142.25	902.4	753.74	876.67	343.339
1968-69	957.55	1149.46	1064.23	956.4	633.95	904.22	390.3894
1969-70	729.85	1048.03	908	777.48	673.23	760.19	391.1085
1970-71	787.59	956.9	1123.54	834.25	600.32	795.41	383.533
1971-72	974.63	1784.53	160.92	996.94	575.86	930.16	314.6794
1972-73	946.77	1250.01	935.67	1001.4	444.87	920.35	353.9241
1973-74	802.5	1235.54	1058.5	880.56	439.99	809.11	371.549
1974-75	868.27	1353.18	649.64	905.2	557.85	849.62	395.7498
1975-76	923.5	1265.3	1003.74	972.99	537.06	907.02	366.9783
1976-77	894.91	1269.97	1062.89	970.25	493.26	903.44	326.7449
1977-78	983.18	1242.45	1053.83	1017.89	457.08	937.98	357.9639
1978-79	984.03	1385.28	1100.76	1055.6	493.99	977.31	272.3341
1979-80	705.03	1107.73	947.18	801.9	510.09	762.92	327.2408
1980-81	1015.21	1313.94	985.27	1048.63	609.01	988.65	314.1155
1981-82	793.07	1342.48	903.73	900.5	610.79	862.24	338.2201
1982-83	681.44	1399.62	1173.57	894.42	590.58	852.34	342.3083
1983-84	1013.39	1552.19	1134.46	1136.14	684.84	1076.24	304.4357
1984-85	1039.32	1616.28	1292.46	1179.54	667.08	1113.43	334.2487
1985-86	1127.61	1600.22	1309.74	1232.08	719.65	1164.9	336.2185
1986-87	1126.11	1555.39	1428.26	1229.62	697.13	1158.58	332.9464
1987-88	916.34	1539.3	1142.29	1084.9	664.39	1031.54	380.0753
1988-89	1196.36	1684.19	1562.36	1333.58	686.49	1256.2	432.0567
1989-90	1201.17	1644.89	1717.24	1337.89	692.89	1255.35	537.2472
1990-91	1217.63	1811.91	1560.62	1374.59	778.94	1300.31	524.9025
1991-92	932.09	1810.91	1853.85	1225.6	785.23	1173.01	488.3782

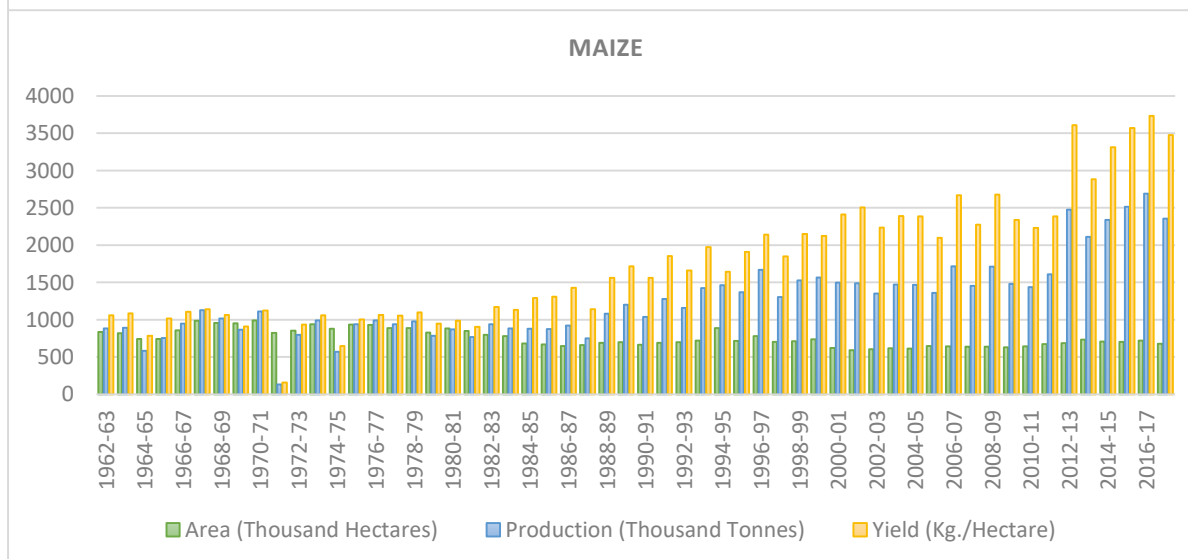
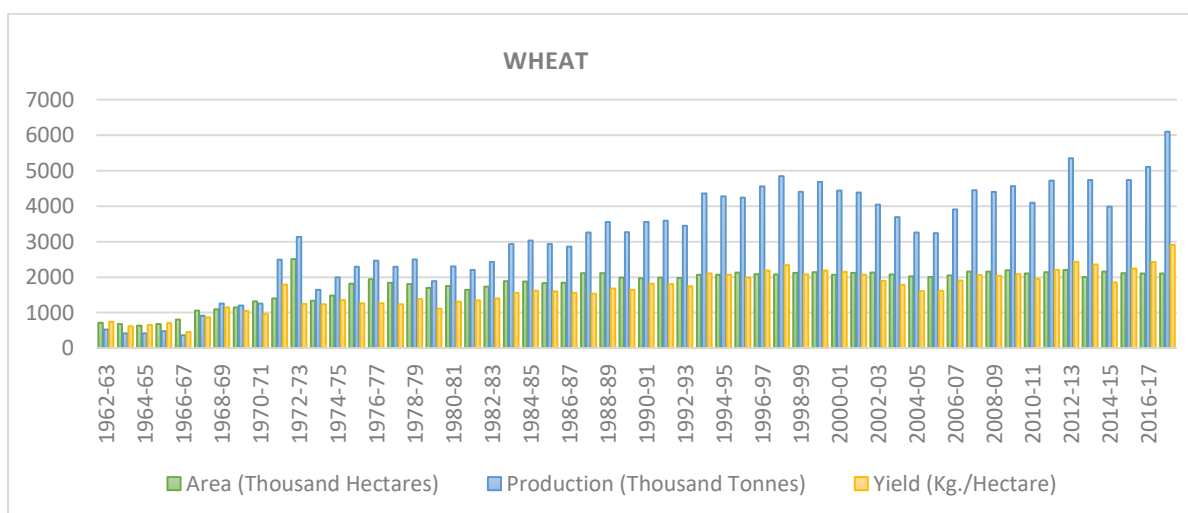
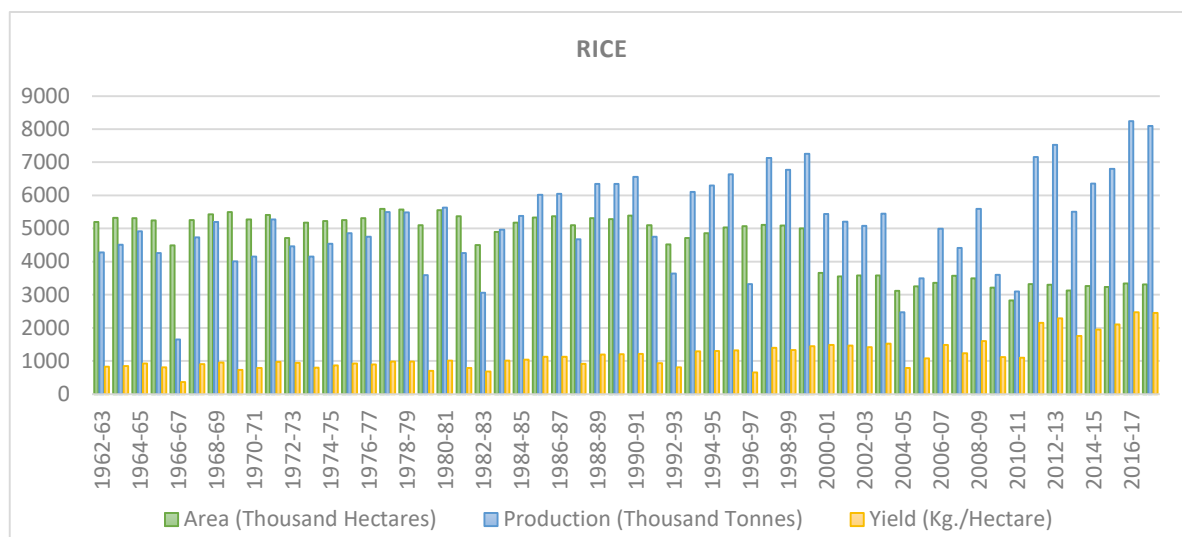
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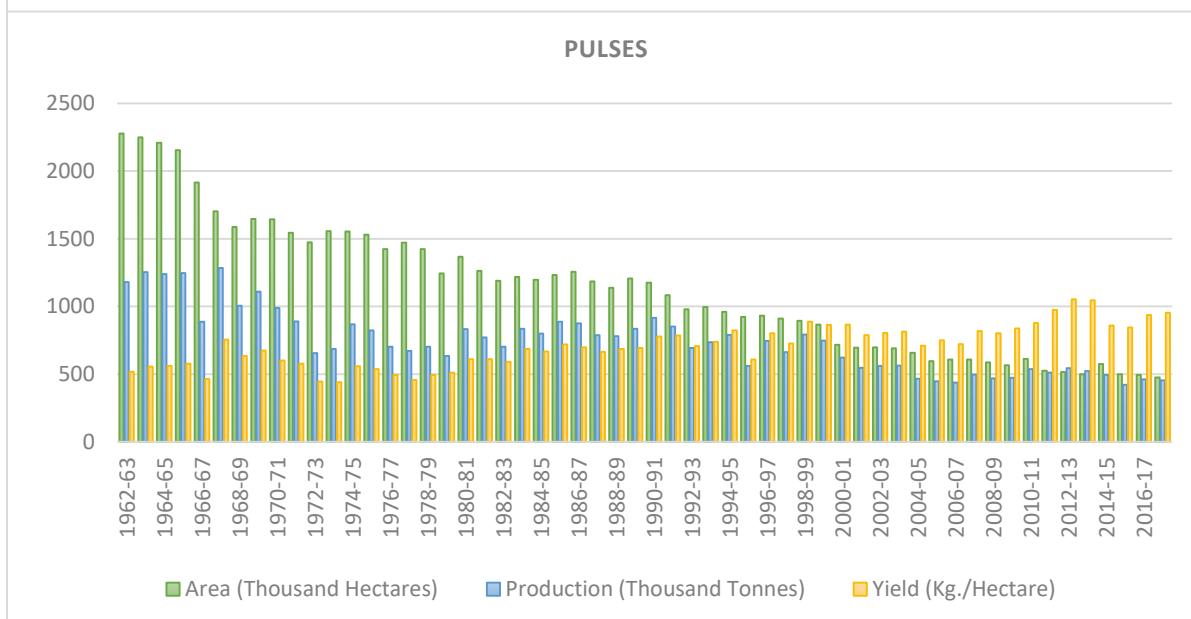
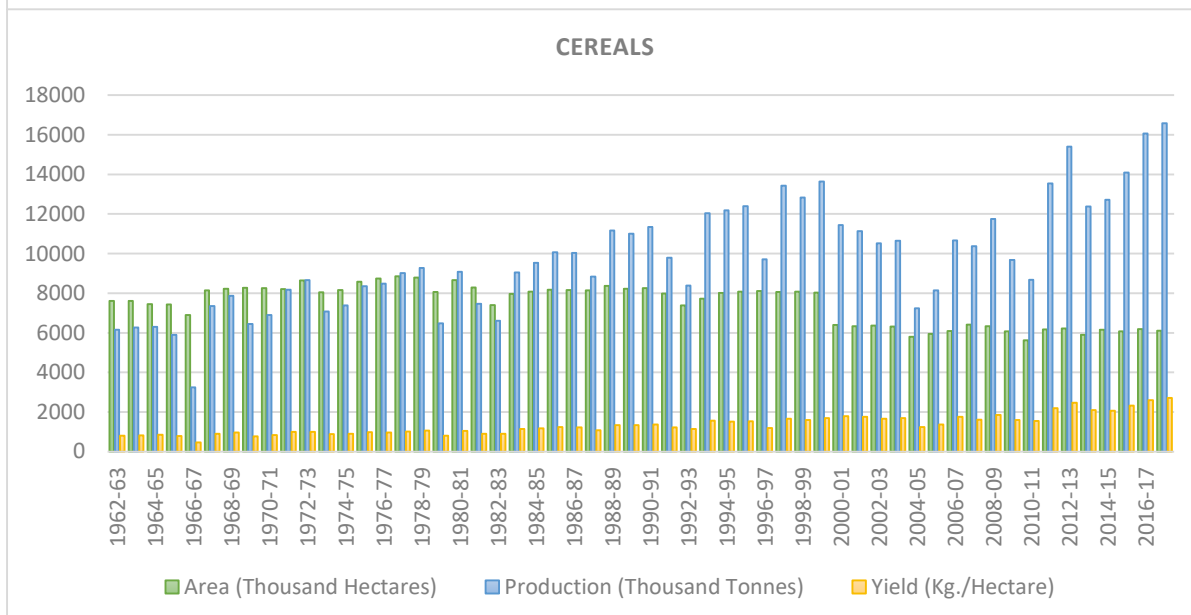
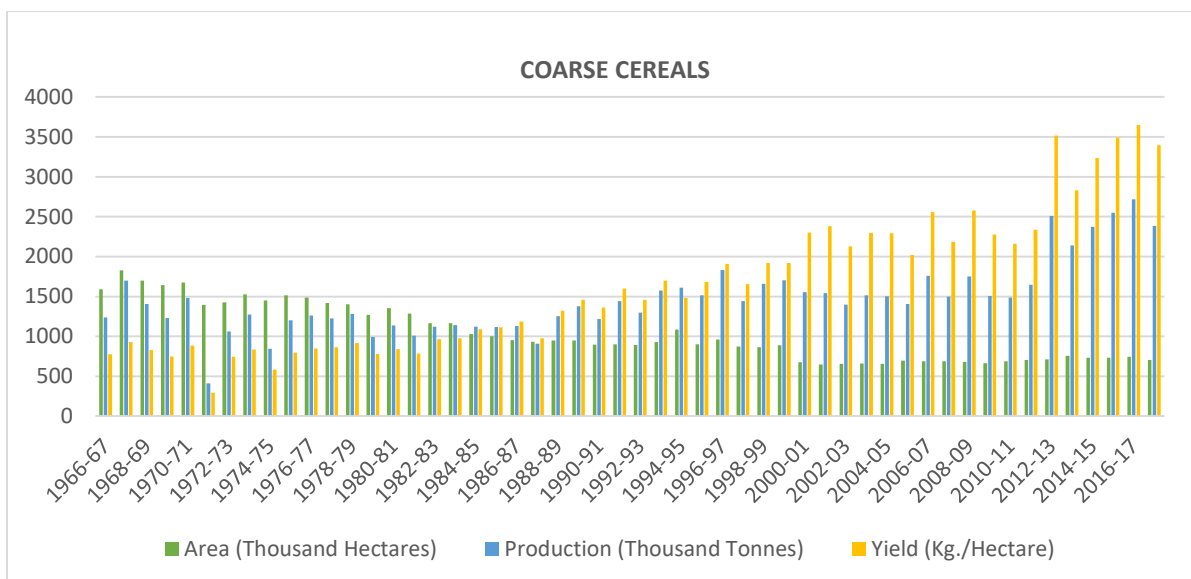
Year	Rice	Wheat	Maize	Cereals	Pulses	Food grains	Sugarcane*
1992-93	806.16	1747.47	1662.56	1136.5	707.74	1086.27	453.845
1993-94	1294.78	2105.09	1972.28	1560.63	738.97	1466.75	366.7973
1994-95	1297.15	2064.22	1643.33	1520.74	822.84	1446.07	459.6834
1995-96	1318.3	1986.08	1908.04	1535.35	608.27	1440.32	438.4333
1996-97	655.88	2183.3	2140.31	1196.84	800.56	1156.06	450.8102
1997-98	1395.3	2337.06	1851.25	1665.89	726.58	1570.51	459.25
1998-99	1330.83	2075.94	2148.08	1589.75	886.84	1519.71	477.1843
1999-00	1449.86	2185.64	2125.12	1698.13	863.17	1616.93	420.1953
2000-01	1488.55	2146.24	2412.89	1786.78	865.45	1693.94	426.4813
2001-02	1464.66	2065.14	2504.29	1760.13	787.96	1664	459.5326
2002-03	1418.67	1896.19	2236.25	1651.54	803.81	1567.87	421.2954
2003-04	1522.58	1776.24	2390.49	1686.75	813.83	1600.61	413.6969
2004-05	791.71	1609.49	2385.58	1246.71	709.68	1192.04	394.5969
2005-06	1074.74	1616.51	2097.87	1367.72	748.53	1311.28	428.2231
2006-07	1486.19	1908.28	2671.44	1748.93	721.91	1655.91	459.5293
2007-08	1236.66	2057.99	2274.15	1614.55	818.14	1545.7	354.9632
2008-09	1599.06	2043.27	2676.03	1855.32	800.92	1766.07	443.244
2009-10	1119.98	2083.95	2340.82	1594.61	836.59	1530.07	434.2192
2010-11	1095.2	1948	2230.04	1544.28	878.2	1478.87	514.6613
2011-12	2154.85	2206.01	2386.32	2193.28	975.21	2097.89	517.1368
2012-13	2282.37	2426.6	3611.16	2475.24	1052.31	2366.29	508.9646
2013-14	1758.6	2358.4	2884.03	2100.36	1044.16	2017.8	499.1584
2014-15	1947.9	1850.61	3312.65	2067.28	858.88	1963.97	551.7858
2015-16	2104.44	2243.96	3570.58	2319.62	844.95	2207.89	518.37
2016-17	2467.01	2427	3731.8	2595.71	936.17	2473.27	544.1485
2017-18	2447.29	2905	3476.1	2713.82	954.2	2586.65	591.38
Source: Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture, Govt. of India.							
Note: * Yield of Sugarcane is in Quintals/Hectare.							

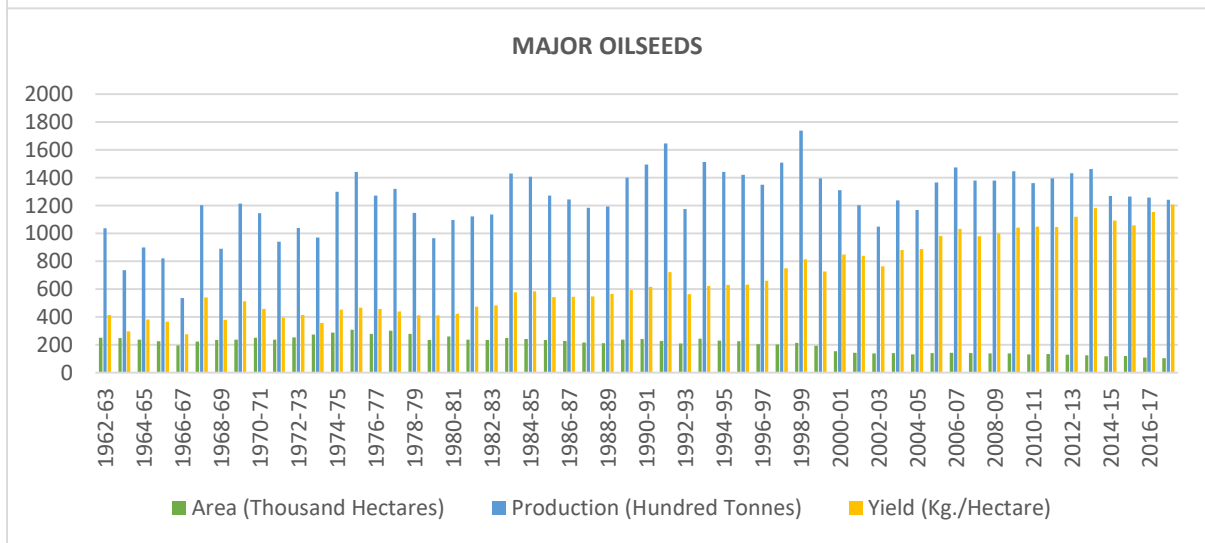
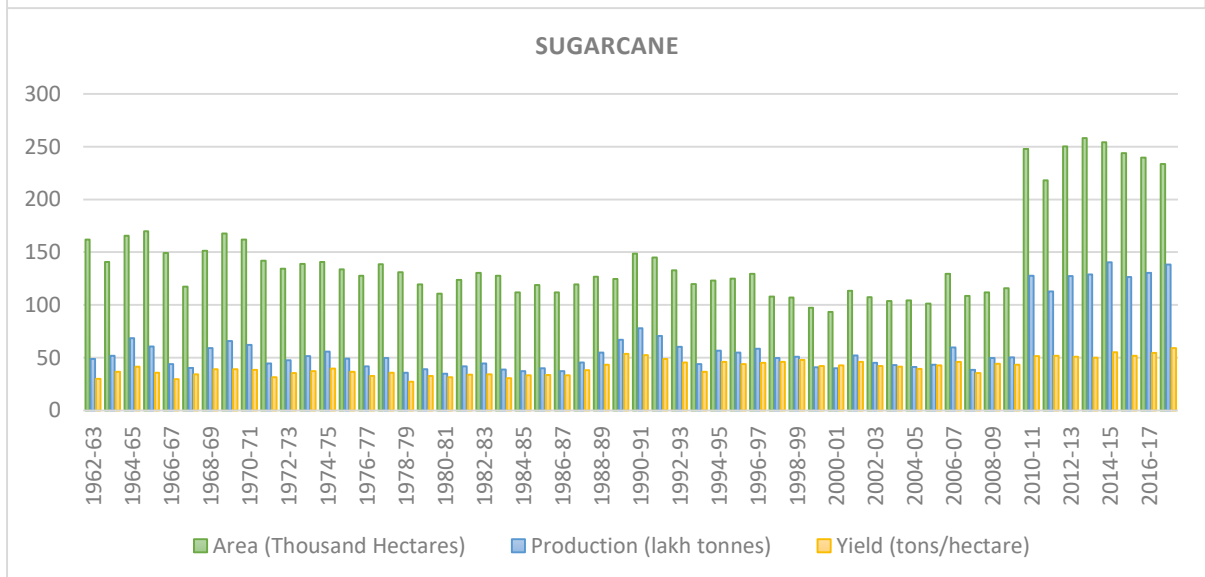
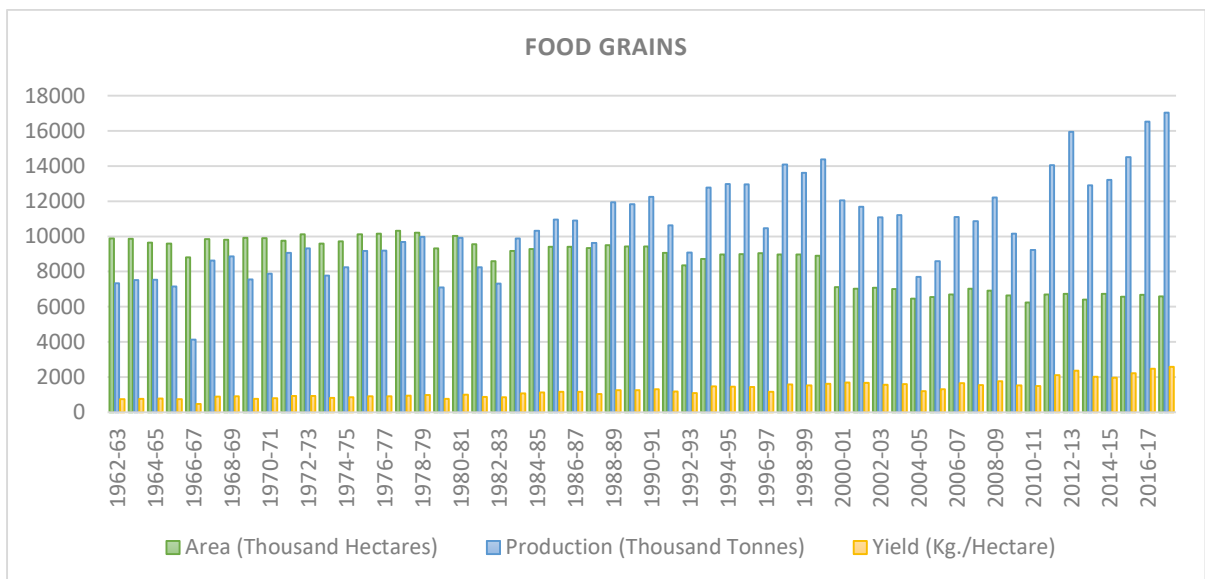
Appendix 2.2

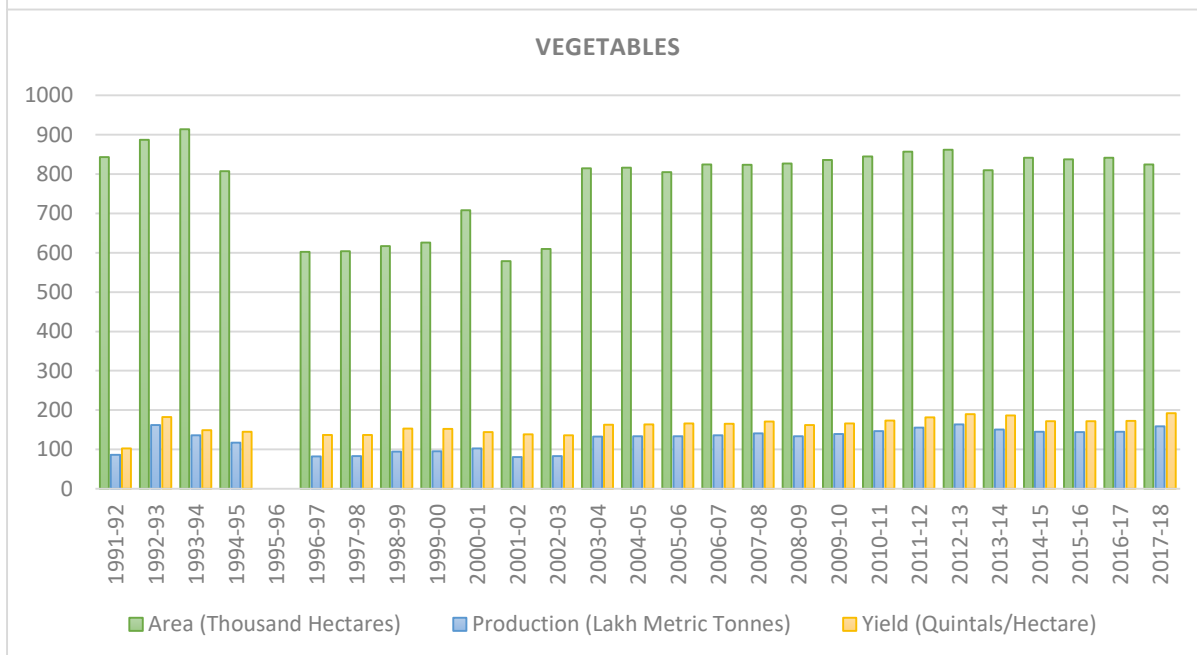
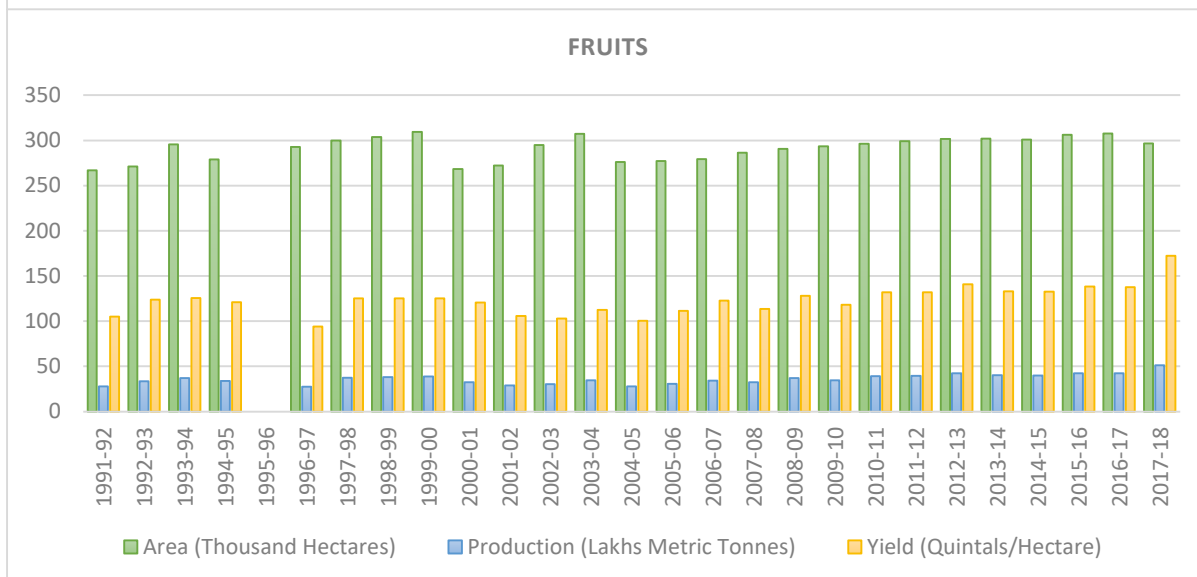
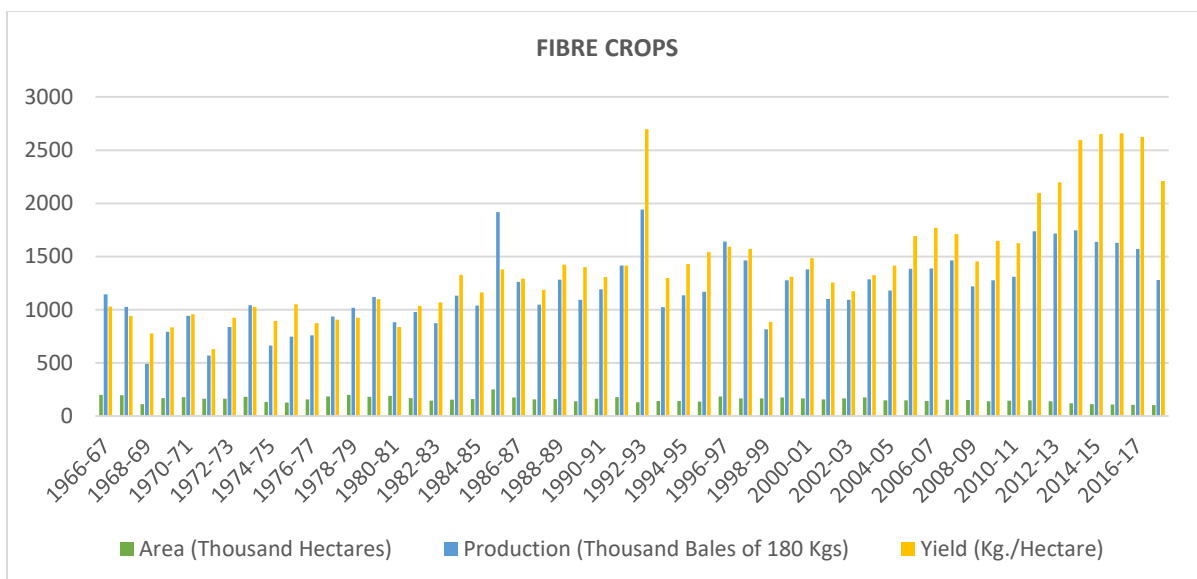
Figure A.2.2. 1: Area, production and yield of major crops in Bihar

(Source: Author's own representation)









CHAPTER THREE

Agrarian Structure and Stagnation

The relationship between agricultural growth and agrarian structure is complex. The interaction between the two takes place in numerous ways under different contexts, shaped by their historically specific paths of evolution. This gives rise to various patterns of reproduction of social relations. It is worth marking out its components without undermining its theoretical unity to comprehend this complex relationship. The task is to look into two different but interlinked processes. The first is to understand how the agrarian structure influences agricultural growth. There is a vibrant debate on how particular types of agrarian structures have held back the development of the agrarian economy in the Indian context. The second question is how the growth in agriculture responding to emerging technological opportunities has changed the agrarian structure. This relates to the debates around the differentiating impact of new technology on the agrarian structure. Before outlining and evaluating these two processes in the context of the present work, a brief critique of the dominant neoclassical paradigm is undertaken to underline why the question of 'structure' is important and how the dominant discourse misses its significance.

3.1 A discussion on methodology: Limits of the neoclassical paradigm

How is an agrarian economy structured? To answer this, one has to look at the conditions of reproduction of direct producers, especially the ownership patterns of the conditions of reproduction and their forms. Typically, in a capitalist society, the conditions of reproduction are controlled by capitalists. This gives a specific form to the organisation of production and consequent social formation. This particular arrangement serves a crucial purpose – the generation and transfer of surplus from direct producers to those with control over social reproduction. Agrarian relations in developing countries are not predominantly capitalist; one indicator of this is the importance, not of capitalist profit, but of land rent, usury interest and the merchant's margins as the main categories of surplus. It is best to scrutinise the form of generation and appropriation of social surplus product to identify specific agrarian relations.

Dependence of direct producers, in some way or another, on owners of conditions of social reproduction can take different forms. In the debates carried out in the Indian agrarian context, we find two different conceptualisations. However, both are based on extreme inequality in land distribution. First visualises the dependence on regular consumption/production loans taken by landless peasant producers, who are also entirely or mainly without any non-land means of production, from the landlords from whom they lease land (Bhaduri, 1973; Breman, 1974). The other emphasises the dependence on landlords for leasing land by land-poor or landless peasants who possess non-land means of production and may take loans but need not from the landlord from whom they rent land (Patnaik, 1976, 1999). These entail different patterns of generation and appropriation of the social surplus product by shaping different production and exchange relations and lead to different theorisations on how investment and growth are held back. But before that, the nature of exchange relations should be spelt out.

Exchange relations between individuals and groups are important as they reflect the core of social relations. After laying bare these exchange relations, we can identify observable regularities in the behaviour of individuals or groups based on which "laws of motion" of the agrarian economy are inferred. In today's world, this relationship is mediated through the institution of the market, and here the market becomes a historical category. This understanding is distinct from the neo-classical/neo-institutionalist analysis that treats markets as a given, one having no historical specificities. It is essential to recognise the historical nature of markets as they have evolved over time to facilitate exchange in a given society with its productive capacity and production relations, which are dynamic by their nature. Any uniform notion about the nature of markets, therefore, becomes flawed. This conception of markets fundamentally differs from the neo-classical/neo-institutionalist conception. The essential points of difference in the methodology are: (a) the questions raised, (b) the appropriateness of the method adopted to answer the questions, and (c) accuracy in the application of the chosen method.

When we say that the market as an institution has evolved over time to facilitate exchange, it does so at a given stage of historical development. This stage of development also reflects itself in the sphere of exchange. Some theorisations see the appropriation of the social surplus product as mediated through exchange relations. Participation in such exchange relations is based on different objectives, which may be non-economic in nature, displaying

no congruity with the assumption of "rationality" and utility or profit maximisation of neoclassical economics. Exchange, in such circumstances, is represented as unequal in nature, thereby transferring surplus from the "dominated" direct producer to the "dominant" partner. In such situations, markets facilitating an unequal exchange cannot be said to be a homogeneous category.⁴²

The neo-classical approach is invariably characterised by a fixation on the question of resource allocation. Any institution is subjected to analysing its efficiency in terms of static resource allocation. This goes to the extent of developing into what can be termed "social Darwinism" (Bhaduri, 1986).⁴³ Markets as economic institutions are discovered only to perform their allocative functions through the forces of demand and supply, determining an equilibrium price that clears the market and provides a solution to the problem of resource allocation. Projected in this light, markets have no other role to play than that of resource allocation based on price/quantity adjustment resulting from excess demand or supply conditions. Both these propositions are violated if we consider exchanges that transfer surplus from direct producers to dominant agents like moneylending traders. Therefore, the market can act as an institution facilitating appropriation of surplus as against mere resource allocation. Price formation under such conditions will, in turn, not be exclusively determined by excess demand or supply.

A part of this neo-classical orthodoxy is their adherence to an imaginary state of perfect competition. Possible imperfections are allowed only to an extent where it reflects upon implications for allocative efficiency. The latter proponents, the neo-institutionalists, tried to cover up this glaring deficiency by incorporating imperfections in the market

42 It is relevant to quote Brenner in this regard. He says that "there is a world of difference between the market as offering an opportunity for gain and the market as imposing the necessity to orient one's entire productive existence to maximise one's price/cost ratio to survive in competition" (Brenner, 1997, pp. 17-18). For the large majority of peasants, "this *did not imply staying out of the market...* It meant eschewing, to the extent possible, full scale specialisation leading to market dependence" (Brenner, 1997, p. 18, emphasis original). Further, "peasants would not be Smithian profit maximisers because profit maximisation was incompatible with the maximisation of their utility. Peasants' adoption of production for subsistence was thus not the expression of economic irrationality, but the quite sensible means to ensure economic security and to pursue understandable non-economic goals, under conditions in which neither economic security nor those non-economic goals could be achieved in conjunction with market-dependent, competitive production. *Peasants might see the gains from trade by becoming involved in the market, but they had to stop short of becoming dependent on it*" (Brenner, 1997, pp. 19-20, emphasis added).

43 Institutions in backward agrarian economies are then judged to evaluate their existence based on their efficiency. They will survive if they are efficient but will vanish if not. The debate centred around the institution of sharecropping is an excellent example of this. This arrangement was termed inefficient by Marshall, announcing its demise. When this prediction failed, Johnson and Cheung tried to recapture the lost ground by showing that sharecropping could overcome Marshallian inefficiency in resource allocation, which is why it could persist (Johnson, 1950; Cheung, 1969).

structure and incidences of externalities, transaction cost and information asymmetry. The existence of different institutions was, in this new version, to be explained sometimes in terms of their role as substitutes for missing markets. This was the case with sharecropping, which was considered a substitute for the missing market in insurance to minimise risk (Stiglitz, 1989). Alternatively, they could be a contract enforcement mechanism. This was the case with the interlinked transactions that would ensure adequate labour input without additional supervision costs (Braverman & Stiglitz, 1982). The centre of analysis, however, remained the same- ascertaining the efficiency in resource allocation. It was never acknowledged that sharecropping could be a "class efficient" system transferring surplus from the direct producer (Bhaduri, 1991, 1997) or that contract enforcement is not always profitable for all the participating agents (Bhaduri, 1983, 1997).⁴⁴

Based on its narrow ahistorical understanding, neo-classical economics poses questions that miss the structural features and focuses on questions of efficiency in resource allocation and welfare implications in terms of Pareto optimality. The solutions arrived at in the course of this analysis prove to be ineffective, as the most relevant question to be posed is not that of resource allocation but that of resource generation, i.e. the problem of lack of productive investment in a backward agrarian economy. Considerations of Pareto optimality are irrelevant as they can be deliberately violated in favour of "class-interest" (Bhaduri, 1997). The relationship between class efficiency and productive efficiency mediated through production relations should form the core of any meaningful analysis. The second noteworthy deficiency is the choice of method- that is, the method of "marginal returns" to carry out an analysis. An excellent example of this is the explanation of the size-productivity relationship, claimed to be negative, which is explained through equality of opportunity cost of labour, which is assumed to be zero, with marginal product of labour. The observed relationship, which is not unambiguous, and might result from non-market considerations, is beyond its imagination (Bhardwaj, 1974).

In the light of the above, any exploration into the complex relationship between the agrarian structure and growth has to find an alternative to the dominant paradigm of neoclassical economics. A more suitable approach will be the one that utilises the valuable insights of the classical political economy. But it must also be rooted in the critical traditions

⁴⁴ Bhaduri describes circumstances where the rural credit market is highly isolated and personalised. Under certain conditions, it is profitable for the lender to force the borrower to default in order to capture significant capital gains.

of the same. The analytical framework of the *Agrarian Question* certainly is a good candidate for this purpose. The same is discussed a little later.

3.2 Agrarian structure as an obstacle to growth

The agrarian relations holding back growth as it has been taken up in the Indian context need to be seen in the larger context of the relationship between agricultural growth and the agrarian structure. The debate on the agrarian structure as an obstacle to growth has its roots in the anti-colonial struggles. It is worthwhile to look at academic contributions in the post-colonial period. The first major contribution was by Prof. Daniel Thorner in the form of a series of lectures in 1955, which was later published as a book (Thorner, 1976). It generated considerable interest in land reforms and made a strong case for it by portraying the existing land relations as obstacles to growth. His penetrative analysis of land relations talked of an "in-built depressor" working to thwart agricultural prosperity by robbing the peasantry of investible surplus. This was done through unrestrained rental extractions, usurious interest rates or speculative trade in agricultural commodities. The ensuing discussions strengthened the belief that agrarian prospects could not be imagined without taking into account the obstacles illustrated by Thorner. Subsequent discussions further enriched the argument by adding nuances to the original analysis by Thorner. A multiplicity of possibilities were considered as far as agrarian relations were concerned, and this implied multiple theorisations of the existing conditions.

There are two distinct types of theorisations of the relation between the landlord and the landless or land-poor tenant mentioned earlier. Based on these, there could be two possibilities in this regard. The first discusses a system of production where there is a polarised class structure where a large part of surplus extraction takes place through "absolute ground rent" from small tenants. It is argued that the landlord would not undertake productive investment in cultivation as long as profitability conditions do not permit overcoming the "rent barrier". Any attempt by landlords to become capitalists, by themselves taking up the task of organising production or hiring labourers, would require a direct investment of capital in production by the landlord. Whereas, under the leasing system, no capital investment by the landlord is required (the necessary outlays being provided by the tenant, who, it is assumed, has sufficient non-land means of production). Hence, the capital directly invested in agriculture by the landlord has to give an adequate return to cover not only the profit it was

earning in other uses but also the foregone rental income from the tenant (which was a pure return to the property, namely absolute ground rent, with no element of interest or profit in it). Thus, there is a "rent barrier" to productive accumulation arising from the ability of landlords to extract absolute ground rent by virtue of their monopoly of property rights (Patnaik, 1976, 1983). This rent barrier can only be overcome through redistributive land reforms breaking the land monopoly. In its absence, however, if the direct investment can embody new technology capable of giving the required quantum jump in land productivity, the landlord will be incentivised to switch to capitalist cultivation. The spate of tenant evictions and switch to capitalist cultivation in Northern India from the late 1960s onwards is explained by the drastic improvement of profitability conditions as entailed in the new HYV-irrigation technology. The persistence of small tenancy in Eastern India in terms of the inability to achieve control over irrigation and raise yields to the required extent led to the persistence of the rent barrier (Patnaik, 1986, 1999) until institutional changes were undertaken in some parts of the region.

The second theorisation of the principal barriers to investment defines the tenant quite differently by specifying that s/he is not only deprived of the land but also has no or very little non-land means of production and, hence, always requires loans. This theorisation stresses the extraction of high, usurious interest on loans given by the landlord to his tenant. It emphasises that technical change which raises yield might reduce the loan interest element to a greater extent than it increases the rent element (given the assumption of an invariant rental share of output going to the landlord) and, hence, will not be undertaken.

Krishna Bhardwaj was the first to coin the term "interlinkage of markets" and provided a general framework for understanding it in agrarian dynamics (Bhardwaj, 1974). It is important to note that the interlinkages per se are not explanatory in an analysis of agrarian dynamics as individuals are always participating in more than one market and in different capacities. It would have analytical meaning only when distinctive and exploitative features of particular exchange relations are pointed out. This is elaborated below.

Interlinked transactions signify a pattern of agrarian development (or lack of it) reflecting a particular process of commercialisation of agriculture having its roots in the colonial past of the country when imperialist domination engendered a process of "perverted" capitalist development resulting in the transfer of surplus produced in the colonial country to the metropolitan imperialist centres. As pointed out in Chapter One, the axis of the whole

surplus transfer mechanism was the land revenue collection system that was arbitrarily imposed at extremely high rates and ruthlessly enforced. This often entailed a deliberate attempt to stifle productive investment in the colony. This precondition also shaped, at the basic production level, the primary interest of surplus extraction in such a way that it conflicted with productive investment in the agricultural sector.

Bhaduri provided a specific formulation of the general phenomenon of interlocked transactions holding back productive agricultural investment (Bhaduri, 1973). In the context of what he termed a "semi-feudal" agrarian structure, with usury by landlords to the almost destitute tenant producers constituting the central feature, there emerges an interlinkage in credit and land markets. The landlords not only pursue the economic objective of maximising profit from moneylending and extracting rent but also the political objective of keeping the peasants under control by ensuring perpetual indebtedness. The model assumes certain levels of yield per peasant family, a rental share, an interest rate, and a marginal propensity to consume in relation to increased peasant income arising from any yield increase. It says that each year the poor peasant families leasing in land from the landlord are left with an amount of paddy that is less than their annual consumption requirements after paying the rental share, the principal amount of paddy taken as a loan and the interest (again in terms of quantity of paddy). This produces a dynamic balance where the tenants remain perpetually indebted. Given the interest rate and rental share, Bhaduri traces all possible combinations of marginal propensity to consume by the indebted tenant families and yield increments. He concludes that under certain conditions, landlords, the source of consumption credit for the poor tenants, would not undertake productive investment to raise unit output, as it would undermine the dominant form of surplus extraction through usury by increasing the net income of the tenant and dynamically reducing his dependence on loans. This reduction of interest income not only might well outweigh the increase of rental income to the landlord but might free the peasants from perpetual indebtedness completely (or, for worse, both).

A careful reading of the model suggests that it can serve as a general framework to explain stagnation or growth given the semi-feudal conditions. There are four possibilities within the framework of the model. In the first scenario, yield improvement resulting from investment implies a net economic loss to the moneylending landlord with peasants still under their control. Second, such improvements imply not only an economic loss but also a political loss when indebted tenants break free from debt bondage. Three, when it brings

economic gains for the landlords but a political loss in terms of control over tenants who break free from debt bondage. And lastly, such economic gains may arise without losing control over the peasantry because debt bondage remains intact. This last scenario is the only possibility to bring any technological improvement without undermining semi-feudal control. In a sense, this is the limit of growth under semi-feudal conditions.

It should be kept in mind that the model assumed a fixed interest rate and rental share. A change in the interest rate or rental share, or both, can change the configuration of outcomes by increasing the scope of stagnation by making such yield improvements economically and politically unacceptable to landlords. Therefore, to reproduce the same agrarian relation and consequent stagnation over time, "class domination" over direct producers is required, allowing for variation in rental or usurious income. This notion of class power, when introduced in the model, produces stagnation in a dynamic sense in a more generalised sense and also provides stability to the model (Majid, 1988). The class power in his formulation makes the degree of involvement of the peasants in exchange relations and the extent of interlinkage between markets (i.e. the spreading of exploitation over a number of markets to maximise surplus extraction) control variables in the hands of the landlord. The importance of usury in this model lies not merely in its size but also in its capacity to create these two control variables.

Certain critical points must be noted to undertake a comprehensive evaluation of these theorisations. While Joan Robinson (1979) accepted Patnaik's argument, there has been little subsequent discussion about it. Her theoretical rejection of Ricardian rent and the stress on the centrality of the Smith-Marx concept of absolute rent (Patnaik, 1983, 1994) remains a minority position. However, Bhaduri's landmark work (Bhaduri, 1973, 1983) has generated extensive discussion. Many theoretical and empirical arguments have been advanced to question some of the assumptions and outcomes of the model (Basu, 1984; Breman, 1974; Ghose & Saith, 1976; Griffin, 1974; Newberry, 1975; Prasad, 1976; Sarkar, 1991; Sen, 1981). These critics have also raised some important questions about the nature of the model. But it is its descriptive validity that has been challenged most often. In the Indian context, it is pointed out that neither usury nor interlinked transactions appear to be significant except for certain pockets, and Bihar invariably appears to be an example of the exception. There has been another criticism regarding the empirical validity of the assumption that the surplus appropriating class is highly homogeneous. If we allow for inter-class and intra-class

heterogeneity, the results can be radically altered. Suppose there are more than one class of surplus appropriators. In that case, we have a varied pattern of outcomes depending on the mutual relationship between these classes and the nature of interlinkages between them. This allows for productive investment, but it can still be thwarted under certain conditions. Regarding intra-class heterogeneity, there is a good chance to break the barrier to productive investment. The state can create fissures in "class collaboration" by increasing the profitability of private investment through expenditure on infrastructural development.

One important point to be kept in mind while evaluating these theoretical formulations is that the distinction between mechanisms of surplus *generation* and surplus *appropriation* has to be properly grasped. While emphasising that surplus is generated only in the sphere of production, appropriation of the surplus is to be mediated through either production relations directly or through exchange relations indirectly. The framework of interlinked transactions focuses on the latter. But if the appropriation of the surplus product is mediated through exchange relations that are unequal in nature, then the basis of such inequality in exchange relations has to be outlined. In the context of a differentiated peasantry, the relative class status of economic agents determines their extent and nature of participation in exchange relations. Therefore, as mentioned above, the structure of the ownership of means of social reproduction assumes significance and, in a sense, primacy as well in the causal determination of exchange relations. Land relation in an agrarian economy occupies the central place in this regard. In any exchange relation, therefore, exploitation or profitability depends not on interlinkages per se but on the nature of involvement, which, in turn, depends on relative resource position and on land relations in particular. Exploitation through the mechanism of forced commerce, thus, cannot be independent of land relations.

In this regard, the institution of sharecropping also has to be looked at in a manner that considers production relations and not merely the contractual arrangement, i.e. the apparent form of sharecropping. It has to be analysed in the context of a differentiated peasantry. It has to be recognised that sharecroppers do not constitute a single class. A sharecropper can be a small peasant involved in feudal relations with a landlord or a rich farmer hiring outside labour to produce a surplus. There can be a variety of production relations between these two extremes depending upon the relative resource position of the peasant concerned.

The discussion so far has treated the agrarian economy in a somewhat abstract manner in that *external* influences have not been mentioned. But, in reality, it is exposed to external influences in two major ways. First, the agrarian economy is related to the outside world through the relations of exchange. These are mediated through the output, material input, and labour markets. The dynamics of the external world transmit its impact on the internal dynamics of the agrarian economy. Another source of external influence on the agrarian economy is state intervention. As mentioned at the very beginning, it can take two forms. Firstly, it directly tries to alter agrarian relations (e.g. through measures of land reforms). Secondly, it alters the exchange conditions generated by free markets by directly investing in infrastructure and regulating price and quantity adjustments in output and input markets. Together they can change agrarian relations and boost productive investment. This possibility has to be incorporated in the analysis of growth in rural Bihar, which appears to be decisive. The insights given by the general framework of interlinked transactions can be gainfully used only when these external influences are also accommodated in theory.

3.3 Specific nature of growth shaping the agrarian structure

The second aspect of the relationship between agricultural growth and agrarian structure, i.e. how growth influences the agrarian structure, has also been intensively discussed in the Indian context. As pointed out earlier, it has generally been discussed in light of the experience of Green Revolution technology and its impact on the process of differentiation/polarisation in the agrarian economy. Since this process is not separated from its theoretical opposite, i.e. agrarian structure influencing growth, we find explicit or implicit conclusions pertaining to differentiation in all of the stagnation models. According to one analysis, the changing agrarian structure, reflected in a change in the form of surplus appropriation from *primitive* accumulation to *normal* accumulation, has been affected by profitability considerations (brought about by new technological opportunities). This kind of change implies a process of class differentiation involving a change in production relations moving towards the formation of capitalist relations. However, the process of class polarisation may not arise; economic differentiation can proceed without being accompanied by the former. This distinction should be borne in mind as the two processes are distinct in their origins and implications. A good example is the cases of interlocked transactions and

forced commerce, where economic differentiation can proceed without a corresponding change in production and exchange relations.⁴⁵

In the Indian context, it is argued that the Green Revolution technology (or the new technology) and its claim of being 'scale-neutral' have been questioned. It is argued that it has not been 'resource-neutral', and rich farmers have disproportionately gained from it (Byres, 1981). In the course of its application, it "has hastened the process of differentiation", consolidating the economic position of the rich peasantry on the one hand and simultaneously giving rise to a process of de-peasantisation on the other. However, this process is a complex one, and it is characterised by *partial differentiation*. This means that the process of de-peasantisation of middle and small cultivators doesn't take place universally. Several studies based on National Sample Survey data and some micro-studies have found evidence of this effect.⁴⁶ Byres found evidence suggesting the increased dependence on wage labour and loss by small peasants in the share of the operated area is not always accompanied by a loss in terms of owned area.

There may be two counteracting tendencies to the process of differentiation. The first is internal to the dynamics of differentiation when the adoption of new technology resulting in increased wage employment may provide additional or substitute sources of income for the small and marginal peasants, thereby increasing their tenacity in terms of retaining their small landed property. In a study of some villages in Bangladesh, evidence suggesting such a pattern was found, which, however, did not go unchallenged.⁴⁷ The second counteracting tendency may arise from the tightening of the labour markets due either to state-sponsored employment generation schemes or a pull factor from urban/rural non-farm employment. Several micro-studies have shown that increased non-farm employment had a substantial impact on stabilising income levels of the poorer households in rural India (Harris, J. 1985, Ramachandran 1990, Walker & Ryan 1990).

45 In Bhaduri's model, it is clear that primitive accumulation can take place through forced commerce. This accumulation can give rise to normal accumulation later *when the lender decides* to capture the collateral by appropriately timing the default. But this must be associated with *economic* benefits to the lender. Economic differentiation can take place without any differentiation along "class" lines as long as the lending landlord decides in favour of debt rolling.

46 Attwood (1979), Cain (1981), Sanyal (1988), Walker & Ryan (1990), Athreya et al (1990), and Harris, J. (1992) have found that landlessness has decreased. At the same time, there are pieces of evidence of the increasing concentration of land ownership in comparable studies at the micro-level (Gough, 1989).

47 The conclusion of Bhaduri et al (1986) was contested by Rahman (1988).

The issue of economic differentiation has been discussed much more intensively. The general perception that the Green Revolution technology has intensified the process of economic differentiation and, consequently, led to poverty-inducing growth has been challenged. For Byres, the adoption of new technology was responsible for throwing a large number of poor peasants into wage labour (Byres, 1981). Harris, accepting the evidence of increasing instances of wage employment, however, questions Byres' proposition that it was the adoption of new technology that was responsible for it by saying that it was not clear on what basis such a claim is made (Harris, J., 1992, p. 195). The proposition that the Green Revolution technology has led to an impoverishment of peasantry has been attacked from another perspective. Lipton and Longhurst held that the new technology with its particular biological characteristics had benefited small and marginal farmers as cultivators by increasing yields, though with a time lag; as workers by increasing employment; and as consumers by bringing down prices of cereals (Lipton & Longhurst, 1989). Thus, the mystery of poverty should not be explored in the domain of peasants but in the labourers' domain that constitutes the overwhelming majority of poor in rural India. Trends in real wages, therefore, explain much of the poverty phenomenon. Some micro-studies have validated this conclusion (notably, Walker & Ryan, 1990). However, employment trends have not shown a positive relationship with the new technology. One study has found that initially, there was a spurt in labour use per hectare for those crops and regions experiencing Green Revolution, which peaked in the mid-1970s. But this trend was reversed afterwards, and yield increases were associated with decreasing labour absorption (Bhalla, S., 1987). Another study has found stagnation or decline in real wages over a longer term in Green Revolution areas (Jose, 1988). This was due to the mechanisation and circular migration of agricultural labourers into these dynamic regions. The impact of price fluctuations is consistently strong and decisive on the incidence of poverty (Gaiha, 1989). It can be argued that this finding reflects the dependence of the poor on wage labour. But this can only be partly true as small and marginal peasants are also net buyers of food without necessarily depending upon casual wage labour, particularly in cases where they are growing a small marketable surplus of food or non-food crops. Further, price fluctuations can be a serious problem for wage labourers and the marginal or small peasantry.

The literature around the evolution of agrarian structure, therefore, has veered around explorations of the growth trajectory with its attendant technological framework. Primarily the issue is whether differentiation of peasantry, for which evidence was found as mentioned

earlier, has been accompanied by polarisation in the class structure. This is situated well within the earliest debates around agrarian transformation raging during the seventies and early eighties of the last century. This also formed the core of the analysis of the Agrarian Question in its initial phase of re-imagining the classic *Peasant Question*⁴⁸ of the nineteenth-century revolutionary transformations in Europe.⁴⁹ This re-imagination was both a cause and a result of new developmental thinking in the post-colonial third world countries struggling to modernise and industrialise. Agrarian transformation remained the axis around which the character of the economies was to change. The Agrarian Question, so far, has been one of the richest frameworks for understanding the agrarian dynamics.

3.4 The *Agrarian Question* in the 21st century

The debates around agrarian relations and lack of growth have given rise to another, more intense debate on the *mode of production* in India⁵⁰ because of the direct political import of the question. The *mode of production debate* also has an empirical focus – whether the agrarian relations in India warrant calling it a capitalist mode or feudal/semi-feudal mode. This does not mean that the theoretical content of the Agrarian Question remained unquestioned. Each participant had sought to question and modify the meaning and scope of the mode of production as they would apply it to the Indian context. Therefore, it remained situated in the larger framework of the Agrarian Question, where the development of agrarian capitalism in the countryside was sought to be explored. This was one of the three 'problematics' as Bernstein would deconstruct Byres' construction of the Agrarian Question.

⁴⁸ Originally propounded by Engels (1977, first published in 1894). Karl Kautsky (1988) published his classic in 1899 that immediately became highly influential in revolutionary political movements.

⁴⁹ Terrence J. Byres (1977, 1986, 1991, 1995, 1996, 2006, 2009) remains by far the most influential scholar of the Agrarian Question. Bernstein (1994, 1996/97, 2000, 2004, 2006, 2009, 2010), an equally vociferous scholar, has also been instrumental in making the Agrarian Question a central concern for all those looking for a solution to the "agrarian impasse" (a phrase popularised by James K. Boyce (1987)). Akram-Lodhi (1998, 2008), Akram-Lodhi and Kay (2009, 2010a, 2010b), de Janvry (1981), Araghi (2000, 2009), Borras (2008), O'Laughlin (2009), Watts (2009), Mamdani (1987), Kay (2000), McMichael (2006, 2009), Wood (2009), Akram-Lodhi, Kay and Borras, Jr. (2009), Patnaik (1987, 1990), Warren (1980), and Harris (1980) is a small list of contributors in a very long list. The *Journal of Peasant Studies* and later the *Journal of Agrarian Change* too, have also carried forward the debate, though not exclusively.

⁵⁰ Some notable, though not an exhaustive list of, contributions are Rudra (1970), whose essay in *Economic and Political Weekly* started this debate in India, Chattopadhyaya (1972a, 1972b), Patnaik (1971, 1972), Harris (1982), Prasad (1973, 1974), Banaji (1972, 1973, 1977), Gough (1980), Sau (1973, 1976), Omvedt (1981). Thorner (1982) is by far the best review article of the debate, and Patnaik (1990) is a good collection of representative views. Bhaduri (1973) has often been misunderstood as a participant in the debate, while he was actually not writing for the debate. Despite this, his work influenced many participants in this debate. His contributions (1973, 1983, 1986, 1991, 1997) have remained theoretical in nature.

By the mid-1980s, the *mode of production debate* was tapering. By then, the theoretical hair-splitting veered the discussion considerably from its initial focus – a more empirical one of identifying agrarian relations and the mode of production in India. One may be compelled to consider its relative futility in understanding and applying it to Indian reality because of theoretical hyperbole dominating the debate in its later phase. The agrarian crisis of the late 1960s and the industrial stagnation of a decade and a half starting from the mid-1960s had considerably eased by the 1980s.⁵¹ This change in the macro context also brought back the other two 'problematics' into sharper focus – one of capital accumulation to support industrialisation and the other of the political balance of class forces within the framework of the Agrarian Question. Adoption and spread of Green Revolution technology also eschewed the question of development of agrarian capitalism with structural transformation achieved through land reforms, more explicitly covered under the third problematic of politics around agrarian transformation. In policy terms, it implied markedly reduced efforts and willingness to undertake land reforms.

At the beginning of the 1990s, the Indian economy saw a massive roll-out of neo-liberal policies that had been more or less confined to Latin American economies till then. This development was also reflected in posing the Agrarian Question in a newer context. Aggressive globalisation and deregulation of domestic markets, commodities as well as labour, coupled with the globalisation of finance, were completely changing the overall economic contexts as well as agrarian conditions in all countries. This called for a reconstruction of the Agrarian Question. The decade of the 1990s had already seen the emergence of literature critical of "old" fashioned formulations. Bernstein (1996) had produced a powerful and critical reformulation during this period that forced other scholars to consider newer developments and critically engage with them. Although Byres' writings remained the axis around which these reformulations took shape, these attempts at reformulations resulted in multiple different aspects placed at the centre of the *multiple* Agrarian Questions posed. These reformulations brought into focus gender and environmental aspects that have been more or less entirely absent from the concerns of the Agrarian Question in earlier theorisations.

In one of the most comprehensive surveys of the Agrarian Question so far, Akram-Lodhi and Kay (2010b) have identified seven such variants of the Agrarian Question in

⁵¹ Nayyar (1994) is a good collection of writings explaining the industrial stagnation in India.

currency today, presenting seven different perspectives. Their identification of these multiple Agrarian Questions is based on Bernstein's (1996) deconstruction of Byres' (1996) formulation into three 'problematics' –the nature of agrarian relations, rural accumulation, and rural politics. Looked at in this way, each one of these perspectives has a distinct core with implications for the three aspects and changes taking place therein - agrarian relations, productive accumulation and the emerging rural political landscape. Even if brief, a description of these questions would help understand the full range of issues they cover, their central concerns, and their important implications.⁵²

The first and the most influential one is where class forces and class dynamics are at the core. The development of agrarian capitalism, subsequent productive accumulation or lack thereof and emerging rural politics is explained in terms of class dynamics, wherein rural politics also determines the class dynamics. Byres' writings (1991, 1996, 2003) have exemplified this approach wherein agrarian differentiation would determine the emergence of wage-labour relations and the extent and nature of surplus accumulation. Byres is of the opinion that one cannot assume a fixed path for the development of capitalism as the process of differentiation allows for multiple possibilities involving a range of class configurations. These configurations may or may not be congruent with neat polarisations along the "classical" cases of the emergence of wage labour. Neither the emergence nor the character of capitalist relation can be assumed (Byres, 2006). Any such presumption would either be a misreading of historical trajectories or an incomplete understanding of it.

The second variant of the Agrarian Question is primarily influenced by the contributions of Bill Warren (1980). Here, the emergence of capitalist relations is almost a given as a result of imperialist penetration in these agrarian economies. Imperialism-driven "path-dependence" of the emergence of wage labour relation is at the core of his analysis, determining the extent and course of accumulation. Variations in the extent of the development of capitalism are because of specific conditions under which imperialism has pushed the commodification of labour. Rural politics, therefore, revolves around the conditions of wage labour relations that prevail in these countries. Agrarian transformation along the lines of deepening capitalism is inevitable even if different countries or regions show uneven and differential patterns.

⁵² The following description is based on Akram-Lodhi and Kay (2010b).

The third variant of the Agrarian Question took shape under a constant re-envisioning of the patterns of agrarian conditions and their interconnectedness with the larger macroeconomy under neoliberal globalisation. Bernstein (1996, 2006, 2009) has stressed that under neoliberal conditions, the spread of globalisation and its incorporation of finance has resulted in a situation where larger capital accumulation, increasingly at the global scale, has detached itself from the limitations of agrarian capital. The development of agrarian capitalism and agrarian transformation is no longer relevant for capital accumulation at large. It relegates agriculture to a condition of abject neglect if it fails to help the appropriation of surplus by globe-trotting capital immediately. The difference between the neoliberal context and the earlier one is that of the capacity of capital today to break domestic barriers and hence seek accumulation outside if restrained by backward agriculture, unable to fast-pace accumulation on its own. This "de-coupling" of the emergence of agrarian capital is at the core of this formulation. Bernstein doubts the existence of an Agrarian Question as he finds that this de-coupling has resolved the Question. At best, the Agrarian Question may still exist in the form of the Agrarian Question *of labour* as the Agrarian Question *of capital* stands resolved. Consequently, rural politics is evolving around the marginalisation and expropriation of labouring masses, labourers or peasants that global capital has unleashed.

The fourth perspective puts the *global reserve army* at the core of its analysis (Araghi, 2000, 2009). It records similarities and continuities between the two phases of globalisation of the world economy: the liberal globalisation of the nineteenth century and the neoliberal globalisation of the late twentieth century. It emphasises the operation of the law of value at the world scale and increasing subjugation of agriculture of Asian, African and Latin American economies under it. In the countryside, it creates an 'enclosure food regime' and increases the reserve army of labour at the world scale by creating surplus migratory labour through the expropriation of the agrarian population. This happens mainly through market imperatives dispossessing and displacing peasants and other labouring masses from the countryside. 'Enclosure food regime', with its ability to depress the value of labour power at the global level, fuels capital accumulation worldwide. The crisis of the agrarian economy is primarily a food crisis (one that happened in 2008 and its immediate aftermath) and a crisis of capital accumulation that further drives dispossession and displacement enlarging the ambit of the 'enclosure food regime'. Rural politics in this variant of the Agrarian Question is seen in the light of the response of the dispossessed and displaced rural population.

The fifth version of the Agrarian Question is reformulated as the Agrarian Question of food (McMichael, 2006, 2009). In its immediate focus, it is similar to the fourth variant that takes globalisation as the crucial context for situating the central problematic of the Agrarian Question. But it is quite different in its analytical core, based on distinctive features of the current phase of globalisation. This contrasts with the fourth variant that emphasises similarities between the nineteenth and the late-twentieth-century globalisations. At the core of this analysis is the emergence of a 'corporate food regime' controlled by transnational corporations riding and exploiting pervasive globalisation. Differentiation of the peasantry is mainly through their exclusion from these global food regimes. It is done through the creation of a commodity fetish and an accumulation fetish in the free market through financialisation and 'supermarketisation'. Rural politics in this variant takes the form of global peasant resistance against their dispossession and exclusion from the corporate food regime that threatens their simple reproduction.

One may think that the last three variants of the Agrarian Question should be taken as one as they all emphasise the current conjuncture of globalisation and other aspects of neoliberal restructuring of agriculture in particular, but also the world capitalist system in general. However, it may be a mistake to do so as the analytical cores and the reasoning of these three are distinct, resulting in differing emphasis and focus. The outcome of an impoverished and differentiating peasantry is common to all of them, but this results from very different processes as visualised by them.

The last two variants are very different in their approach and bring an entirely new dimension to the formulation of the Agrarian Question. The sixth variant has gender relations at its core and asserts that agrarian class formation and accumulation are mediated through gender relations (O'Laughlin, 2009). It reformulates the Question as a 'gendered' Agrarian Question. Exclusive focus on the commodification of labour, it argues, is likely to miss essential links in the accumulation process by overlooking the crucial role of the non-commodified labour in this process. Emerging institutions, formal or informal, and evolving politics have to be interrogated through a gendered lens to fully comprehend the production and reproduction of social classes, commodities, and circulation of surplus labour and commodities. Gender and class relations are reproduced through the process of gendered accumulation and gendered articulation of politics, wherein they both determine each other.

The last variant also puts an essential and a new core at the base of their reformulation, the ecology (Foster 2009; Watts 2009; Weis 2007). In their formulation, the 'biophysical agroecological setting' directly impacts the production process, shaping the process of class formation and accumulation process. Control over agroecological resources and their deployment underpins a definite class setting. At the same time, it continuously keeps reshaping it, ushering in a regime of accumulation suited for the given agroecological resource setting. Emerging social and political institutions reflect these agroecological relations, and hence contemporary rural politics has to be reflected upon in a manner that takes into account these relations as well.

The intense debate around the Agrarian Question has not only proved its continued relevance but has made it even more relevant. One does not have to, and one should not be looking at the 'best' among them. It is likely that different analytical constructs with differing focus, emphasis and reasoning would seem to suit different contexts. Therefore, the best one can get from this debate is by reading it contextually and testing the reasoning implicit in any analysis by empirical standards. Aiming merely at the internal logical consistency of the arguments may not suffice. Many of the propositions in the debate may appear questionable. A good example of this would be the 'de-coupling of agriculture' thesis proposed by Bernstein (2006, 2009). The globalisation of trade in commodities coupled with the globalisation of finance is the binding force behind this de-coupling. But in other variants, for example, Araghi (2000, 2009) and McMichael (2009) suggest a robust coupling that connects the agricultural sector with global regimes of accumulation. That does not mean, however, that the analytical construct of Bernstein is entirely redundant. The same has been able to explain the increasing dispossession and displacement of the peasantry and the proletariat/semi-proletariat. It is worth reading these analytical constructs, understanding their reasoning behind the accumulation and differentiation process, and identifying the most powerful ones operating in the given context.

Given that these theorisations are rooted in a praxis-oriented approach, only a praxis-oriented reading would better understand the prevailing conditions and the subsequent choice of policy. Byres (1996, 2003, 2009) has already warned against the typification of transition trajectories as historical processes contain a multitude of possibilities that can only be predicted with limited precision. All the above perspectives, therefore, offer beneficial

insights to comprehend the contemporary world of the peasantry and how it is undergoing structural transformation.

To make sense of the contemporary world of the peasantry, it is essential to be aware of the limitations of applying the so-called 'historical lessons'. Theoretical hyperbole in the debates around the Agrarian Question and the mode of production has dominated the academic discourse for over two decades. It has ultimately reached an impasse (Akram-Lodhi and Kay 2010a, 2010b; Bernstein 2009; Levien, Watts & Hairong 2018). But this impasse has also induced the resurrection of agrarian/peasant studies that offer far more innovative and creative ways to engage with the contemporary world and the agency of the peasantry. This is in part also because critical Marxist approaches have become far more receptive to 'populist' insights and agrarian 'populists' more explicitly embracing Marxist insights (Levien, Watts and Hairong, 2018). A careful exploration of the literature indicates that this creative academic synthesis is primarily a result of the changed economic and political circumstances of the 'agrarian South', wherein the political economy of such transformation has created complex challenges for 'old' theorisations. It also implies the synthesis of two 'warring' sides is basically a synthesis of relatively successful elements from both sides – a core understanding of the accumulation regime and its dynamics coming from Marxists (Bernstein, 1996, 2006, 2010) and a broader understanding of the plurality of class dynamics and the unfolding of rural politics coming from a new variety of populist writings (McMichael, 2015). This synthesis offers a new opening, substituting vibrancy in place of the 'impasse' that the Agrarian Question was experiencing for some time.⁵³

3.5 Locating the present exploration within the framework of the *Agrarian Question*

Where do these issues discussed above place the Indian reality today? How do we comprehend the inter-relationship between agrarian structure and agricultural growth today? Integration of Indian agriculture into the ever-expanding network of agricultural trade must be considered. The massive presence of transnational corporations and their control of the Indian market has altered the relationship of the Indian peasantry with markets, domestic as well as global. Differentiation of the peasantry has proceeded largely under market

⁵³ Borras Jr. (2009) recounts many variants of contemporary peasant politics amidst emerging conditions of the agrarian economy and society in the introduction to a volume of the *Journal of Peasant Studies* devoted to exploring the terrain of peasant studies.

imperatives. The power and scope of non-market coercive apparatus of feudal or semi-feudal type have reduced. Fragmentation of holdings has further progressed under demographic pressure. Speaking of peasantry today, therefore, more so in the case of Bihar, is a world of nearly or completely landless and marginal landholders.⁵⁴

Many accumulation patterns could be possible, including that of no accumulation in any given agrarian structure, depending on the specific context. The production structure and its orientation towards marketable surplus, to be sold in home markets or abroad, and the degree and status of the differentiated peasantry would imply different combinations of class relations and accumulation patterns. Akram-Lodhi and Kay (2010b) identify two forms of production systems. One where production is directed for export markets with dynamic links with global, often transnational capital. This facilitates capital accumulation directly in the form of profit from agricultural production and indirectly by lowering the value of labour power in the centres of capital accumulation in advanced capitalist countries. The other form is an inheritance from the past – a vast mass of impoverished peasantry engaged in petty production largely for subsistence. This form of production, despite its relatively smaller participation in the produce market, is increasingly getting drawn into it, subjecting this system of production also to the law of value operating worldwide. Further, the impoverished peasantry's reproduction is increasingly getting determined by yet another market, the labour market, as they are progressively relying on the sale of labour power for their survival.

It is this second form that comes closest to the conditions prevailing in agrarian Bihar. A careful reading of the literature suggests that the question of agrarian transformation has to be located on two plains simultaneously. First, it must incorporate the possibilities of crop diversification (emphasised and explored in Chapter 2), yield increases, and, increasingly, the labour market conditions, particularly the conditions and prospects of non-farm employment. At the same time, it also has to factor in the progressed differentiation of peasantry without the creation of 'footloose labour'.

After exploring the second aspect in a detailed manner in the next chapter, the analytics of a possible transformation is presented subsequently. As discussed above, a fuller understanding of the agrarian dynamics can only be done by situating it in its specific historical and spatial context. The question of technology will be a key factor with a crucial role in determining the extent and nature of class differentiation as well as patterns of

⁵⁴ These features are discussed in the next chapter in a detailed manner.

accumulation. The policies, and hence the state's politics, will be instrumental in shaping the eventual outcome. Given the non-neutrality of yield-improving technologies, a growing peasant resistance is expected to take shape. This is because of a retreat of the state from the agricultural sector (which no longer seems to be a *priority* sector) that has already progressed to the extent of depriving the rural population of some minimal benefits that had supported their sustenance in the past. In light of this, the state is called to intervene by competing interests – corporates, rich peasants, petty producers and a vast mass of semi-proletariats. The theoretical explanation given in the fifth chapter will account for the same.

The retreat of the state has to be read carefully in this context. It is not an absence but rather a radical re-posturing, as Harvey (2007) has suggested. The state administrative apparatus and its attendant institutions, formal and informal, create a network of privileges and prospects to move beyond the limits of agrarian accumulations. Wilson (2002, 2006) notes that a very small section of agrarian households, benefitting from much-depressed subsistence of labouring households over time, are able to extract surplus. They deploy it as an instrument to access, penetrate and exploit the nexus of government bureaucracy, criminal gangs and political parties to further their accumulation, mostly of the primitive type, by economic or, more often, non-economic methods. The threat of physical violence against any resisting agency is quite pervasive. This is a typical case of agrarian power fuelling social and economic differentiation based on primitive accumulation. This aspect of Bihar's agrarian landscape has been a persistent theme in discussions. Sinha A. & Sinha I. (1996) postulate a similar nexus that superimposes itself over the old agrarian structure, thus doubling exploitation and surplus extraction. While speaking of the 'old' structure, the phenomenon of 'bonded' labour (Bharti 1990) has also been recorded.⁵⁵ Much of it might have crumbled by now under the twin pressures of market and demography, albeit only on the concrete basis of evolving rural politics and agricultural technology.

A critical reading of the literature suggests that any analysis of the agrarian structure in Bihar and its relationship with agrarian accumulation has to be located in the broader context of the development of forces of technology, politics and the market. This must also allow for variations that would be predicated on the balance of these forces in the agrarian countryside. This forms the core problematic as well as the motivation behind the present work.

⁵⁵ Tom Brass (1999, 2010) gives a more general, analytical treatment of the "unfreedom" of labour within the political economy framework.

CHAPTER FOUR

The differentiated nature of Bihar peasantry

How do the theoretical questions discussed in the preceding chapter relate to the agrarian structure of Bihar? The agrarian society and the economy of Bihar have drawn a lot of academic interest. Researchers are primarily motivated by the challenges of explicating the "backward" agrarian structure and its relationship with observed agrarian stagnation. The nature of agricultural growth in Bihar was briefly discussed in the second chapter. This chapter starts with some of the significant findings regarding the agrarian structure of Bihar, sourced from secondary sources. This mainly relies on National Sample Survey reports and reports of the Agricultural Census of Bihar. These findings will be compared and contrasted with primary surveys wherever it is useful. Based on information available from secondary sources, certain important features of the structure of the agrarian economy of Bihar, which are relevant for this study, are outlined below. Later in the chapter, results and observations from the field study are presented to scrutinise and investigate some of the proposed thesis on agrarian stagnation and growth.

The present study devotes itself to examining the land ownership pattern and tenancy relations to broadly outline the structural features of Bihar's agrarian economy. Other structural aspects of income and expenditure patterns of cultivating households will also be examined. Similarly, the extent and nature of credit transactions, ownership of other farming assets and households' ability to increase cropping intensity will also be investigated to understand the growth dynamics. It will also investigate, to the extent permitted by and required for the limited focus, the question of wage income permeating the agrarian economy of Bihar. However, the control of land as the most important asset and the most powerful instrument of control remains at the centre.

Before proceeding to analyse the agrarian structure of Bihar, certain disclaimers are in order. First, the present work does not intend to do an in-depth investigation or analysis of the agrarian structure of Bihar. As it tries to look into the relationship that may exist between the structure and growth, it is worth identifying and laying out the essential aspects of agrarian structure for this purpose. To this end, only a limited discussion of some essential aspects that

directly impact the production of crops is possible. Given the nature of agricultural growth, the focus will be on yield levels in a given agrarian context. Only those aspects of agrarian relations that directly impact yield improvements or lack thereof will be looked at carefully, even if briefly.

Therefore, the issues examined in the present study, although a part of the wider issues raised during the mode of production debate, does not attempt to take a stance or investigate the prevailing agrarian relations. Similarly, despite being located in the larger framework of the Agrarian Question, it does not attempt to answer it as the scope of the Question is more comprehensive, encompassing industrialisation, rural politics and overall agrarian transformation.⁵⁶ However, the findings of this study can be utilised to clarify the relevant aspects of the Agrarian Question.

Secondly, any comprehensive discussion on the agrarian structure in India cannot exclude the question of caste. The connections between the "class" and "caste" structures have long been a vexed issue in social science research. In the present work, even in the limited sense, the inter-relationship between land ownership and caste is more than apparent. Caste dynamics often play an important role in determining the economic dynamics of agrarian society, not only in Bihar but in other parts of the country as well. The control over agrarian or rural surplus product cannot possibly be understood without locating it in a larger social dynamics where caste plays a decisive role. The evolution of land ownership patterns, tenancy relations, and wage labour relations are all located in and influence the larger caste dynamics. Several incisive and penetrating analyses of this aspect of Bihar's agrarian dynamics exist.⁵⁷ But given the limited focus of the present work, the evaluation will largely refrain from diving into this aspect of social dynamics. To the extent caste plays an important

⁵⁶ The conceptualisation of the *Agrarian Question* itself has undergone many changes since its inception. Starting from an explicitly political character in Engel's formulation as the "peasant question", it has long focused on the *transition* from pre-capitalist to capitalist mode (Bernstein, 1996, 2006, 2009; Lerche, 2013). Later versions have widened the scope as the varied experiences of agricultural growth or stagnation impacting the macroeconomic evolution of these societies in numerous ways started appearing more prominently in theorisations (Kay 2009; Akram Lodhi & Kay, 2010a, 2010b; O'Laughlin, 2008). A good example of this trend would be identifying different types of agrarian societies in terms of wider "food regimes" (McMichael, 2009). Changing nature of the "land question" is also featured in the recent writings as part of the larger *Agrarian Question* (Vijayabaskar, 2020). It clearly indicates that it has engaged with the debates on developing underdeveloped regions in diverse ways, moving away from an exclusive focus on the transition. But it has retained the class perspective and focuses on capital accumulation to look and critically engage with the more dominant discourses on development.

⁵⁷ Chakravarty (2000, 2011) provides a very useful analysis of this aspect. Among the recent works on agrarian dynamics, Sharma (2005) is notable for its comparative historical approach. There are some other field-based studies that connect caste status with land relationships (Sahay, 2002, 2020). These are some illustrative examples from a long list of authors engaging with the issue.

role in determining agrarian dynamics, it will be taken as a given, and the analysis will proceed accordingly, instead of explaining or analysing the caste dynamics or its complex intermingling with "pure" economic logic.

The relative size of the agrarian economy, in proportionate terms, is much bigger in the case of Bihar than the country as a whole. Therefore, the existing land relations and control or subjugation of the landless and marginal peasantry have been strongly reflected in the social and political landscape of the state. Whether it is in the form of social movements asserting the rights of the middle peasantry or that of agricultural labourers, the political establishment has remained concerned with the pattern of surplus generation, appropriation and utilisation. A gradual shift in the balance of social power and its reflection in the political establishment is visible today (Chaudhary and Shrikant, 2010). The emergence of a strong peasant movement during the colonial period has shaped the subsequent evolution of Bihar's political and social landscape. There is ample research that chronicles this evolution, discussing prospects of progress in this context.⁵⁸ The present work does not intend to go into the details of this aspect, though it acknowledges its importance in understanding agrarian dynamics. However, it will use the insights from such academic works wherever it is required for clarity.

4.1 Identifying structural features of agrarian Bihar: Looking at secondary sources

4.1.1: Distribution of landholdings and landlessness

The most important determinant of the agrarian structure is the structure of ownership and control of landholdings. At the outset, it must be said that the historical legacy of the *zamindari* system and the abject failure of land reforms in Bihar has resulted in a structure of ownership and control of land, which has remained "backward". By this backwardness, it is meant that not only is it highly unequal in nature, but it is also overwhelmingly dominated by owners of tiny landholdings and petty producers. The following observations regarding the distribution of ownership and operational holdings in Bihar make it amply clear.

⁵⁸ Arvind N. Das was a deeply passionate scholar of agrarian movements and their reflections on social and political dynamics. His works (Das, 1979, 1982, 1983a, 1983b, 1992) provide an insightful and penetrative analysis of land and labour relations of agrarian Bihar and its larger social and political evolution (or socio-political). He sees the opportunities for progress (and the squandering of the same) in terms of specific configurations that these constellations of agrarian forces have created.

Table 4. 1: Distribution of ownership holdings in Bihar (Year 2013)

Size class of ownership holding (ha)	% distribution of households	Average area of land owned, excluding homestead land per household (0.000 ha)	% distribution of area owned (including homestead)
Nil	3.13	0	0.00
>0.000 & ≤ 0.002	2.20	0	0.02
0.002-0.005	12.38	0	0.22
0.005-0.040	33.73	0.002	2.06
0.040-0.500	34.20	0.147	24.79
0.500-1.000	8.71	0.704	27.99
1.000-2.000	3.87	1.289	21.28
2.000-3.000	1.21	2.27	11.72
3.000-4.000	0.25	3.297	3.52
4.000-5.000	0.13	4.224	2.37
5.000-7.500	0.07	5.935	1.81
7.500-10.00	0.10	8.585	3.73
10.00-20.00	0.01	11.261	0.36
>20.00	0.00*	13.8	0.12
All sizes	100.00	0.218	100.00
* Negligible. Source: Calculated from the 70 th Round, NSS Report no. 571, p. A 96.			

The degree of inequality in the ownership of land is very high. Table 4.1 shows that 51.44 per cent of rural households own a mere 2.30 per cent of the total land, including the homestead. They are the households that effectively do not own any cultivable land. 85.63 per cent of households own just 27.09 per cent of the land. The top 1.77 per cent of households own 24.63 per cent of the land. This degree of inequality is only slightly modified when we look at the distribution of operational holdings.

In terms of operational holdings, the overwhelming majority of the cultivators are marginal peasants, and the overall distribution of landholdings is characterised by a very high degree of inequality (Table 4.2). About two-thirds of total cultivators at the bottom have landholdings of less than half a hectare operating only 20 per cent of the total area. More than 86 per cent at the bottom operate with holdings of below one-hectare size operating on about 50 per cent of the total area. At the top, less than 4 per cent of the landholders operate nearly one-fourth of the total area.

The picture is slightly modified in the data released by the Agricultural Census division of India (Appendix Table A4.1.1). The pattern is largely similar, but the size of the small operators category is bigger in the NSS survey than shown in the agricultural census. This difference is largely explained by a bigger proportion of marginal peasants in the census figures. This is reflected in the average size of marginal operational landholdings, which is

much smaller at 0.24 hectare compared to 0.3 hectare in the NSS report. The top segment shows a similar concentration in the Census report too. It is worth noting that the Agricultural Census has much bigger coverage than the NSS. Inequality seems to be equally validated, if not more, by the Census too.

Table 4. 2: Distribution of operational holdings in Bihar (Year 2013)

Size class of operational holding (ha)	% distribution of holdings	% distribution of area operated	avg. area operated (used for agri. activities) per holding (0.000 ha)
Nil	0	0	0
>0.000 & ≤ 0.002	0	0	0
0.002-0.005	0.8	0.00	0.00
0.005-0.040	11.8	0.18	0.01
0.040-0.500	53.7	19.87	0.18
0.500-1.000	20.2	30.45	0.72
1.000-2.000	9.8	25.11	1.22
2.000-3.000	2.4	11.39	2.25
3.000-4.000	0.6	3.98	3.34
4.000-5.000	0.2	2.02	4.23
5.000-7.500	0.3	3.32	5.58
7.500-10.00	0.2	3.00	8.52
10.00-20.00	0*	0.19	11.22
>20.00	0*	0.46	23.00
All sizes	100	100.00	0.48
* Negligible. Source: Calculated from the 70 th Round, NSS Report no. 571, p. A 578.			

The trend as reported in the NSS reports shows a reducing inequality measured by the Gini coefficient. Figure 4.1 shows that the value of the coefficient shows a perceptible decline after 1991-92. The distribution of ownership holding shows a modest declining trend till 1992, after which there is a noticeable decrease in inequality. After showing an increasing trend till 1992, distribution of operational holding also shows a declining trend afterwards. The latest Round of NSS data also suggests that the difference in the degree of inequality between ownership and operational holdings became the narrowest in 2013. As the inequality in the distribution of operational holding shows a decline, the narrowing is because of a much sharper decline in the degree of inequality in the distribution of ownership holdings.

Figure 4.1 also suggests that the operational holdings are relatively more equally distributed than the ownership holding, which is on the expected lines. The role of tenancy, in this regard, becomes important as it is expected that the transformation in the distribution of ownership holdings into the distribution of operational holdings is largely through the land

lease arrangements in the rural economy. This requires a closer look at the nature of tenancies in Bihar.

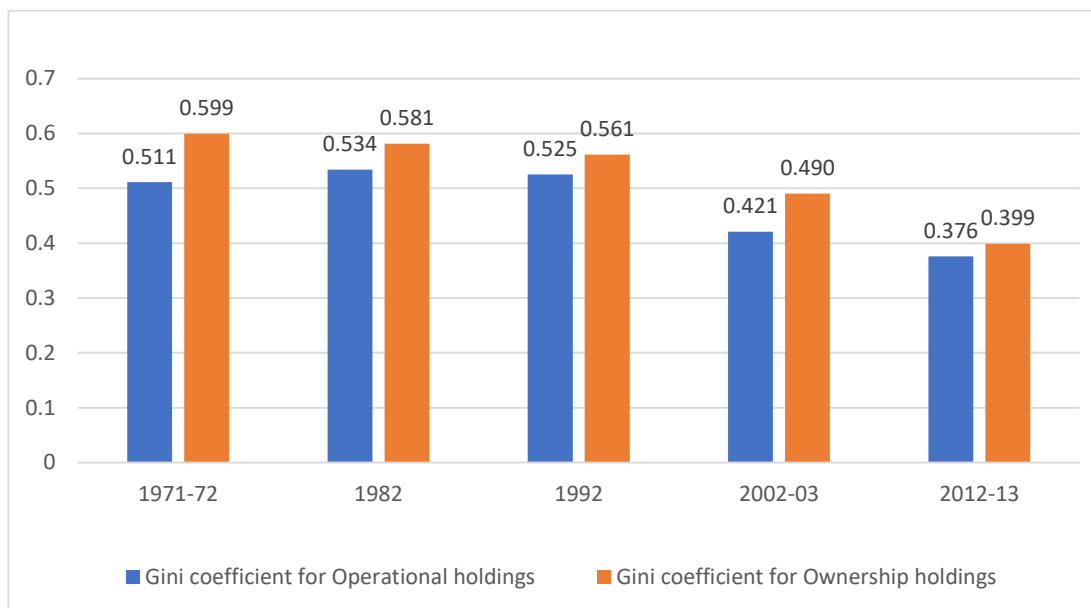


Figure 4. 1: Inequality of distribution of ownership and operational holdings in Bihar over time (computed from NSS reports)

Source: Author's own representation

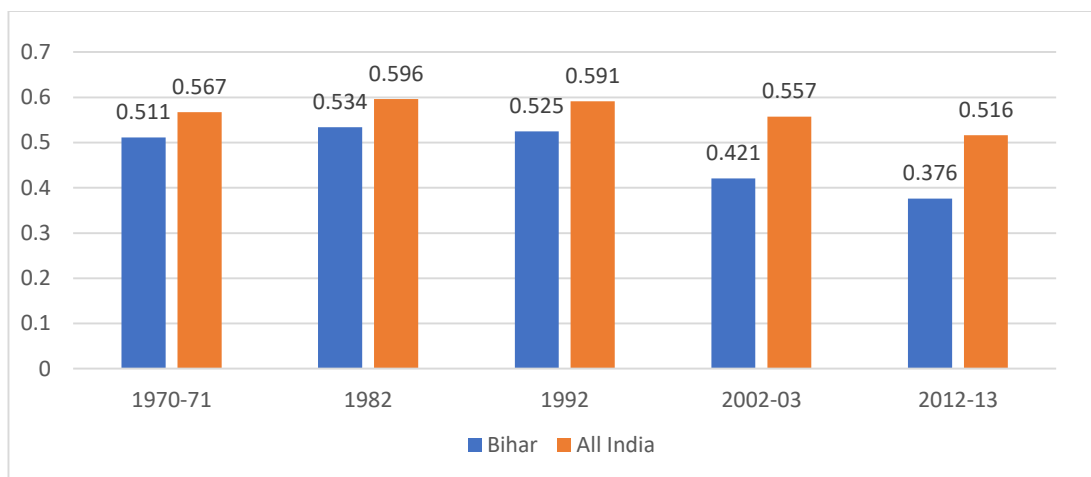


Figure 4. 2: Value of Gini coefficient for operational holdings

Source: Author's own representation

Further, the distribution of holdings in Bihar, whether measured in terms of ownership or operational holdings, is relatively more equal than that of India as a whole. In 2012-13, the value of the Gini coefficient for the distribution of ownership holding was 0.72 for India, as compared to 0.399 for Bihar. The decline in the inequality in the distribution of operational

holding is also seen in the case of all-India distribution, but the decline is much sharper in the case of Bihar. This is evident from Figure 4.2, where the value of the Gini coefficient for the distribution of operational holdings in Bihar is shown in relation to the value of the coefficient for India as a whole.

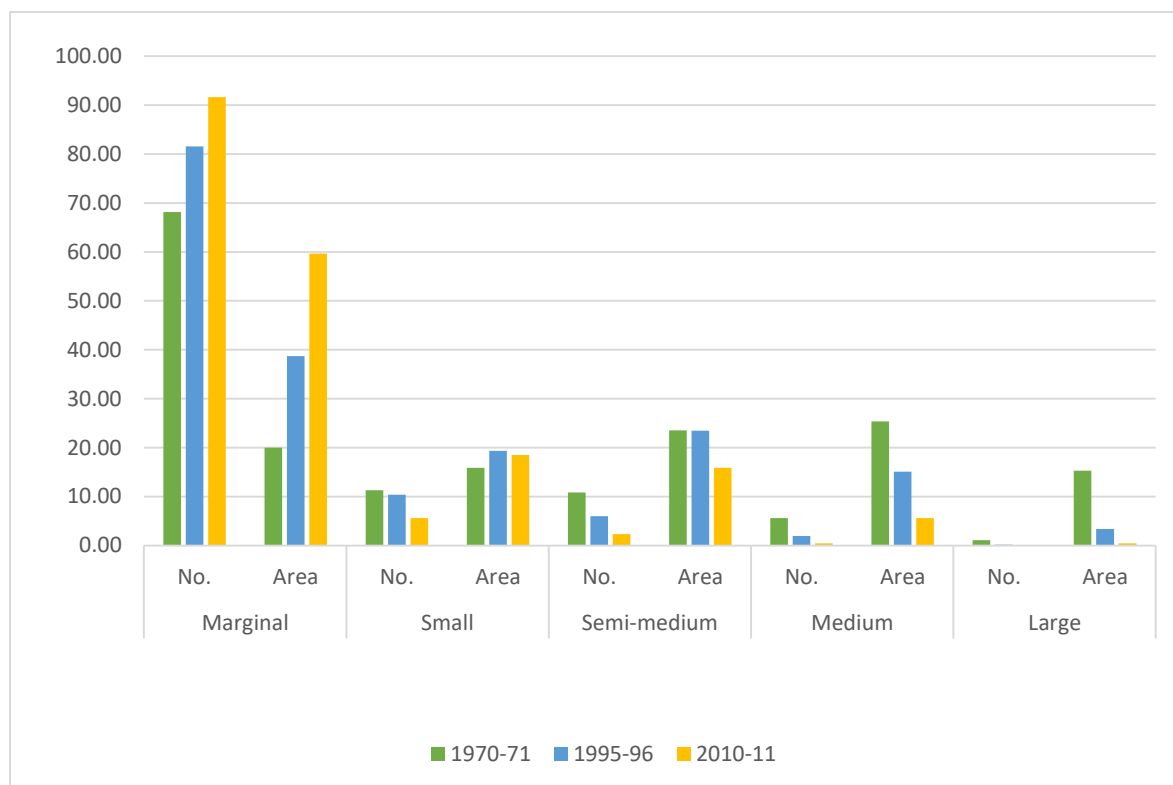


Figure 4. 3: Distribution of operational holdings and area (based on Agricultural Census Reports)

Source: Author's own representation

Figure 4.3 presents a comparative picture of the distribution of operational holding in Bihar since the 1970s. The four decades since 1970-71 have witnessed a transformation in which Bihar's agrarian economy, which was already dominated by marginal and landless peasants, became almost entirely taken over by marginal landholdings. Their share increased from 68.15 per cent to 91.67 per cent. The change suggests that it is largely on account of fragmentation over the generational division of landholdings. The share of area operated by marginal holdings has grown three times during this period – increasing from 19.97 per cent to 59.65 per cent. Those who operate more than 2 hectares of land were about 17 per cent, operating nearly 64 per cent of the total area. Their share in number and area operated came down to 2.74 per cent and 22 per cent respectively. The small category has experienced an increase in their share in the total area while witnessing a decline in their share in numbers.

The dominance of Bihar's agrarian economy by marginal landholdings has accelerated in the last decade. This coincides with a decline in the net sown area as reported in the land use statistics for the state after the turn of the last century. In the absence of any redistributive policy and very limited agricultural land market, this possibly hints at the play of the demographic factor with a tight land constraint fragmenting the bigger holdings into marginal holdings.

Therefore, the picture that emerges from the reports of NSS and Agricultural Censuses carried out over several decades is that of high inequality in landholdings coupled with the overwhelming dominance of marginal holdings. The distribution as shown in the ownership and operational holdings also suggests that the inequality is not mitigated substantially through the operation of land lease markets. This aspect demands a closer look at the extent and nature of incidence of tenancy in the state's agrarian economy.

The feature of high inequality is accompanied by a high and increasing degree of landlessness. The latest 70th Round of NSS for 2012-13 shows that landlessness as defined in the report (all those who own less than 0.002 hectare) has come down from the previous Round in 2002-03, from 7.6 per cent to 5.33 per cent. In fact, it shows that after peaking in 1991-92, it has been coming down consistently. But this may be misleading, and many researchers have pointed out the *increasing* incidence of landlessness (Basole & Basu, 2011; Sharma, 2005; Yadu & Satheesha, 2016).

The increasing incidence of landlessness is revealed from the NSS data itself when we look at the distribution of ownership holdings, excluding the homestead. The extent of landlessness has also remained very high: the 48th Round of NSS conducted in the year 1991-92 showed that about one-third of all rural households owned no land except their homestead.⁵⁹ The 59th Round (for the year 2003) data showed that the extent of landlessness had further increased to close to 50 per cent. 43.7 per cent of the total household in rural areas owned no land except their homestead. If we add all those who own less than 0.04 hectare of land, excluding the homestead, then this figure rises to more than 48 per cent. The cumulative percentage of all those who own less than half a hectare of land was 79 per cent.⁶⁰

⁵⁹ NSS, 48th Round, Report No. 399. Table: 5(R), p. A-62.14

⁶⁰ NSS, 59th Round, Report No. 491. Table: 4(R), p. A-82.

Other works, like Basole and Basu (2011), have also pointed out the increasing incidence of landlessness across Indian states. They added those households who own less than 1 acre of land to the landless category to call them *effectively landless*. Applying this categorisation to village-level data collected by Wilson (1999), they found that in central Bihar, the extent of effective landlessness was an overwhelming 71 per cent. The latest 70th Round of NSS shows that if we slightly broaden the definition of effectively landless to include all households owning less than half a hectare of land (which will be a little more than what Basole & Basu (2011) have suggested), then the percentage of households considered effectively landless would be a whopping 85.63 per cent (Table 4.1). This trend suggests that the apparent decline in landlessness as defined officially may not be revealing the true picture. Interestingly, the 70th Round report (Report No. 571) on ownership holding (which has been clubbed together with operational holdings) does not have a separate table showing the distribution of households based on land ownership, excluding the homestead. In the absence of direct estimates from the report, the closest estimate would be to consider all households who own an average of 0.002 hectare of land or less, excluding homestead. This figure is 51.4 per cent (Table 4, p. A-96, can also be seen in Table 4.1), higher than 48 per cent from the previous Round in the year 2002-03. This suggests that landlessness has not come down, even if it has not increased substantially.

A close reading of Tables 4 and 5 from the same report also indicates a similar observation. Those who own less than 0.002 hectare are, in any case, defined as landless. All those who own less than 0.005 hectare do not have land except the homestead. Those who own between 0.005 and 0.04 hectare have just 0.002 hectare of land, excluding homestead. A mere 13.7 per cent of this size class are reported to be self-employed in cultivation; a majority of them are wage earners. It is only with the ownership size class of 0.04 to 0.5 hectare and above that these households are reported as cultivators. Even this size class owns, on average, just 0.147 hectare of land (roughly one-third of an acre).

The large-scale out-migration of agricultural household members in search of employment is to be located in this context. But any simplified reading of this process can be misleading. The simple reading that the poorer households would migrate in search of employment, given that employment growth within the village economy is not sufficient to absorb "surplus" labour, may suggest that the proportion of household members belonging to the smallest size classes would be the highest. The data, however, does not conform to this

simple reading. The 70th Round data of NSS shows that it is the poorer cultivators, but not the poorest, who are found to be migrating out of the village for wage employment.⁶¹ If we look at those who operate less than half a hectare of land, they constitute more than 66 per cent of households. But their share in the households with members staying away from the village for employment is 45.2 per cent only. The out-migration seems to be concentrated in the upper spectrum of marginal /small size classes – between .04 to 2.0 hectares. A plausible reason could be proposed in terms of their capacity to out-migrate. Those with relatively better social-economic status may find it easier to decide positively about migration as this decision is a risky one. Many studies on the informal economy have emphasised the linkages between the rural and urban workspaces that work through "social networks". Social status seems to be a relevant factor in determining the capacity of the individuals to be a part of the social network that facilitates migration, stay and employment in faraway urban/rural locations of work. The differential nature of employment (rural/agricultural wage labour, urban services sector wage labour, urban industrial wage labour, etc.) may also be explained in terms of socially diverse networks apart from education and skill possessed.

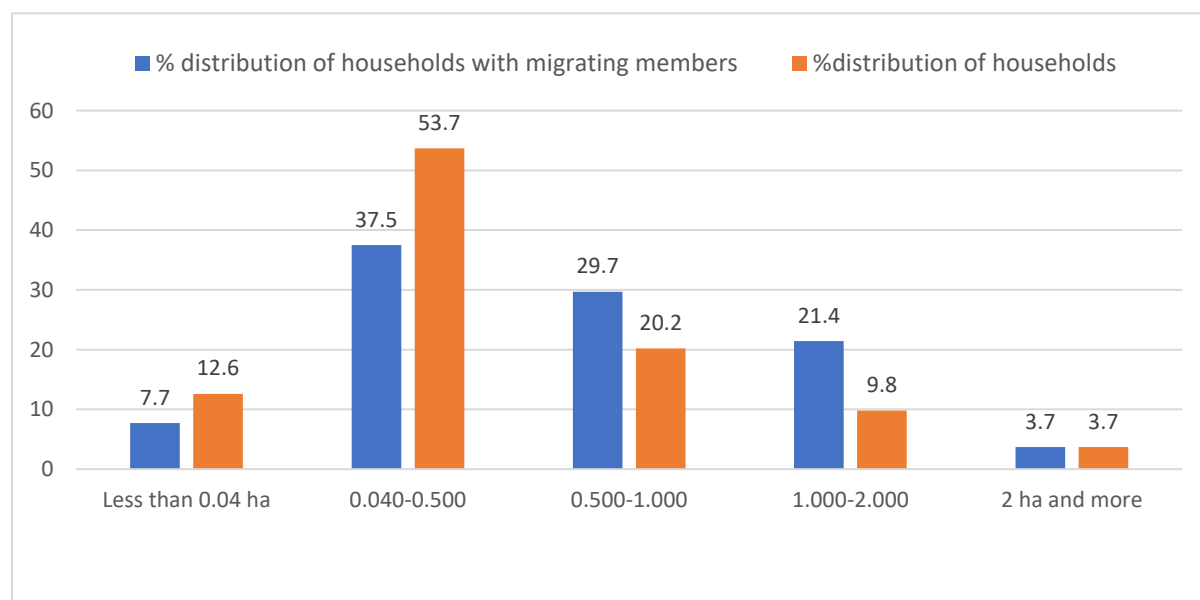


Figure 4. 4: Incidence of migration for wage employment

Source: Author's own representation

Thus, the phenomenon of people migrating in search of employment outside their village/farm economy may be looked at from the perspective of their respective capacities to

⁶¹ NSS, 70th Round, Report No. 571, Table 14, p. A-699.

migrate. The entire spectrum of potentially migrating populations can have two ends. On the high end, there are those who are comfortably nestled in the cradle of facilitative social networks and can take the decision to migrate relatively easily. The lower end of the spectrum is populated by those who, metaphorically, have their feet stuck in the field, for whom the decision to out-migrate is filled with disastrous risks and uncertainties. Besides, the decision to migrate also has an immediate monetary cost which many households may find prohibitive. These two ends constitute the two poles of the agrarian economy's "surplus population". Inter-polar mobility, although feasible, may be arduous as it is largely determined by socio-economic dynamics. In the coming decades, some policies of the government may play an important role in changing the dynamics of this mobility. Varied experiments with food policy are likely to have a differential impact on this mobility in the short and medium run.⁶²

4.1.2: The extent and nature of the tenancy

Before we look at the data contained in secondary sources, it is important to point out that there is a gross underreporting of the incidence of tenancy in government surveys and enumeration. The Agricultural Census particularly reports a small level of prevalence of tenancy. Intuitively, it appears that it is primarily on account of the non-revelation of unrecorded tenancies. As unrecorded tenancies account for the overwhelming majority of tenancies, the problem of underreporting is substantial. NSS reports are not free from this problem, but invariably they report a higher incidence of tenancy than the Agricultural Census. Therefore, the present study will concentrate on the NSS reports to understand the extent and nature of tenancy in Bihar.

From the 70th Round data of NSS, it appears that the incidence of tenancy in Bihar has a contrasting case as compared to the Indian scenario. The percentage of owner households who report leasing out in Bihar is 3.11 against the Indian average of 3.26, whereas the same for leasing-in households is 18.72 against the Indian average of 13.65. The size of the average area leased-in is 0.395 hectare against the all-India average of 0.501. The overall incidence of tenancy measured in terms of total leased-in area as a percentage of the total owned area is much higher at 30.71 per cent compared to the all-India average of 11.62. The larger share of leased-in land does not go with larger operational holdings. The much smaller size of the

⁶² The recent policy, "One Nation One Ration Card", may significantly impact the mobility of labouring households if pursued vigorously across the country.

operational holdings suggests that it is "biased" towards the smaller size of operational holdings.

Table 4.3: Extent of tenancy over time in Bihar

	1981-82	1991-92	2002-03	2012-13
% of tenant holding in all operational holdings	19.7	5.6	12.7	28.0
% of leased-in area in the total operated area	10.3	3.9	8.9	21.6
Source: NSS, 70 th Round, Report No. 571.				

The incidence of tenancy reported in the 59th Round of NSS, which was showing a declining tendency till 1991-92, has reversed the trend subsequently. There is a big jump in the percentage of tenant holdings after 2002-3 and a bigger jump in the percentage of the area under tenancy in the total area operated (Table 4.3). Further, as seen from Table 4.4, Bihar has become the second-largest in terms of operational holdings reporting leasing-in land at 28 per cent, second only to Andhra Pradesh.⁶³ In terms of share of the leased-in area as a percentage of the total operated area, it is again only behind Andhra Pradesh and Punjab. States like Haryana and Odisha are far behind. It does not conform to any simple image of tenancy as a "backward" feature of stagnating states like Odisha or tenancy as a modern capitalist market arrangement in agriculturally dynamic states like Punjab. It would be interesting to see the nature of this massive jump in the incidence of tenancy in Bihar.

Table 4. 4: Comparative incidence of tenancy across some states (2012-13)

	Bihar	Andhra Pradesh	Punjab	Haryana	Odisha	All India
Percentage of tenant holdings in operational holdings	28.0	42.3	19.0	15.1	20.6	13.7
Percentage of leased-in area in operated area	21.6	34.2	24.8	15.0	16.7	10.2
Source: NSS, 70 th Round, Report No. 571.						

Within the leased-out land area, the share of sharecropping against other types of tenancy is much higher in Bihar. In the state, it stands at more than 80 per cent, more than double the all-India average of around 40 per cent. Its share in the leased-in area is also more

⁶³ The percentage of leased-in holdings shows a little variation, as given in Tables 4.3, 4.4, 4.6 and 4.7, varying between 28 to 31 per cent. This is on account of measurement based on slightly different categories.

than 35 per cent. Over time, however, fixed kind rent, as well as fixed money rent, is showing a rising tendency.

Behind the aggregative picture of tenancy, as presented above, lies much structural differentiation. If we look at the distribution of households (or plots) and area according to different size classes of ownership and operational holdings, it presents a highly polarised picture of tenancy in rural Bihar. Table 6 of the Report no. 571 (NSS, 70th Round, p. A 260) shows that of all the plots that reported possession on account of leasing in, the overwhelming majority were from the nearly landless category. More than 94 per cent of them were from those who own less than half a hectare of land. Interestingly, of all the plots reported leasing out, two-thirds were from the size class of 0.04 to 0.5 hectare.

Table 4. 5: Distribution of households reported leasing in and leasing out, area leased-in and leased out, and average area owned, area leased-in and area leased out by size-class of ownership holding

size class of ownership holding (ha)	% distribution of households reporting leasing-in of land	% distribution of households reporting leasing-out of land	% distribution of leased-in area	% distribution of leased out area	Av. Area owned excluding homestead	average leased-in area per household (0.000 ha)	average leased-out area per household (0.000 ha)
nil	8.2	0	1.84	0.00	0	0.088	0
0.000-0.002	1.8	0	0.88	0.00	0	0.193	0
0.002-0.005	3.6	0	2.36	0.00	0	0.26	0
0.005-0.040	43.9	0.2	43.58	0.01	0.002	0.392	0.023
0.040-0.500	38.2	70.9	41.90	33.20	0.147	0.434	0.18
0.500-1.000	2.7	23.9	4.61	46.41	0.704	0.687	0.745
1.000-2.000	1.3	1.6	3.37	2.87	1.289	0.991	0.709
2.000-3.000	0.2	1.9	0.64	8.94	2.27	1.597	1.773
3.000-4.000	0	1.1	0.01	4.64	3.297	0.366	1.646
4.000-5.000	0	0.1	0.04	0.59	4.224	0.861	1.666
5.000-7.500	0	0	0.00	0.37	5.935	0	3.641
7.500-10.00	0	0.1	0.77	0.99	8.585	12.04	4
10.00-20.00	0	0.1	0.00	1.99	11.261	0.429	7.804
>20.00	0	0	0.00	0.00	13.8	0	0
All sizes	100	100	100.00	100.00	0.218	0.395	0.384

Source: Report No. 571, NSS 70th Round. Compiled from Appendix Tables 4, 7 and 8 of the report.

Table 4.5 presents a direct estimate of the number of households reporting leasing out land. An overwhelming majority of leasing out households came from two size classes of ownership holdings – 0.04 to 0.5 and 0.5 to 1 hectare, with the respective shares being 71 per cent and 24 per cent. But an equally overwhelming majority of leasing-in households also

came from the marginal segment, that too from smaller size class of ownership holdings. This makes the overall size of leased-in and leased-out land areas quite small, 0.395 and 0.384 hectare, respectively. The percentage distribution of leased-in and leased-out area also reflects the same pattern. More than 90 per cent of the area was leased-in by those owning half hectare or less. Eighty per cent of the total area was leased by those owning between 0.04 and 1 hectare. It makes it clear that the leasing appears to be taking place overwhelmingly within the marginal households. Within this category, the direction of leasing appears to be from relatively larger holdings to smaller holdings. That appears to be in contrast with the occurrence of the reverse tenancy. Tenancy, observed from the above table, appears to be concentrated in the marginal ownership holdings.

Table 4. 6: Percentage distribution of leasing in households, area leased-in and leased out, and average area operated and average area possessed but not owned by size class of operational holdings

size class of operational holding (ha)	% distribution of households reporting land (excluding homestead) possessed but not owned	Per cent of households reporting leasing in	Percentage distribution of area leased-in	Percentage distribution of area leased out	Average area per household possessed but not owned (ha)	Average area operated (for agri. activities) per holding
nil	0.00	0.00	0.00	0.00	0.00	0.00
0.000-0.002	0.19	0.00	0.00	0.00	0.00	0.00
0.002-0.005	0.00	0.00	0.00	0.00	0.00	0.00
0.005-0.040	0.61	1.57	0.01	67.72	0.03	0.01
0.040-0.500	58.05	32.54	23.74	6.37	0.18	0.18
0.500-1.000	25.17	37.42	33.81	0.74	0.55	0.72
1.000-2.000	14.05	39.81	28.70	11.18	0.95	1.22
2.000-3.000	0.81	10.79	3.93	9.86	1.83	2.25
3.000-4.000	0.55	29.91	2.83	0.93	1.94	3.34
4.000-5.000	0.00	0.00	0.00	2.46	0.00	4.23
5.000-7.500	0.54	56.84	6.08	0.00	4.78	5.58
7.500-10.00	0.01	1.45	0.13	0.40	5.46	8.52
10.00-20.00	0.00	0.00	0.00	0.34	0.00	11.22
>20.00*	0.03	87.50*	0.13	0.00	12.04	23.00
all sizes	100.00	29.91	100.00	100.00	0.43	0.48

* There was just one household in the sample of 1481 households in this category, thereby inflating the particular attribute disproportionately for this size-class.

Source: Tabulated from Tables 13, 16 and 18 of Report No. 571, NSS 70th Round.

This information, now tabulated in terms of the size distribution of operational holdings, is presented in Table 4.6. Nearly 84 per cent of all households that reported possessing land but not owning it belonged to the marginal landholding category. This also shows that about two-thirds of the total area leased out was reported from those operating less

than 0.04 hectare of land, whereas almost the entire area leased-in was reported by the larger size classes. Reading this with the table above (for ownership holdings) suggests that owners of immediately bigger size classes after leasing out land are left with a much smaller area to operate. This is reflected in the last column of the table, where they are shown to be operating on just 0.01 hectare of land.

Table 4. 7: Percentage of operational holdings leasing-in land under different types

Size-class of operational holding (ha)	Percentage of operational holdings reported leasing-in under different types of tenancy					% distribution of holdings reported leasing in	% distribution of holdings
	fixed money	fixed produce	share of produce	All others	Any term of lease (incl. n. r.)		
nil	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>0.000 & ?0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.002-0.005	0.00	0.00	0.00	0.10	0.10	0.00	0.82
0.005-0.040	0.00	0.00	0.00	0.80	0.80	0.30	11.68
0.040-0.500	5.00	13.30	13.20	2.40	34.00	57.83	53.35
0.500-1.000	7.10	17.00	15.60	1.00	40.90	26.17	20.12
1.000-2.000	18.00	4.00	17.20	0.50	40.70	13.67	10.55
2.000-3.000	2.40	3.20	6.00	0.80	12.70	0.91	2.24
3.000-4.000	0.60	0.00	28.70	0.40	32.00	0.57	0.55
4.000-5.000	0.00	0.00	0.00	0.00	0.00	0.00	0.22
5.000-7.500	9.80	0.00	1.00	0.00	56.60*	0.51	0.28
7.500-10.00	0.60	0.00	0.00	1.20	1.80	0.01	0.17
10.00-20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
>20.00	83.60	0.00	0.00	0.00	83.60	0.03	0.01
all sizes	6.10	11.00	12.30	1.70	31.40	100.00	100.00
Overall distribution of holdings reported leasing-in by type	19.46	35.11	39.04	5.20	100.00		

* This appears non-synchronous. The sixth column of the table should be a horizontal sum of columns 2 to 5. The number in this case, however, does not match. This might arise for two reasons. The Rounding off may result in some discrepancy as the information is presented in terms of numbers per 1000 households. Further, the households may report leasing in under different types that may overlap across types and seasons. It may also arise because of possession which is not recorded as leasing-in.

Source: Tabulated from Table 20 of Report No. 571, NSS 70th Round.

This can also be inferred from Table 4.5 by looking at the columns where the average area leased-in and leased out per household is given. It shows that those who own less than half a hectare of land have a much bigger leased-in area than leased-out area per household. This is bound to change their operational holding status upwards. Therefore, a much larger share in the leased-out area by a very small size class of operational holding should not be

taken as a sign of reverse tenancy; it is rather a sign of change in the size class distribution of operational holdings that is effected through leasing in, largely by the smaller owners from bigger owners, and not vice versa.

Another important aspect of tenancy is its form. A lot of theoretical debates have taken different forms as indicative of the "backward" or "modern" character of agrarian societies (as discussed in the previous chapter). A brief discussion on this aspect of Bihar's agrarian economy is presented below. Table 4.7 presents a summary of these aspects for a number of operational holdings.⁶⁴

The data for the 70th Round of survey by NSS shows that more than 31 per cent of operational holdings reported leasing-in land under any type of contract. Of all the operational holdings reporting leased-in land, the largest number for all size classes as a whole was leasing-in under the sharecropping system. This is closely followed by the fixed produce rent system. The number of households leasing in under the fixed cash rent system was roughly half the number of households leasing-in under sharecropping. A comparison between different types of leased-in tenancy shows that the share of leasing-in holdings under the *fixed rent system* is close to 55 per cent as against the share of the sharecropping system, which is at 39 per cent. This may suggest that the majority of the cultivators are undertaking risks associated with output and price related uncertainties. It should be noted that an overwhelming majority of leasing-in households are marginal and small operators. From Table 4.7, it can be deduced that the three size classes of operational holdings – 0.04-0.5, 0.5-1, and 1-2 hectares – account for about 84 per cent of all operational holdings, for more than 97 per cent of all leasing-in operational holdings.

But there may be another perspective if we realise that the share of leasing-in households on a produce rent basis is an enormous 75 per cent. It may indicate the more dire need of the leasing-out households for agricultural produce than that of cash. This reading of the situation finds support from the pattern of leasing out. As indicated above in Table 4.5, more than 71 per cent of households reported leasing out land owned less than half a hectare of land, leasing out a mere 0.18 hectare of land on an average. Nearly 95 per cent of the

⁶⁴ The sixth column of the Table should be a horizontal sum of columns 2 to 5. The numbers, however, do not match. This might arise for two reasons. The rounding off may result in discrepancies as the information is presented in terms of numbers per 1000 households. Further, the households may report leasing in under different types that may overlap across types and seasons.

leasing-out households⁶⁵ and 79 per cent of the total leased-out area⁶⁶ came from the two size classes of ownership holding, 0.04-0.5 and 0.5-1 hectare.

Table 4.8 presents a snapshot of the pattern of terms of the lease for leased-out land by different size classes of owners. The class of marginal owners leased out land on a sharecropping basis overwhelmingly (share being 88 and 100 per cent for the two size classes, respectively). Not only leasing out of land is heavily biased in favour of sharecropping, but it is also more pronounced in the smaller size classes.

Table 4. 8: Per cent distribution of leased-out land by terms of lease by size-classes of ownership holdings

size class of ownership holding (ha)	fixed money	fixed produce	share of produce	usufructuary mortgage	All other terms	Any term of lease (incl. non recorded)	Percentage of households reporting leased-out land
Nil	0	0	0	0	0	0	0
>0.000 & ?0.002	0	0	0	0	0	0	0
0.002-0.005	0	0	0	0	0	0	0
0.005-0.040	13	29	0	57	0	100	0.3
0.040-0.500	0	0	88	0	12	100	8.6
0.500-1.000	0	0	100	0	0	100	8.3
1.000-2.000	7	20	71	2	0	100	1.4
2.000-3.000	15	44	40	1	0	100	6.5
3.000-4.000	3	79	17	2	0	100	9.9
4.000-5.000	55	0	45	0	0	100	3.8
5.000-7.500	0	0	100	0	0	100	1.3
7.500-10.00	0	0	100	0	0	100	3.4
10.00-20.00	85	0	15	0	0	100	37
>20.00	0	0	0	0	0	0	0
all sizes	4	8	84	0	4	100	3.1

Source: Tabulated from Tables 10 of Report No. 571, NSS 70th Round.

It is marginal and small holdings that account for the bulk of the area leased-in, together accounting for more than 86 per cent of the total area leased-in. In their operational holdings, leased-in land occupies a little less than one-third share. It is interesting to note from Table 4.9 that there is no direct relationship between the size class of operational holdings and the type of tenancy, though the share of fixed rent tenancies is the maximum for the highest bracket of marginal holdings and small holdings.

⁶⁵ NSS Report No. 571, Table 7, page A 338.

⁶⁶ NSS Report No. 571, Table 10, page A 494.

Sharecropping registers the largest share in the smallest of the operational holdings as well as bigger landholdings.

Table 4. 9: Pattern of leasing-in by type of tenancy and percentage distribution of leased-in and operated area by size classes of operational holdings

size class of operational holding (ha)	Share in total leased-in area					% distribution of		share of leased-in and operated area in total area operated
	fixed money	fixed produce	share of produce	share of produce together with other terms	Any term of lease (incl. n. r.)	area operated	leased-in and operated area	
nil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>0.000 & ?0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.002-0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.005-0.040	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00
0.040-0.500	15.72	31.45	44.02	3.14	100.00	19.45	23.91	31.80
0.500-1.000	14.12	49.40	31.76	3.53	100.00	30.27	33.16	28.34
1.000-2.000	50.19	7.17	35.85	0.00	100.00	26.88	28.99	27.90
2.000-3.000	20.49	20.49	51.23	0.00	100.00	10.58	3.99	9.76
3.000-4.000	0.00	0.00	86.67	0.00	100.00	3.78	2.87	19.61
4.000-5.000	0.00	0.00	0.00	0.00	0.00	1.96	0.00	0.00
5.000-7.500	8.25	0.00	0.00	0.00	100.00	3.29	6.17	48.49
7.500-10.00	0.00	0.00	0.00	88.47	100.00	2.97	0.13	1.13
10.00-20.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00
>20.00	100.00	0.00	0.00	0.00	100.00	0.46	0.78	43.77
all sizes	23.19	27.06	34.79	3.87	100.00	100.00	100.00	25.87

Source: Calculated from Table 21 of Report No. 571, NSS 70th Round.

The mixed pattern of terms of the lease in the distribution of leased-in land shows that *it is very difficult to link any particular kind of tenancy as more or less favourable to the bigger or smaller size of cultivators*. Moreover, the very complex dynamics of the land lease market may not necessarily follow the logic of choice of the form of tenancy of those who wish to lease-in the land. There may be an equally strong expression of choice of the form of tenancy by those leasing out. The motivations behind these two sets of participants in the lease market may also be very different. It may not be an apparent economic objective of income maximisation. It is, therefore, necessary to go into qualitative aspects of decision-making in the lease market. The findings from the primary survey will comment briefly on this in the subsequent discussion.

4.1.3: Some structural features of economic functioning

The overwhelming presence of marginal operators also impacts the economic functioning of the overall agrarian economy. This may have some important implications for future prospects of growth. How the decisions regarding the choice of land use is made will impact the evolution of the agrarian economy. It is important, therefore, to look into these features briefly. The 70th Round of NSS has some interesting observations to make in this regard.

It may not be surprising to see that overall, 90 per cent of land possessed by households is devoted to crop production (95 per cent, if we add *jhum* land crop production also). It is only very tiny holdings where crop production may not make much sense that we see them engaging in the farming of animals or other agricultural uses (NSS 70th Round, Report no. 571, Table 23, page A 1209). If we further look into the area in which crop production or livestock farming takes place, 87 per cent of it is devoted to cereal production, followed by 6 per cent to pulses.⁶⁷ Here also, tiny operational holdings engage mostly in dairy farming (NSS 70th Round, Report no. 571, Table 24, page A 1287). It is interesting to see, however, that even the tiny holdings of up to 0.04 hectare also devote 42 per cent of all area to cereal production and not to animal farming only or production of any other high-value crop. Besides this, land distribution among cereals, pulses, other crops, or animal farming does not show much variation across different size classes of operational holdings.

The picture is slightly more diversified if we consider the distribution of operational holdings among various uses in comparison with the distribution of area. The 70th Round of the survey (as presented in Table 32 of the *NSS Report No. 571*, page A 1716) tells us that two-thirds of all operational holdings engage in only crop production (about 70 per cent if we add those cropping on *jhum* land). The share of households engaged purely in animal farming and mixed land use is 12 and 15 per cent, respectively. A relatively bigger share in numbers and a very tiny share in the area in the case of other than crop production shows that those devoting area to non-crop production usage have a very small area to do so. The share of households having mixed use of land - for cropping as well as animal farming - is much greater for small to middle size classes than their shares in the area for mixed usage. This reflects their better capacity to do so, as well as the much bigger size of their holdings, requiring a very tiny fraction of it for mixed usage.

⁶⁷ This is in tune with the data on the area under different crops presented in chapter 2, where it is overwhelmingly dominated by cereal production. The figures for 2012-13 (the survey year) are 80 per cent and about 7 per cent for cereals and pulses, respectively.

The stressed nature of the peasant economy in Bihar is also visible through the income-expenditure data as presented in *NSS Report no. 576*.⁶⁸ Bihar peasantry as a whole is a deficit peasantry. From Appendix Table 1 of the above report (page A-120, for all seasons combined and for all social classes together, original table reproduced in chapter *Appendix 4.1*, Appendix Table A4.1.2), it can be deduced that an average family possessing land has a net negative saving of about Rupees two thousand per month. This deficit is confined to the small and marginal size classes. Those possessing extremely tiny land of area less than 0.01 hectare and those possessing more than 2 hectares of land do not show this deficit. All the deficit households together constitute more than 94 per cent of agricultural households (Table 4.10).

Table 4. 10: Composition of average monthly income and consumption expenditure as a percentage of the total income of agricultural households for each size-class of land possessed

Size-class of land possessed (ha.)	Composition of total income				total consumption expenditure as % of total income	Percentage distribution of agricultural households
	income from wages	net receipt from cultivation	net receipt from farming of animals	net receipt from non-farm business		
< 0.01	72.93	0.18	22.90	4.00	91.71	2.03
0.01 - 0.40	61.59	18.32	11.49	8.57	170.84	47.93
0.41 - 1.00	19.50	61.26	15.31	3.93	183.00	35.39
1.01 - 2.00	18.78	88.12	-21.01	14.10	157.84	10.63
2.01 - 4.00	23.90	66.33	6.72	3.05	70.79	3.32
4.01 -10.00	2.00	98.83	-1.59	0.75	51.84	0.66
10.00+	0.00	101.66	-1.66	0.00	27.56	0.04
All size-classes, incl. non recorded	37.18	48.20	7.84	6.75	154.16	100.00

Source: Calculated from NSS 70th Round, Report No. 576, Appendix Table 1, Page A-120.

How does this overwhelming majority sustain itself in the light of a net deficit? The two possible sources of survival could either be borrowing or a sale of assets. Both are likely in the case of the Bihar peasantry. Appendix Table 16 of the same report tells us that the proportion of indebted households stands at 42.5 per cent. Not all of them, however, be considered to be financing their deficit by recurring loans. Therefore it is apparent that a huge percentage of households would be financing their deficit through the sale of assets. Land could not be the sole asset in this regard. In fact, it is unlikely that the sale of land could be the means of survival for the stressed peasantry of Bihar, given the overall paucity of land

⁶⁸ *NSS Report no. 576: Income, Expenditure, Productive Assets and Indebtedness of Agricultural Households in India, 2012-13.*

and their meagre landholding. It is more likely that it is financed through the sale of non-land assets, particularly livestock.⁶⁹ It can be seen that two-thirds of agricultural households have reported having income from animal farming.⁷⁰

It is interesting to see that the households possessing less than 0.01 hectare are not deficit households. This is because of their much higher average monthly income and a lower average consumption expenditure than their bigger counterparts in the category of small and marginal households. Their earnings from cultivation are negligible; it comes overwhelmingly from wages. They earn significantly from animal farming as well. It can be seen that when the share of income from cultivation is significant, and as the share of income from wages and animal farming goes down for small and marginal category households, they turn into deficit households. This suggests that the source of deficit is primarily arising from cultivation if you are a marginal or small operator, as consumption cannot be pushed further down. On the other end, larger landholding households are clearly surplus households, with most of their incomes coming from cultivation.

As observed in Table 4.10, the Bihar peasantry is seen to be extremely stressed in terms of economic sustenance. More than 37 per cent of total income is earned through wages. Net receipt from cultivation accounts for about 48 per cent of total income. Net income from animal farming and non-farm business constitutes about 8 and 7 per cent, respectively. A disaggregated picture tells that about one-half of the agricultural households at the bottom earn their income overwhelmingly from wage employment. The next 46 per cent belonging to size-classes 0.41 to 2.00 hectares earn about 20 per cent of their total income from wages. Thus 96 per cent of agricultural households earn roughly 41.57 per cent of their total income from wages, 41.45 from cultivation and 9.54 per cent from animal farming. The remaining 7.39 per cent comes from non-farm businesses. Given that the wage earnings from within the agricultural sector are meagre, the importance of non-farm wage employment could not be overstated. Less than 7 per cent of all agricultural households have income from non-farm businesses. Therefore, for the overwhelming majority, the fortune of survival depends crucially on non-farm wage employment and income from animal farming.

⁶⁹ This phenomenon was amply demonstrated during the field survey of the researcher. This would be commented upon later while discussing the primary survey data.

⁷⁰ Appendix Table 1, page A-120, *NSS Report no. 576*.

The significant share of income from animal farming has a bearing on the possibility of the emergence and strengthening of reverse tenancy specifically and for the "class polarisation" of the peasantry in general. Rearing and sale of livestock could be a reliable source of sustenance for the deficit households, delaying the process of polarisation or halting the occurrence of the reverse tenancy. Though a direct comparison between Appendix Table 32 of *NSS Report No. 571* and Appendix Table 1 of *NSS Report No. 576* is not possible owing to the differences in the size categorisation, there is ample evidence in the former to show that the smaller size class households do engage in animal farming in a much bigger way. The latter also reveals that about 96 per cent of households engaged in animal farming belong to the marginal and small categories.

How do the agricultural households engaged in animal farming in Bihar stand before their counterparts from other Indian states? An inter-state comparison shows that Bihar remains at the bottom amongst all Indian states except Chhattisgarh, West Bengal and the group of Union Territories. The average net earnings from animal farming during a period of 30-days remains a meagre Rs 486 in Bihar.⁷¹ From the same source, it can be inferred that the average receipt from animal farming is many times over in many states – 21 states have it more than twice, 12 states have it more than thrice, and six states have it more than five times that of Bihar. Bihar appears to be lagging much behind in terms of both – the extent of total receipts as well as the net earnings from animal farming.

In addition to being a laggard state as far as animal farming is concerned, as stated before, the instance of animal farming is also a *marginal* phenomenon – roughly 85 per cent of all those engaged in animal farming possess up to 1 hectare of land. They all earn a net positive earning of Rupees 712 during a period of 30-days. Their net receipt from animal farming constitutes more than 13 per cent of their total income.⁷² Bigger size classes earn a net negative sum except for those possessing 2 to 4 hectares of land.

As far as non-farm business is concerned, for all size classes together, nearly six and a half per cent of all agricultural households engage in this activity. In comparison with other states, again, Bihar is raked much below, with only Madhya Pradesh, Chhattisgarh and three North-eastern states having a lower percentage of households engaged in non-farm business. In terms of average net receipts during a period of 30-days, it falls among the bottom one-

⁷¹ Appendix Table 7, page A-1121, *NSS Report no. 576*.

⁷² Calculated from Appendix Table 8, page A-1154, *NSS Report no. 576*.

third of Indian states, having Rs. 3837 as non-farm income.⁷³ Of those agricultural households who engage in non-farm business in Bihar, more than 84 per cent possess only one hectare or less. On average, they earn Rs. 3221 during 30-days. The bigger size-classes earn more than double this amount, but given their very small share in the total number of agricultural households engaged in such activities, it does not affect the overall picture of meagre income support coming from the non-farm business. Per cent of agricultural households engaged in non-farm business does not exhibit any systematic variation with size classes.⁷⁴

Looking at the economics of crop production in Bihar, yet again the stressed nature of crop production gets reiterated. From Appendix Table 6 of the *NSS Report No. 576*, it is evident that except for the landless and near landless categories, almost all households do crop cultivation. These groups, together with those who possess 0.41-1.00 hectare of land, constitute about 84 per cent of all households producing crops. These households earn an average of Rs. 1206 per month, the small holders, constituting less than 12 per cent of all cultivating households, Rs. 3601 and larger holdings together constituting a little over 4 per cent earn a monthly income of Rs. 10774.⁷⁵

If we look at the decomposed figures for average monthly expenditure incurred and value of output per agricultural household presented in Table 4.11, the cost of seed, fertiliser-pesticide/weedicide and irrigation together constitute more than 50 per cent of total expenses. Hired labour cost is 20 per cent, rent for leased-in land stands at little more than 6 per cent. "Other expenses" constitute more than 21 per cent. This latter item does not include interest payments and the cost of repair and maintenance of machinery, which together constitute a meagre 1.38 per cent of total expenses.

This pattern of cost appears to be fairly common in all size-classes, with the exception of the smallest size category. Cultivators belonging to this category spend a bigger share on seeds, fertiliser, irrigation, and "all other expenses" than their bigger counterparts. The larger share of these expenditures is adjusted against the cost of hired labour which they do not incur as their own family labour suffices for their tiny holdings. Given a very small share of this segment of the peasantry in area and number of holdings, these features do not impact the

⁷³ Deduced from Appendix Table 9, page A-1170, *NSS Report no. 576*.

⁷⁴ Appendix Table 9, page A-1170, *NSS Report no. 576*.

⁷⁵ Calculated from Appendix Table 6, page A-1090, *NSS Report no. 576*.

larger functioning of the agrarian economy. The largest size class of 10 hectares or more also spends a relatively bigger share on seeds and "all other expenses" than others. This size class is also small enough in terms of numbers or area operated to remain insignificant.

Table 4. 11 Composition of average monthly expenses and receipts (₹) for crop production per agricultural household by size class of land possessed

size class of land possessed (hectares) →		< 0.01	0.01 - 0.40	0.41 - 1.00	1.01 - 2.00	2.01 - 4.00	4.01 - 10.00	10.00 +	All sizes	Percentage of households reporting use of
Composition of total expenses	seeds	22.73	10.78	9.17	10.80	10.88	9.54	13.96	10.11	85.35
	fertilizer/manure	29.55	26.10	26.49	24.02	25.92	27.83	26.61	25.86	99.21
	plant protection chemicals	2.27	3.83	2.58	3.38	2.97	3.91	2.26	3.16	75.46
	irrigation	11.36	15.32	11.82	9.42	6.99	7.40	0.99	11.21	79.36
	minor repair and maintenance of machinery and equipment	1.14	0.71	0.95	1.63	1.83	1.69	2.53	1.17	25.92
	interest	0.00	0.14	0.27	0.39	0.19	0.04	0.23	0.21	3.01
	lease rent for land	0.00	6.67	6.05	8.49	4.32	0.49	4.15	6.26	18.84
	Human labour	1.14	15.18	22.42	19.44	23.16	27.50	20.17	20.50	81.56
	Animal labour	0.00	1.28	0.20	0.14	0.14	0.02	0.00	0.41	6.48
	all other expenses	31.82	20.00	20.04	22.32	23.57	21.57	29.12	21.05	86.75
	total expenses	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.00
% Share of	products	90.87	88.61	90.28	90.85	91.68	92.04	89.99	90.44	99.95
	by- products	9.13	11.32	9.69	9.15	8.23	7.96	9.07	9.56	99.77
	pre- harvest sale	0.00	0.00	0.00	0.00	0.09	0.00	0.95	0.03	0.11
	total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.00
Per cent of households engaged in crop production		6.00	83.40	100.0	100.0	97.20	99.50	100.0	90.00	-
Percentage distribution of households engaged in crop production		0.14	44.40	39.31	11.80	3.58	0.72	0.05	100.0	-

Source: Calculated from NSS 70th Round, Report No. 576, Appendix Table 6, Page A-1025.

One aspect, however, stands out: marginal holdings spend a bigger share on irrigation and rent for leased-in land than bigger landholdings. This is again adjusted against a smaller share of the cost of hired labour and "all other expenses". The composition of the value of items sold does not show any variation across size-classes.

The manner in which the peasants spend money on productive usage is important to understand the productive potential of the agrarian economy. But it is equally or even more important to understand how much they spend on productive usage altogether and if that is sufficient to warrant a certain dynamism in the economy. The investment scenario can be seen in Table 4.12. The bigger size classes devote a larger share of their income to investment. Close to half of the agricultural households at the bottom have just about one per cent share of capital formation. It is the upper stratum of the marginal holdings that devote the largest share of their income to productive investment. Given their meagre income, it amounts to a paltry sum, unlikely to change their fortunes. Even the largest landholdings having relatively much higher monthly incomes devote just a little over 5 per cent of their income towards productive capital accumulation. As a result, overall capital formation by all agricultural households remains less than 5 per cent. This clearly shows a deep crisis wherein the agriculturists lack both the ability as well as incentive to invest. Those at the bottom, the overwhelming majority, lack the means, and those on top, the minuscule minority, lack the incentive.

Table 4. 12: Net investment in productive assets and average monthly expenditure incurred on assets used for farm and non-farm business per agricultural household as per cent of average monthly total income by size class of land possessed

size class of land possessed (ha.)	net investment in productive asset	Average monthly expenditure on assets per agricultural household					
		livestock and poultry	agricultural machinery and implements	other productive assets	total productive assets	non- farm business	All
<0.01	0.24	1.35	0.28	0.06	1.67	0.02	1.69
0.01 - 0.40	1.09	1.67	1.02	0.78	3.43	0.31	3.74
0.41 - 1.00	10.48	2.36	2.63	14.74	19.73	0.37	20.13
1.01 - 2.00	6.17	1.20	3.13	1.47	5.80	3.13	8.94
2.01 - 4.00	2.06	1.40	4.16	0.44	6.00	0.33	6.33
4.01 - 10.00	5.45	0.19	1.34	2.58	4.10	0.04	4.14
10.00+	3.26	0.00	1.02	2.23	3.25	0.00	3.25
All size (incl. non recorded)	4.81	1.71	2.11	5.37	9.19	0.67	9.87

Source: Calculated from NSS 70th Round, Report No. 576, Appendix Tables 1 and 3, Page A-120 and A-624.

This limitation is bound to have affected the efforts to improve productivity through the use of better tools and implements, land improvements, better irrigation and drainage, etc. Lack of capital assets seems to lower the current expenditure on the usage of such assets. The data on average monthly expenditure incurred on assets used for farm (or non-farm) business per agricultural household tells the abysmal story of Bihar peasantry in relation to other states. Except for Jharkhand, West Bengal, Chhattisgarh, Jammu and Kashmir and four North-eastern states, all spend a larger amount on productive assets than Bihar. If the all-India average is taken as a benchmark, the Bihar peasantry spends 31 per cent of the all-India average on livestock and poultry, 21 per cent on agricultural machinery and implements, and 42 per cent on other productive assets and 32 per cent on all productive assets taken together.⁷⁶

The average amount spent on normal repairs and maintenance in Bihar is one-fourth of the Indian average (Rs. 153 and 609, respectively). Of the meagre amount that is spent, the share of farm machinery and irrigation equipment is less than one-fourth, which is much smaller than the 35 per cent share in the case of India as a whole. The number of households reporting any kind of fixed capital expenditure in farm business per 1000 households is just 93 against the all-India figure of 205. The average value of such capital expenditures in Bihar is about one-tenth of what an average Indian household spends.⁷⁷

The variation across size-classes in average monthly expenses on all productive assets show the same pattern as is seen in the case of net investment. But there are some obvious patterns. The tiniest size spends most of the money on livestock and poultry. This is understandable as they are not really the cultivators; they lack access to land and are almost purely wage earners. The next size-class also spends the maximum on livestock and poultry, but their expenses on cultivation-related assets are not insignificant in relation to their total spending. The upper stratum of the marginal size class and upwards spend most of their money on agricultural machinery and implements. Thus, the expenditure on current usage of productive assets also reveals the same bind in the agrarian economy – it is a collective of agriculturists either lacking economic means to spend more on productive usage or not having an incentive to invest if they happen to be left with a usable financial surplus. It is not

⁷⁶ Appendix Table 5, page A-1025, *NSS Report no. 576*.

⁷⁷ These figures are taken from different tables carried in *NSS KI (70/18.2): Key Indicators of Debt and Investment in India* (NSS 2014b).

surprising then that the overall expenses on productive assets remain just above 9 per cent of the average total income of agricultural households.

Table 4. 13: Percentage of area and operational holdings growing more than one crop

size class of operational holding (ha)	% of area operated used for growing more than one crop	% of crop growing operational holdings growing more than one crop	percentage distribution of area used for growing more than one crop	percentage distribution of operational holdings growing more than one crop	percentage distribution of area used for growing any crop	percentage distribution of operational holdings growing any crop
nil	0.00	0.00	0.00	0.00	0.00	0.00
>0.000-0.002	0.00	0.00	0.00	0.00	0.00	0.00
0.002-0.005	0.00	0.00	0.00	0.00	0.00	0.00
0.005-0.040	15.61	10.63	0.08	1.35	0.05	2.25
0.040-0.500	10.84	18.18	20.40	59.16	19.37	57.62
0.500-1.000	9.40	16.68	27.44	22.06	30.06	23.42
1.000-2.000	8.94	17.24	23.52	12.24	27.08	12.57
2.000-3.000	11.01	20.72	11.35	3.12	10.61	2.67
3.000-4.000	11.74	25.33	4.35	0.94	3.82	0.66
4.000-5.000	20.90	32.79	4.03	0.49	1.98	0.26
5.000-7.500	11.55	17.52	3.75	0.33	3.35	0.34
7.500-10.00	16.79	23.19	4.92	0.26	3.02	0.20
10.00-20.00	0.00	0.00	0.00	0.00	0.19	0.01
>20.00	3.28	87.50	0.15	0.06	0.47	0.01
all sizes	10.29	17.71	100.00	100.00	100.00	100.00

Source: Calculated from Tables 26 of Report No. 571, NSS 70th Round.

The same observation can further be strengthened by looking at the size-class variation in instances of multiple cropping. Given the pattern of landholding, the importance of small and marginal holdings in improving the agrarian condition cannot be overemphasised. But the strained economic situation of precisely this segment is a cause of worry. If we look at the distribution of operated area devoted to multiple cropping⁷⁸, it shows a clear bias in favour of larger holdings (except for tiny holdings of less than 0.04 hectare, but given their insignificant share in the total cropped area, it does not count much). A comparison of the 4th and 6th columns of Table 4.13 (and as reflected in column 2) indicates that share of area devoted to multiple cropping is consistently higher than share in the cropped area for operational holdings of 2 hectares and more. It is notable that those who

⁷⁸ Multiple cropping, as reported here, is recorded during one of the two visits done during the survey. The above data is for the second visit (January 2013 to June 2013). This may vary from the cropping intensity data shown in the Agricultural Statistics for the overall usage of land during the entire year. The data above, however, is useful to understand the structural characteristics and differences therein of operational holdings of differing size-classes.

operate between half a hectare to 2 hectares, cultivating more than 57 per cent of the area, have cultivation intensity (measured by per cent of the area used for growing more than one crop) lower than average.⁷⁹ This strengthens the observation that small and marginal holdings may lack sufficient means to improve their cultivation practices.

These structural features of the agrarian economy of Bihar call for resolving problems on both ends: at the bottom, supplying means to make productive investments and meeting current productive expenditures, and at the top, it requires making the cultivators confident about potential profits. But it would be an analytical mistake to assume this simplistic pattern of lack of investment. Though the two types of problems may be weighing differently at the two ends, the two categories of peasants may experience both the problems. In the following paragraphs, a snapshot of these aspects is presented.

One way of resolving the problem is through the usually conceived method of supplying credit at easier terms, especially to the small and marginal segment of the peasantry. The entire structural pattern of credit, however, should be located in a context where credit penetration, measured in terms of the proportion of households having outstanding loans, is much lower in Bihar. This proportion is 42.5 against the all-India level of 52 per cent.⁸⁰ Not only the incidence of indebtedness is lower in Bihar, but the average amount of outstanding loans is also just Rs. 163 per agricultural household against the all-Indian average of Rs. 470.⁸¹ Except for all North-eastern states, Sikkim, Jharkhand, Chhattisgarh and Jammu and Kashmir, all Indian states have a greater amount of outstanding loans than Bihar. 70th Round of NSS also has figures for institutional credit among rural households. Not only does Bihar has a much smaller percentage of households having any bank or any other kind of deposit accounts, but they also have a very small percentage of those having *Kisan Credit Card (KCC)*, the much-publicised government scheme to avail credit facilities. It was reported that the average amount of credit received from *KCC* in the

⁷⁹ It should be noted that the extent of multiple cropping reported in the 70th Round of the NSS is much lower than what is reported in the Land Use Statistics provided by the Directorate of Economics and Statistics, Ministry of Agriculture. According to the NSS Report No. 571, the divergence is not only significant but growing over time (p. 4). A possible reason could be the data collection method where information regarding only one crop at a time (visit) is collected in surveys of NSS, thereby underestimating the true extent of multiple cropping. Moreover, it is also narrower in surveys in terms of spatial and institutional coverage. Therefore, it is better to focus on the distributional aspects within the operational holdings rather than on the extent of multiple cropping.

⁸⁰ A loan includes any type of loan, either in cash or in kind, either with a positive rate of interest or without any interest from friends, relatives, etc.

⁸¹ Table 13, pp. A 20-21. *NSS KI (70/33): Key Indicators of Situation of Agricultural Households in India* (NSS 2014a).

last 365 days per household having *KCC* was just Rs. 28,296. It is not surprising that the average Bihari household in the rural area relies more on remittances than on institutional or non-institutional credit for any kind of financial need. The average amount of remittances received during the last 365 days per household was much higher in Bihar than the all-India average.⁸²

What is the nature of the loan that an average Bihari agriculturist takes, and what are their major sources of income? Answering these questions would certainly illuminate the underlying basis of credit penetration and its purpose. Table 4.14 tells that 42.5 per cent of agricultural households are indebted. More than 55 per cent of these indebted households are cultivators, followed by wage/salaried employees at more than 25 per cent. Despite having the largest share in indebted households, only one-third of cultivators are indebted. Two-thirds of wage earners, pensioners, and animal farmers are indebted. Forty-six per cent of those who mainly rely on remittances are also indebted. More than 88 per cent of all loans taken by agricultural households is in cash. Cultivators and animal farmers take loans in kind as well. Cultivators and wage earners have about 6 per cent of their loans as hereditary. As about 86 per cent of indebted households are cultivators, animal farmers and wage earners, it would be useful to look at the differentiated picture.

Table 4. 14: Composition of outstanding loans by nature of loan for different sources of major income of agricultural households

source of major income	hereditary loan	loan in cash	loan in kind	loan partly in cash & kind	All	Per cent of indebted agricultural households	Percentage distribution of indebted households
cultivation	6.20	86.50	6.90	0.40	100	33.80	55.32
livestock	0.60	85.80	10.90	2.70	100	66.50	4.70
agricultural activity, other	0.00	100.00	0.00	0.00	100	85.70	0.45
non-agricultural enterprises	7.20	92.20	0.20	0.50	100	60.00	7.01
wage/salaried employment	5.40	93.30	1.00	0.10	100	66.40	25.49
Pension	0.00	99.90	0.10	0.00	100	69.10	2.41
remittances	6.10	91.00	2.40	0.00	100	46.00	4.33
Others	1.00	94.00	5.00	0.00	100	36.10	0.29
All	5.90	88.30	5.40	0.40	100	42.50	100.00

Source: Calculated from NSS 70th Round, Report No. 576, Appendix Table 11, Page A-1223.

⁸² These figures are taken from Table 9R, p. A-21, from *NSS KI (70/18.2): Key Indicators of Debt and Investment in India* (NSS 2014b).

Table 4. 15: Composition of outstanding loans by nature of loan for each size class of land possessed

size class of land possessed	hereditary loan	loan contracted in cash	loan contracted in kind	loan contracted partly in cash and partly in kind	all	proportion of indebted agricultural households	Percentage distribution of indebted agricultural households
< 0.01	3.70	95.90	0.40	0.00	100.00	47.40	2.27
0.01 - 0.40	11.00	86.20	2.60	0.10	100.00	54.30	61.21
0.41 - 1.00	1.80	92.60	5.30	0.20	100.00	27.90	23.25
1.01 - 2.00	2.50	85.00	11.10	1.30	100.00	39.80	9.96
2.01 - 4.00	5.50	90.40	3.70	0.40	100.00	33.00	2.56
4.01 - 10.00	0.90	92.80	6.30	0.00	100.00	44.10	0.71
10.00 +	0.00	100.00	0.00	0.00	100.00	50.30	0.05
all sizes	5.90	88.30	5.40	0.40	100.00	42.50	100.00

Source: Calculated from NSS 70th Round, Report No. 576, Appendix Table 12, Page A-1280.

It is clearly seen from Table 4.15 that the highest incidence of indebtedness is recorded at the two ends of the spectrum, the middle recording the lowest incidence. Given the distribution of agricultural households, it becomes obvious that the overwhelming majority of indebted households lie at the lower end. The lowest rung of cultivating households (likely to be placed in the size class 0.01-0.40 ha. And the most numerous among the agricultural households) also have the highest share of hereditary loans against them. This indicates that they may be trapped under rolling debt over generations, possibly resulting in severe restrictions on choice of work, livelihood, and migration. It may also result in labour bondage. The upper stratum of the marginal and small households also take kind loans. This suggests their dependence on kind loans for consumption as well as farming needs (to feed the cattle).

As mentioned previously, given the preponderance of cultivators, wage earners and animal farmers among all agricultural households, the course of the agrarian economy is much likely to be influenced by their choices and constraints within which they operate. If they need to borrow, who are they borrowing from? Table 4.16 tells us that the agricultural economy still borrows mostly from informal sources, moneylenders supplying more than half of their credit needs. Cultivators and wage earners get half of their credit needs met by the professional moneylenders, and the animal farmers borrow a whopping 80 per cent from the latter. Cultivators also get one-fifth of their loans from banks. Animal farmers also borrow

significantly from their employers/landlords. Informal sources as a whole supply close to 70 per cent of credit to cultivators and wage earners, and animal farmers almost entirely get their credit from informal sources.

Table 4. 16: Composition of loans by source of loan taken for different sources of major income of agricultural households

source of major income	government	co-operative society	bank	employer/landlord	agricultural/professional money lender	shopkeeper/trader	relatives & friends	others	All
cultivation	3.80	3.30	21.30	6.20	49.40	6.00	7.80	2.10	100
livestock	0.00	0.10	0.60	12.30	79.40	0.80	6.90	0.00	100
other agricultural activity	0.00	0.00	3.00	0.00	0.00	0.00	97.00	0.00	100
non-agricultural enterprises	0.00	0.00	47.90	2.60	45.30	0.70	2.90	0.50	100
wage/salaried employment	0.00	15.00	17.10	4.30	50.70	3.50	6.10	3.20	100
pension	0.00	0.00	72.30	0.00	27.60	0.10	0.00	0.00	100
remittances	0.00	0.00	1.90	0.80	77.80	2.40	15.90	0.70	100
others	0.00	44.10	8.70	0.00	20.00	0.00	9.30	17.80	100
All	2.60	4.80	21.50	5.70	51.20	4.80	7.40	2.10	100

Source: Calculated from NSS 70th Round, Report No. 576, Appendix Table 13, Page A-1336.

Table 4. 17: Composition of loans by source of loan taken for different size classes of land possessed

size class of land possessed	Government	co-operative society	bank	employer/landlord	agricultural/professional money lender	shopkeeper/trader	relatives & friends	others	all
< 0.01	0.20	0.00	0.60	26.40	43.40	12.00	3.40	13.90	100
0.01 - 0.40	0.20	9.70	6.50	4.90	65.60	2.40	9.50	1.10	100
0.41 - 1.00	4.60	1.40	17.70	7.50	53.90	5.10	5.10	4.60	100
1.01 - 2.00	4.00	0.70	39.40	5.10	34.20	9.80	5.90	0.80	100
2.01 - 4.00	4.90	5.30	58.80	3.20	19.80	1.10	6.60	0.20	100
4.01 - 10.00	1.20	0.00	76.80	0.00	2.70	0.00	19.30	0.00	100
10.00 +	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	100
all sizes	2.60	4.80	21.50	5.70	51.20	4.80	7.40	2.10	100

Source: Calculated from NSS 70th Round, Report No. 576, Appendix Table 14, Page A-1392.

The impression that the smaller landholders get their credit mostly from informal sources is validated by the NSS 70th Round survey report as well. From Table 4.17, it can be

seen that the landless and the marginal landholders rely overwhelmingly on informal sources of credit. Small landholders roughly get half of their credit met through informal sources, whereas larger holdings rely overwhelmingly on formal sources of credit. Combining this information with the operational landholding distribution data tells us that the marginal and small segment of the peasantry, together accounting for 84 per cent of holdings and 75 per cent of the area, borrows mostly from informal sources.

Without going into a detailed analysis of rural credit markets, it can safely be said that the rate of interest is higher, terms of borrowing are more uncertain, and chances of "interlinkages" with other markets (labour, land lease, and produce) are much greater in the informal market than in the formal market. Given the economic and social status of small and marginal landholders, these aspects will contribute to increasing inequality of opportunities – for making productive investments and of making greater returns.

The distribution of land is already noted to be highly unequal, and the degree of landlessness is very high in Bihar. Is this inequality mitigated by ownership of other assets? In the absence of direct data on asset holdings according to size-class distribution, the overall data for the state is looked at. The first thing to observe is that the value of the Gini coefficient for the asset distribution in rural Bihar is higher than the all-India value,⁸³ in contrast to the land distribution picture where Bihar shows much less inequality. This suggests that the non-land resources are distributed in a more skewed manner in Bihar in relation to India as a whole. Much poorer conditions in respect of other resources (the average value of assets in Bihar is just 54 per cent of all-India value)⁸⁴ makes this unequal distribution even more problematic. The share of the average value of land in the average value of all assets in Bihar is similar to the all-India share. But it has a much smaller share (half that of the Indian share) of the average value of farm business equipment in total assets. The same is true for transport equipment. This suggests the relative poverty of the state in terms of these productive assets.

This inequality has been present in Bihar's agrarian economy for a very long time. A cursory look at the 48th Round of NSS data shows the following aspects. The number of agricultural machinery per 100 households in the size-class of less than one hectare shows that except for ploughs, primitive indigenous water lift equipment and chaff-cutter, no other

⁸³ NSS Report No. 570: *Household Assets and Liabilities in India*, page 44.

⁸⁴ *Ibid*, page 44.

agricultural implement exceeds four in number.⁸⁵ However, the use of farm implements on different size classes of operational holdings shows a different pattern.⁸⁶ The smaller size-classes, particularly marginal holdings, use more hand-operated implements. In the case of animal-operated implements also, generally, it is marginal holdings that have reported using the highest number of implements, except for relatively bigger implements like cane-crushers, threshers and seed-cum-fertilizer drills/seed drills, which are used more by small and medium holdings. It is interesting to see that even in the category of some of the power-operated implements, marginal holdings lead others in terms of numbers, with small holdings coming next (though in a number of other farm implements, larger holdings are the biggest users). In terms of share of area operated by these implements, however, larger holdings, it is expected that, would be much ahead. This actually reflects the dependence of marginal and small holdings on the new technology. Taking into consideration the ownership structure of these implements, their dependence on large operators appears quite clear.

How are these structural features likely to be affecting the agrarian economy of Bihar? The land and other physical resources are scarce, both in relative as well as absolute sense. Credit penetration is limited in the state, physical infrastructure very poor and institutional support very limited, to say the least. The highly skewed distribution of land, other physical assets and credit, together with this overall paucity of resources, further compounds the problems of the agrarian economy. This is because both the absolute paucity and the skewed distribution affect the lowest rung of the peasantry in an adverse manner. Given that they constitute the overwhelming majority in terms of their numbers as well as operating three-fourths of total land, it ensures that the overall dynamism is held back.

This, however, is only about the supply side of the limitations that Bihar agriculture faces. As mentioned above, the problem of incentives is still an unresolved issue that afflicts all segments of the peasantry and is not limited to the larger size-classes. In fact, a simplistic reading of the problem of lack of both ability and incentive to invest could be misleading. There is a chance that the two sides of the problem, demand as well as supply, interact to produce a likely stagnation. If the cultivators are not sure of the outcome of the produce market, they will be wary of making investments, particularly by borrowed means or by using remittances. Given the current situation, marked by the dissolution of the APMC Act, scarce

85 NSS, 48th Round Report No. 408, *Livestock and Agricultural Implements in Households Operational Holdings 1991-92*, Table 7(R), p. A-109.

86 Agricultural Census of Bihar, *Input Survey*, 1990-91. Table 7.

government procurement, high price volatility combined with much higher costs of cultivation, it is unlikely that a “free” market will somehow propel the cultivators to invest more, even if supply constraints are assumed to be relieved.

4.2 Outlining structural features through the primary data

The above-discussed considerations would certainly impact the economic choices and behaviour of peasants. The decisions that the cultivators make, the condition under which they make those decisions, and their expectations from them can only be gauged more accurately by directly interacting with them. This section discusses the results of the field survey conducted by the researcher.

4.2.1: A brief note on the survey and the villages surveyed

The fieldwork was conducted between the years 2005 and 2009 in the South-central parts of Bihar. The villages surveyed belong to the Buxar, Arwal and Gaya districts of the state. A total of 76 households engaged in cultivation were surveyed. The choice of households was such that the sample contained all size classes of ownership holdings, which included some agricultural labour households as well, who were engaged in petty production too. The distribution of ownership as well as operational holdings during the field survey, therefore, may vary considerably from the NSS reports or from that contained in the Agricultural Census data. The researcher is aware of the limitation of generalisation of the distributional data as contained in the field survey. The data, therefore, will be used more to explain the structural characteristics of operational holdings of different size-classes rather than to comment upon the distribution of landholdings.

To this end, a detailed questionnaire was used to collect quantitative information on all aspects of cultivation – land area, cropping pattern, yield level, inputs used, gross output, wages paid and received, irrigation pattern and its cost, details of labour use that had to be paid, credit transactions, and household expenditure. This was also supplemented with information on cattle rearing. Buying and selling of land were also recorded.

Through interviews, more qualitative information was collected regarding the past history of cultivation, labour use pattern, cropping pattern, social and political dynamics,

perceived motivations and compulsions behind cultivations, etc. This was done to contextualise the quantitative analysis into a definite social set-up. This has helped the researcher in understanding the nuances of the peasants' decision-making in its proper context, saving the analysis from a possible reductionism of existing academic perceptions. In the following analysis, such qualitative information will be used wherever it will be required to supplement the quantitative analysis.

4.2.1(a): Village A

This village is located in district Buxar which is the Western central end of the state bordering Uttar Pradesh. It is part of the Gangetic alluvial plain. The village is irrigated through two canals located north and south of the villages. Both these canals are part of the Sone River Command System. The canal system dates back to the late nineteenth century, constructed by the British. Shallow tube well irrigation is the main source of irrigation in the village, as the canal irrigation remains uncertain. The village lies on the tail end of the canal. The water discharged into it, and its availability is severely inadequate and ill-timed. More often, the canal water is used for irrigation only through a pumping set and not through the irrigation channels, as the water level is low and cannot flow into the channels on its own.

The cropping pattern seen in this village is primarily and heavily paddy-wheat cycle. Even in this, there is an absence of summer rice. The land remains fallow for about two months after the harvesting of the rabi crop. Paddy is the main *kharif* crop, and wheat is the *rabi* crop. There is little cultivation of pulses, oilseeds, and other coarse cereals, mostly for self-consumption. Vegetables are also grown in the village, and in contrast to the pulses, a part of this cultivation is commercial. However, this is still very small in relation to paddy-wheat cultivation. Earlier, sugarcane was also grown on a significant area of land, but over time it has effectively vanished from the village. One sugar mill in the district town of Buxar, dating back to the colonial period, had closed down many decades earlier.

The village is predominantly small/marginal cultivating household dominated. There are only a couple of big land operators. The social composition of the village is dominated by a majority of middle-caste peasant households. The landless or the effectively landless households are predominantly scheduled caste and scheduled tribe households. But there are some who belong to the middle caste category as well. Very few households belonging to the upper social stratum also do not own land. The tenancy is heavily tilted in favour of the fixed

cash rent type. Fixed kind rent is seen in extremely low frequency. Sharecropping still persists on a significant basis.

The village is very close to the district town of Buxar. It is relatively easy to commute. There is a large number of workers who commute daily to do casual wage labour or even a more regular job in the services sector. Some households also own small businesses on the outskirts of the town. There is a *pakka* road that connects the village to the town. Though there is a middle school in the village, most of the school-going children prefer going to private schools in the town. The primary health centre is in dilapidated condition.

The peasant households get most of the purchased items from the town. They buy all the inputs for cultivation from the town. Most often, they are also selling their produce in this local town. The town has a *Bazar Samiti*, where significant trade in food grains takes place. Outsider traders also visit the village to buy agricultural produce. Village traders are also important players in the food grain trade of the village. This district town is well connected with the rest of the country through a rail network.

4.2.1(b): Village B

This village is situated in the central part of Bihar, in the Arwal district. It is not in close proximity to any canal, and peasants for irrigation mostly depend on shallow tube wells. The village is part of the Sona Command Area, but it is not effectively covered by the same, and over time it is gradually lost the canal irrigation cover that was earlier available.

The cropping pattern of the village is also dominated by the paddy-wheat cycle, but in contrast to the first village, it does grow pulses on a significant scale as a *rabi* crop. In general, the yield of wheat is very low, and *masoor* provides them with an alternative. There are very few households that are engaged in vegetable cultivation on a commercial basis. Cultivation of other coarse cereals and oilseeds is mostly for self-consumption, as in the first village.

The village is also predominantly small/marginal cultivating household dominated. There are no big land operators. The social composition of the village is again dominated by a majority of middle-caste peasant households. The landless or the effectively landless households are predominantly scheduled caste households. Again, some middle-caste

households are landless as well. Small and marginal tenants mostly leased-in land on a sharecropping basis, though fixed kind or fixed cash rent tenancies were not entirely absent.

The village is very close to a very small market settlement, a *qasba*, but is relatively far from the district town of Arwal. In fact, households prefer visiting the neighbouring district town to their own for any commercial needs, which is also at a distance. The district town is connected with a road network with other districts of the state but is not connected by any rail network. A *pakka* road, though in bad condition, connects the nearby market settlement with the village.

Villagers visit the nearby *qasba* for their daily needs if they need to buy anything. They also go to the same market to sell small amounts of agricultural produce. Major agricultural inputs are also purchased from this market, though for subsidised inputs, cultivators had to visit the local block office. Larger quantities of produce are mostly sold to outside traders in the village itself who come to buy in the village. Village traders also buy from and sell to villagers different items of agricultural output.

It was observed that, unlike in the first village, the incidence of commuting for daily wage employment was lower, though not absent in this village. It is understandable that the local market settlement, which is of small size, could not possibly have a big demand for the casual or regular labour force.

4.2.1(c): Village C

The households surveyed for this location were not necessarily from a *single* village settlement, but were drawn from a cluster of very small settlements in the vicinity of each other, spread not wider than 2 kilometres. This location is situated in the Southern part of the state, in the Gaya district. The village is covered under canal irrigation but is completely useless as the level of the canal is lower than the field level, and therefore, cultivators cannot draw water from the canals even if there is water discharge into the canal. Pumping sets are used to take water from the canal. Shallow tube wells again form the backbone of irrigation in the village. In this village, there are some other sources, like wells and ponds, used for irrigation.

The cropping pattern is more similar to the second village. Paddy remains the major *kharif* crop. But during the *rabi* season, pulses are grown at a much wider scale in this village

than in the first two. The production of oilseeds and coarse cereals is similar to the other two villages. *Masoor* is grown in a much larger land area in this location. Vegetable farming is at a low scale and is almost entirely for self-consumption. The village had earlier seen the cultivation of summer rice and sugarcane on a significant scale. But this has vanished completely now. The reason for this is the loss of irrigation cover, which in turn was because of the vanished electricity supply. Irrigation with diesel pumping sets is not economically viable, rendering cultivation of these irrigation-intensive crops impossible. A couple of cultivators have experimented with cropping some medicinal plants recently, but the monetary yield remains highly volatile and does not attract much attention from the cultivators.

This cluster also is dominated by the middle caste peasants, though there is a significant presence of cultivators from the upper social stratum. Scheduled caste households are almost entirely landless and depend either on leasing-in land from the middle-caste landowners or on wage work available in the agricultural sector or other non-farm work in the village. The land ownership pattern is similar to the other two villages. In this cluster, however, there are few large landowners. The leasing pattern is overwhelmingly tilted in favour of sharecropping. In fact, this settlement is characterised by a much lesser penetration of monetised exchanges as compared to the other two. Wages are mostly paid in kind (rice) in the village.

The nearest town is a sub-divisional town which is very close. The district headquarter is located much further. This village can be considered “remote” in a relative sense. As the nearby town does not offer much wage employment, the incidence of daily commuting for work is almost negligible. The town is connected with other districts with a road network. It is not connected to any rail network. The nearest railhead is the district headquarter of Gaya, which is well connected with other parts of the country.

The nearest small town serves the villagers for their consumption requirements which are to be purchased. Peasants purchase most of their inputs from this town. As the degree of commercialisation is comparatively low, there is not much selling by the peasants in the town. Those with a marketable surplus of agricultural produce, mostly paddy and *Masoor*, sell in the village to the outside traders arriving to purchase these. There is not much selling to the village traders in this settlement.

With this brief description in place, the basic finding related to the agrarian economy as observed during the field survey is presented below. First, the analysis of the land lease arrangement will be discussed, followed by a description and analysis of the actual economic dynamics underlying crop production in the villages surveyed. This involves looking at cropping patterns, input use, costs and returns, and other relevant information. The objective would be to understand and bring forth the key structural patterns that shape the everyday evolution of the agrarian economy. Village A will be referred to as location A, while villages B and C together will be referred to as location B (given the similarities in the cropping pattern, market involvement, and geographical proximity).

4.2.2: The land question: How do the peasants get land to till?

As already mentioned above, this sub-section would not go into discussing or analysing the distribution of landholdings, ownership or operational, because it would not be appropriate to generalise the results, given the narrow base of the survey. This sub-section instead would focus on the basic features of tenancy relations as observed during the field survey. This would explain the structural patterns obtained in the land lease arrangements. The data on landholding, however, is presented here for reference (Table 4.18).⁸⁷

Table 4. 18: Distribution and average size of landholdings

Size-class	percentage distribution of ownership holdings	percentage distribution of operational holdings	percentage distribution of area owned	percentage distribution of area operated	Average size of ownership holding in Hectare	Average size of operational holding in Hectare
Nearly Landless	47.37	30.26	5.19	7.00	0.13	0.28
Marginal	15.79	35.53	11.03	23.10	0.84	0.79
Small	23.68	21.05	27.66	26.90	1.41	1.55
Semi-Medium	7.89	9.21	16.68	19.30	2.55	2.55
Medium	3.95	3.95	27.03	23.80	8.26	7.31
Large	1.32	0.00	12.41	0.00	11.38	0.00
All	100.00	100.00	100.00	100.00	1.21	1.21

Source: Field survey of the researcher.

Who are the cultivators leasing in the land under what tenancy type? Is tenancy spread uniformly across different size classes? Table 4.19 shows that there is a significant incidence of tenancy observed in all size classes of operational holdings. Nearly landless, marginal and

⁸⁷ Appendix Table A4.2.1 describes the size-classes. *Appendix 4.2* also has tables with data on the distribution of landholdings and the different characteristics of these holdings. These tables are used only to contextualise the discussion on specific aspects.

small landholdings record a greater incidence and given their large numbers, it pushes the degree of incidence of tenancy quite high for the entire sample. Close to two-thirds of households reported leasing in the land. There is, however, a much greater prevalence of tenancy in location A than in B. In the latter location, tenancies are not found in size-classes above small landholdings. The nearly landless in location A lease in land in a big way than in location B if we look at the number of households leasing-in.

Table 4. 19: Percentage distribution of leasing-in households by types of tenancy and percentage of leasing-in households under each size class of operational holdings

Size-class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Tenancy type in Location A	Fixed	53.85	27.27	36.36	100.00	100.00	46.15
	Mixed	23.08	54.55	54.55	0.00	0.00	38.46
	Sharecropping	23.08	18.18	9.09	0.00	0.00	15.38
	% of leasing-in households	81.25	68.75	100.00	33.33	100.00	76.47
Tenancy type in Location B	Fixed	50.00	0.00	50.00	0.00	0.00	20.00
	Mixed	0.00	16.67	50.00	0.00	0.00	20.00
	Sharecropping	50.00	83.33	0.00	0.00	0.00	60.00
	% of leasing-in households	28.57	54.55	40.00	0.00	0.00	40.00
Tenancy type in All Locations	Fixed	53.33	17.65	38.46	100.00	100.00	40.82
	Mixed	20.00	41.18	53.85	0.00	0.00	34.69
	Sharecropping	26.67	41.18	7.69	0.00	0.00	24.49
	% of leasing-in households	65.22	62.96	81.25	28.57	66.67	64.47

Source: Field survey of the researcher.

All size-classes together lease in mostly on fixed rent basis, followed by mixed arrangements. Only one-fourth of the operational holdings leased-in land on a sharecropping basis. However, there is a marked difference between the locations: location A overwhelmingly witnessed the fixed and mixed types of tenancies while location B had 60 per cent of tenancies on a sharecropping basis. Sharecropping, in both locations, is almost confined to nearly landless and marginal holdings. Overall, the largest and the smallest size-classes prefer fixed-rent contracts over sharecropping.

This finding suggests that the small and marginal peasantry is behaving in a risk-averse manner by putting their stakes in mixed or sharecropping tenancies instead of purely fixed rent tenancies. However, the lowest rung is mostly leasing in on the basis of fixed rents. Are they risk-takers in the same way in which the largest size-classes can said to be? Perhaps not. This was revealed by many respondents belonging to the lowest segment when they explained their choice of the form of tenancy. They found it easier to lease in with cash rent,

secured it with their labour incomes at the beginning of the *kharif* season, and as they did not have to share the produce, they required a smaller area of land to produce their subsistence, their primary reason for leasing-in.

Table 4. 20: Average area leased-in under different types of tenancies (in Hectare)

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Tenancy type in Location A	Fixed	0.25	0.35	0.73	1.01	3.04	0.77
	Mixed	0.30	0.70	0.87	0.00	0.00	0.69
	Sharecropping	0.36	0.73	0.30	0.00	0.00	0.47
	Any type	0.29	0.61	0.77	1.01	3.04	0.69
Tenancy type in Location B	Fixed	0.25	0.00	0.51	0.00	0.00	0.38
	Mixed	0.00	0.89	0.78	0.00	0.00	0.83
	Sharecropping	0.13	0.22	0.00	0.00	0.00	0.20
	Any type	0.19	0.33	0.64	0.00	0.00	0.36
Tenancy type in All Locations	Fixed	0.25	0.35	0.69	1.01	3.04	0.73
	Mixed	0.30	0.73	0.86	0.00	0.00	0.70
	Sharecropping	0.30	0.36	0.30	0.00	0.00	0.34
	Any type	0.27	0.51	0.75	1.01	3.04	0.62

Source: Field survey of the researcher.

This behaviour is revealed by the smallest size class in location A where they are leasing-in land in a big way. Though the share of operational holdings leasing-in land on a sharecropping basis in terms of their numbers is less than half of the purely fixed rent basis, the average area leased-in on a sharecropping basis is roughly fifty per cent higher than that on fixed rent basis (Table 4.20). In both size-classes where sharecropping is found abundantly (nearly landless and marginal), the average area under sharecropping contracts is much bigger than under fixed-rent contracts. It is also clear that this segment is leasing-in land to augment the size of their holdings, making it more than double. Table 4.18 above shows that larger holdings are leasing out a substantial portion of land and the near landless category is the biggest receiver of their land.

The observation from the secondary sources that leasing land is essentially a “marginal” phenomenon is also validated by the field survey. The nearly landless and marginal categories virtually seem to be interacting with each other in the leasing exercise. The near 20 percentage point gain in the share of marginal holdings can almost entirely be attributed to an equally substantial decline in the share of the nearly landless – the latter leasing-in land, doubling their average size of operational holdings and thus moving a class above to populate the marginal segment.

Table 4. 21: Percentage distribution of leased-in area by types of tenancy and percentage of leased-in area under each size class of operational holdings

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	medium	Grand Total
Tenancy type in Location A	Fixed	47.46	15.83	34.76	100.00	100.00	51.38
	Mixed	23.73	62.49	61.65	0.00	0.00	38.12
	Sharecropping	28.81	21.68	3.60	0.00	0.00	10.50
	% of leased-in area	68.68	54.95	49.87	13.22	42.11	41.96
Tenancy type in Location B	Fixed	66.67	0.00	39.22	0.00	0.00	20.83
	Mixed	0.00	44.87	60.78	0.00	0.00	45.83
	Sharecropping	33.33	55.13	0.00	0.00	0.00	33.33
	% of leased-in area	38.46	21.79	16.40	0.00	0.00	13.04
Tenancy type in All Locations	Fixed	49.23	12.24	35.35	100.00	100.00	47.75
	Mixed	21.54	58.49	61.53	0.00	0.00	39.03
	Sharecropping	29.23	29.28	3.12	0.00	0.00	13.22
Total leased-in area as a % of total area operated		64.04	40.83	39.25	11.34	27.70	33.20

Source: Field survey of the researcher.

Table 4. 22: Percentage distribution of leasing-out households by types of tenancy and percentage of leasing-out households under each size class of ownership holdings

Size class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Large	All size classes
Tenancy type in Location A	Fixed	100.00	100.00	44.44	33.33	0.00	100.00	53.33
	Mixed	0.00	0.00	11.11	66.67	0.00	0.00	20.00
	Sharecropping	0.00	0.00	44.44	0.00	0.00	0.00	26.67
	% of leasing out households	3.45	16.67	90.00	60.00	0.00	100.00	29.41
Tenancy type in Location B	Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mixed	0.00	0.00	25.00	0.00	66.67	0.00	25.00
	Sharecropping	0.00	100.00	75.00	100.00	33.33	0.00	75.00
	% of leasing out households	0.00	66.67	50.00	100.00	100.00	0.00	48.00
Tenancy type in All Locations	Fixed	100.00	20.00	30.77	25.00	0.00	100.00	29.63
	Mixed	0.00	0.00	15.38	50.00	66.67	0.00	22.22
	Sharecropping	0.00	80.00	53.85	25.00	33.33	0.00	48.15
% of leasing-out households		2.78	41.67	72.22	66.67	100.00	100.00	35.53

Source: Field survey of the researcher.

How do these patterns of leasing land affect land distribution? Reading Table 4.21 with Table 4.20 reveal some interesting patterns. Firstly, as expected, the percentage of area

leased-in varies inversely with the size of landholding. This pattern is found in both locations. Secondly, roughly half of the total area leased-in is under fixed-rent contracts, followed by mixed rental arrangements, and only a small fraction is under the sharecropping system. However, there is a difference between the two locations in this regard. Location B records more area under mixed and sharecropping systems than in fixed rental arrangements. Thirdly, roughly half of the total area leased-in by the nearly landless households is under fixed-rent contracts. As one moves to watch the leasing pattern by marginal and small landholders, a larger leased-in area is found under mixed and sharecropping contracts. The largest segment's leased-in area consists solely of fixed rental contracts. Thus this suggests an inverted-U relationship between the size-class of operational holdings and the incidence of fixed rent tenancy.

Table 4.23: Percentage distribution of leased-out area under different types of tenancies and percentage of area under tenancy

Size class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Large	All size classes
Tenancy type in Location A	Fixed	100.00	100.00	32.10	5.97	0.00	100.00	61.15
	Mixed	0.00	0.00	30.86	94.03	0.00	0.00	30.14
	Sharecropping	0.00	0.00	37.04	0.00	0.00	0.00	8.71
	% of leased-out area	12.29	3.41	14.65	16.42	0.00	35.56	18.92
Tenancy type in Location B	Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mixed	0.00	0.00	32.97	0.00	84.86	0.00	64.04
	Sharecropping	0.00	100.00	67.03	100.00	15.14	0.00	35.96
	% of leased-out area	0.00	33.85	30.33	94.74	69.74	0.00	54.03
Tenancy type in All Locations	Fixed	100.00	9.59	11.95	2.88	0.00	100.00	15.94
	Mixed	0.00	0.00	32.18	45.32	84.86	0.00	55.20
	Sharecropping	0.00	90.41	55.86	51.80	15.14	0.00	28.86
	% of leased-out area	6.64	18.25	21.68	28.72	69.74	35.56	36.41

Source: Field survey of the researcher.

Who is supplying how much land in the land lease market, if one can speak of it? The answer from the data presented in Table 4.22 and Table 4.23 is that a little more than one-third of households lease-out land, which constitutes roughly the same percentage of the total area of their ownership holdings. Location B witnesses a greater degree of leasing out by owner households than location A, both in terms of number and area. Not only that, but the average area leased out per household is also three and half times greater in location B (Table 4.24), resulting in a much larger (three times) percentage of the total area owned being leased

out. Further, a comparison of average area leased-in and leased-out also indicates that whereas in location A average area leased-in is slightly greater than the average area leased-out, in location B average area leased-out is five times the average area leased-in. From the data on landholding, the direction of leasing over the entire spectrum of landholdings becomes very clear –larger landholdings leasing-Out to smaller landholdings. This is also possibly indicated by the fact that the average area leased-out is double that of the average area leased-in.

Table 4.24: Average area leased-out under different types of tenancies (in Hectare)

Size class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	medium	Large	All size classes
Location A	Fixed	0.32	0.18	0.16	0.13	0.00	4.05	0.67
	Mixed	0.00	0.00	0.63	1.00	0.00	0.00	0.87
	Sharecropping	0.00	0.00	0.19	0.00	0.00	0.00	0.19
	Any type	0.32	0.18	0.23	0.71	0.00	4.05	0.58
Location B	Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mixed	0.00	0.00	1.14	0.00	7.33	0.00	5.27
	Sharecropping	0.00	0.42	0.77	2.28	2.62	0.00	0.99
	Any type	0.00	0.42	0.86	2.28	5.76	0.00	2.06
All Locations	Fixed	0.32	0.18	0.16	0.13	0.00	4.05	0.67
	Mixed	0.00	0.00	0.89	1.00	7.33	0.00	3.07
	Sharecropping	0.00	0.42	0.44	2.28	2.62	0.00	0.74
	Any type	0.32	0.37	0.42	1.10	5.76	4.05	1.24

Source: Field survey of the researcher.

Of the leasing-out households, roughly half leased-out land under the sharecropping system, followed by the fixed rent and mixed arrangement. Of the total area leased-out, more than half was under the mixed type of tenancies, followed by sharecropping, and only a small portion was under a purely fixed-rent system. But there is a marked difference between the two locations. Location B has three fourth of households leasing-out under sharecropping and the rest one-fourth under the mixed tenancy and no one under a purely fixed rental system, whereas in location A, more than half of the households leased-out land under purely fixed-rent tenancy, and the rest roughly equally divided between mixed and sharecropping tenancy. The distribution of area also shows a similar pattern. In location A, more than 60 per cent of the land was leased-out under purely fixed rentals, followed by mixed rentals. The share of land under sharecropping was very small. Location B, on the other hand, two-thirds of the total land leased-out was under mixed rentals and the rest one-third under sharecropping.

Nearly landless households leased-out land (only in location A) entirely under a fixed rental system. Marginal landowners in location A again leased out entirely under a fixed rental system, whereas in location B, they did so entirely under sharecropping. The small landowners in both locations lease out land significantly under sharecropping. Larger landowners display divergent patterns in the two locations: in location A they lease out more under fixed rent arrangements, while in location B, overwhelmingly under sharecropping. The largest size owners have gone either for a purely fixed rent or for a mixed type of tenancy. The preference for the marginal landowners in location B to lease out under sharecropping may be a result of desperation on the part of their tenants, who are entirely marginal or landless households (Table 4.26), to ensure a certain food supply given a higher degree of the precariousness of wage income (largely non-farm). Table 4.25 depicting the average area leased-out under different types of tenancy also confirms the same pattern. In both locations, households, while leasing out, did so for a greater area of land on average by entering into a mix of different types of tenancies. This is followed by fixed type in location A and by sharecropping in location B.

Table 4. 25: Average area leased-out under different types of tenancies (in Hectare)

Size class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	medium	Large	All size classes
Location A	Fixed	0.32	0.18	0.16	0.13	0.00	4.05	0.67
	Mixed	0.00	0.00	0.63	1.00	0.00	0.00	0.87
	Sharecropping	0.00	0.00	0.19	0.00	0.00	0.00	0.19
	Any type	0.32	0.18	0.23	0.71	0.00	4.05	0.58
Location B	Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mixed	0.00	0.00	1.14	0.00	7.33	0.00	5.27
	Sharecropping	0.00	0.42	0.77	2.28	2.62	0.00	0.99
	Any type	0.00	0.42	0.86	2.28	5.76	0.00	2.06
All Locations	Fixed	0.32	0.18	0.16	0.13	0.00	4.05	0.67
	Mixed	0.00	0.00	0.89	1.00	7.33	0.00	3.07
	Sharecropping	0.00	0.42	0.44	2.28	2.62	0.00	0.74
	Any type	0.32	0.37	0.42	1.10	5.76	4.05	1.24

Source: Field survey of the researcher.

It is already noticed from the NSS data that the leasing pattern clearly exhibits a biased pattern – land lease activity is hugely concentrated in the marginal size class of holdings. What is the larger pattern of leasing that comes out from the field survey? Who is leasing from whom? The following tables present the result that sums up this tenancy relation.

Table 4. 26: Percentage of leasing-in households by class of their lessors for each size class of operational holdings

Size class of operational holdings reporting leasing-in →		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Lessors, location A	Marginal plus others	0.00	36.36	18.18	0.00	50.00	17.95
	Only marginal	38.46	27.27	36.36	50.00	0.00	33.33
	Other than marginal	61.54	36.36	45.45	50.00	50.00	48.72
Lessors, location B	Marginal plus others	50.00	16.67	0.00	0.00	0.00	20.00
	Only marginal	0.00	33.33	0.00	0.00	0.00	20.00
	Other than marginal	50.00	50.00	100.00	0.00	0.00	60.00
Lessors, all locations	Marginal plus others	6.67	29.41	15.38	0.00	50.00	18.37
	Only marginal	33.33	29.41	30.77	50.00	0.00	30.61
	Other than marginal	60.00	41.18	53.85	50.00	50.00	51.02

Source: Field survey of the researcher.

Table 4.26 shows that more than half of all the leasing-in households lease land from landowners having more than 1 hectare of land, 30 per cent of them lease in only from marginal households, and the rest from marginal as well as bigger landowners. This pattern is roughly similar in both locations. However, location B displays the “traditional” pattern more emphatically– other than marginal (read bigger) landholdings leasing-out to nearly landless, marginal and small landholdings. Location A, however, displays both patterns of leasing. Nearly landless and marginal holdings leasing-in land from those owning more than 1 hectare of land. At the same time, it is seen that there are signs of “reverse tenancy” – half of the semi-medium landholdings and more than 36 per cent of those operating between 1 to 2 hectares of land are seen to be leasing in from those who own less than 1 hectare of land. Clearly, location A is visibly more diverse, offering greater potential for productivity growth based on economies of scale.

Table 4.27 shows the same pattern when looking at the distribution of leased-in area, with the only difference that the marginal landholders as lessors seem to have a smaller share in terms of area than their share in numbers in location A. The distribution of leased-in area also exhibits a more pronounced “traditional” pattern in location B than the distribution of the number of leasing-in households. Data on average area leased-in from different classes of lessors for each size-class of operational holdings (Table 4.28) also confirms a similar pattern. It also displays the same difference between the two locations – landless and

marginal households in location B leasing in a larger area from bigger landowners than from their own marginal brethren, whereas location A revealed a mixed direction of leasing-in. Table 4.29 sums up this tendency by presenting the data on the average size of ownership and operational holdings. From the table, the difference between the two locations, as marked out above, comes out very clearly.

Table 4. 27: Percentage of leased-in area by class of lessors for each size class of operational holdings

Size class of operational holdings reporting leasing-in →		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Lessors, location A	Marginal plus others	0.00	46.47	16.78	0.00	41.67	26.18
	Only marginal	38.81	15.83	36.18	37.50	0.00	23.44
	Other than marginal	61.19	37.70	47.04	62.50	58.33	50.38
Lessors, location B	Marginal plus others	33.33	44.87	0.00	0.00	0.00	27.78
	Only marginal	0.00	28.85	0.00	0.00	0.00	15.63
	Other than marginal	66.67	26.28	100.00	0.00	0.00	56.60
Lessors, all locations	Marginal plus others	3.08	46.10	14.55	0.00	41.67	26.37
	Only marginal	35.23	18.79	31.38	37.50	0.00	22.51
	Other than marginal	61.69	35.11	54.06	62.50	58.33	51.12

Source: Field survey of the researcher.

Table 4. 28: Average leased-in area from different classes of lessors for each size class of operational holdings (in hectare)

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Lessors, location A	Marginal plus others	0.000	0.779	0.708	0.000	2.529	1.009
	Only marginal	0.290	0.354	0.764	0.759	0.000	0.486
	Other than marginal	0.285	0.632	0.794	1.265	3.541	0.715
	All classes	0.287	0.610	0.767	1.012	3.035	0.692
Lessors, location B	Marginal plus others	0.126	0.885	0.000	0.000	0.000	0.506
	Only marginal	0.000	0.285	0.000	0.000	0.000	0.285
	Other than marginal	0.253	0.173	0.645	0.000	0.000	0.344
	All classes	0.190	0.329	0.645	0.000	0.000	0.364
Lessors, all locations	Marginal plus others	0.126	0.801	0.708	0.000	2.529	0.897
	Only marginal	0.290	0.326	0.764	0.759	0.000	0.459
	Other than marginal	0.282	0.435	0.752	1.265	3.541	0.626
	All classes	0.274	0.511	0.749	1.012	3.035	0.625

Source: Field survey of the researcher.

Table 4. 29: Average area owned and operated by each size-class of operational holdings

Size-class of operational holdings	Location A		Location B		All locations	
	Average area owed	Average area operated	Average area owed	Average area operated	Average area owed	Average area operated
Nearly Landless	0.146	0.339	0.967	0.141	0.396	0.279
Marginal	0.511	0.763	1.101	0.823	0.751	0.788
Small	0.852	1.539	1.315	1.573	0.997	1.550
Semi-Medium	2.293	2.551	10.117	2.529	3.411	2.548
Medium	6.197	7.208	10.117	7.499	7.503	7.305
Grand Total	0.902	1.261	1.828	1.117	1.207	1.214

Source: Field survey of the researcher.

The tenurial condition of the leasing arrangements shows the uncertainty of tenure. Tables 4.30 and 4.31 present the data on the period of leasing arrangements. An overwhelming majority leases in the land just for a year. Except for about one-twentieth of leasing-in households in location A, belonging to nearly landless and marginal categories, no one gets a lease extending beyond a one-year period. A much greater percentage than this leases-in land for less than a year in both locations (location B still has a higher percentage than location A). The distribution of leased-in area is also showing a similar pattern.

Table 4. 30: Percentage of leasing-in households by period of lease for each size class of operational holdings

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Location A	1 year	92.31	72.73	90.91	100.00	100.00	87.18
	< 1 year	0.00	18.18	9.09	0.00	0.00	7.69
	> 1 year	7.69	9.09	0.00	0.00	0.00	5.13
Location B	1 year	100.00	66.67	100.00	0.00	0.00	80.00
	< 1 year	0.00	33.33	0.00	0.00	0.00	20.00
	> 1 year	0.00	0.00	0.00	0.00	0.00	0.00
All locations	1 year	93.33	70.59	92.31	100.00	100.00	85.71
	< 1 year	0.00	23.53	7.69	0.00	0.00	10.20
	> 1 year	6.67	5.88	0.00	0.00	0.00	4.08

Source: Field survey of the researcher.

Table 4. 31: Percentage of leased-in area by period of lease for each size class of operational holdings

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Location A	1 year	86.44	69.93	93.71	100.00	100.00	88.68
	< 1 year	0.00	21.11	6.29	0.00	0.00	7.22
	> 1 year	13.56	8.95	0.00	0.00	0.00	4.10
Location B	1 year	100.00	87.82	100.00	0.00	0.00	93.40
	< 1 year	0.00	12.18	0.00	0.00	0.00	6.60
	> 1 year	0.00	0.00	0.00	0.00	0.00	0.00
All locations	1 year	87.69	74.00	94.54	100.00	100.00	89.24
	< 1 year	0.00	19.08	5.46	0.00	0.00	7.15
	> 1 year	12.31	6.92	0.00	0.00	0.00	3.61

Source: Field survey of the researcher.

How easily do the leasing-in households get land to till? One crucial variable to influence this is the number of lessors from whom they are leasing-in land. A higher number implies a more cumbersome and more uncertain process of negotiation. Tables 4.32 and 4.33 sum up the degree of ease in leasing by looking at the distribution of leasing-in households and leased-in area by the number of lessors for each size-class of operational holdings. Overall it seems to be a diversified pattern where leasing-in households seem to be distributed across the number of lessors. Roughly one-third of the leasing-in households have to lease in from 3 or more lessors. This is true for both locations. However, nearly landless households lease in mostly from a single lessor. This is very much expected given the tiny size of their landholdings. But as we move on to the marginal size category, the number of lessors rises, with about 60 per cent of them leasing in from 3 or more lessors.

Table 4. 32: Percentage distribution of leasing-in households by number of lessors for each size class of operational holdings

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
No. of lessors in Location A	1	61.54	18.18	45.45	100.00	0.00	43.59
	2	15.38	9.09	45.45	0.00	0.00	20.51
	3 or more	23.08	72.73	9.09	0.00	100.00	35.90
No. of lessors in Location B	1	50.00	0.00	50.00	0.00	0.00	20.00
	2	50.00	66.67	0.00	0.00	0.00	50.00
	3 or more	0.00	33.33	50.00	0.00	0.00	30.00
No. of lessors in All locations	1	60.00	11.76	46.15	100.00	0.00	38.78
	2	20.00	29.41	38.46	0.00	0.00	26.53
	3 or more	20.00	58.82	15.38	0.00	100.00	34.69

Source: Field survey of the researcher.

Table 4. 33: Percentage distribution of leased-in area by number of lessors for each size class of operational holdings

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
No. of lessors in Location A	1	57.97	6.41	32.66	100.00	0.00	27.33
	2	18.31	9.43	43.07	0.00	0.00	18.35
	3 or more	23.73	84.17	24.27	0.00	100.00	54.31
No. of lessors in Location B	1	66.67	0.00	39.22	0.00	0.00	20.83
	2	33.33	29.49	0.00	0.00	0.00	19.44
	3 or more	0.00	70.51	60.78	0.00	0.00	59.72
No. of lessors in All locations	1	58.77	4.95	33.53	100.00	0.00	26.56
	2	19.69	13.98	37.36	0.00	0.00	18.48
	3 or more	21.54	81.06	29.11	0.00	100.00	54.96

Source: Field survey of the researcher.

A study of the leasing-out activity also reveals the choices of households doing so and the consequent distribution of leased-out area by the number of lessees. A cursory look at Tables 4.34 and 4.35 displays a highly fragmented nature of the leasing-out activity. Though the distribution of leasing-out households by the number of lessees appear similar to that of leasing-in households by the number of lessors, the distribution of leased-out area shows that 75 to 80 per cent of the total area leased-out is distributed among three or more lessees. Nearly landless and marginal landowners, as expected, lease out mostly to one lessee. But as size-class increases, the number of lessees rises. This ultimately shows that despite the significant presence of land lease arrangements (market or otherwise), the agrarian economy is characterised by the preponderance of marginal landholders in the absence of a tendency where larger holdings are formed through land lease arrangements.

Table 4. 34: Percentage distribution of leasing-out households by number of lessees for each size class of ownership holdings

Size class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Large	All size classes
No. of lessees in Location A	1	100.00	0.00	66.67	33.33	0.00	0.00	53.33
	2	0.00	100.00	22.22	33.33	0.00	0.00	26.67
	3 or more	0.00	0.00	11.11	33.33	0.00	100.00	20.00
No. of lessees in Location B	1	0.00	50.00	0.00	0.00	0.00	0.00	16.67
	2	0.00	25.00	75.00	100.00	0.00	0.00	41.67
	3 or more	0.00	25.00	25.00	0.00	100.00	0.00	41.67
No. of lessees in All locations	1	100.00	40.00	46.15	25.00	0.00	0.00	37.04
	2	0.00	40.00	38.46	50.00	0.00	0.00	33.33
	3 or more	0.00	20.00	15.38	25.00	100.00	100.00	29.63

Source: Field survey of the researcher.

Table 4. 35: Percentage distribution of leased-out area by number of lessees for each size class of ownership holdings

Size class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Large	All size classes
No. of lessees in Location A	1	100.00	0.00	43.21	5.97	0.00	0.00	15.25
	2	0.00	100.00	25.93	7.46	0.00	0.00	9.95
	3 or more	0.00	0.00	30.86	86.57	0.00	100.00	74.80
No. of lessees in Location B	1	0.00	63.64	0.00	0.00	0.00	0.00	4.30
	2	0.00	13.64	49.82	100.00	0.00	0.00	17.11
	3 or more	0.00	22.73	50.18	0.00	100.00	0.00	78.59
No. of lessees in All locations	1	100.00	57.53	16.09	2.88	0.00	0.00	7.16
	2	0.00	21.92	40.92	55.40	0.00	0.00	15.24
	3 or more	0.00	20.55	42.99	41.73	100.00	100.00	77.60

Source: Field survey of the researcher.

What is the overall impression that is given by these data on different aspects of land lease arrangements witnessed in rural Bihar? First, there is a considerable extent of tenancy observed. Second, this much prevalent practice is largely accounted for by the very small landholdings given their preponderance amongst the agricultural households. Third, fixed-rent tenancy seems to be the most prevalent form of tenancy. Fourth, sharecropping appears to be confined largely to the landless and marginal peasantry. Fifth, leasing of land is observed to be happening mostly among the smaller landholdings. To an extent, it involves larger landholdings; the direction of leasing is mostly “traditional”, i.e. from the larger to the smaller landholdings, although there is some presence of “reverse tenancy”. Sixth, among the leasing-out households, sharecropping appears to be the most prevalent form. However, in terms of total area leased-out, mixed type tenancies are the most common, followed by sharecropping and cash rent tenancy. Seventh, land lease arrangements are made mostly for just a year rendering a high degree of uncertainty of tenure. Eighth, even though tenancies are mostly among the marginal, sub-marginal and small segments of the peasantry, an average leasing-in household has to negotiate with multiple lessors. Similarly, an average household leases out to multiple tenants.

Within these overall observations, there are marked differences between the two locations in many respects. The overall extent of tenancy is higher in location A than in B if we look at the percentage of operational holdings leasing in and the percentage of area leased-in. But location B has a much bigger percentage of area leased-out on account of larger holdings resorting to extensive leasing out. But the most prominent difference is witnessed in the form of tenancy. In location B, sharecropping is the most prevalent form of

tenancy, whereas in location A it is the least prevalent form. Location B, thus overall, appears to be more traditional in the patterns it reflects – leasing happens to be from larger landowners to near landless and marginal peasant families in the form of sharecropping.

Table 4. 36: Percentage distribution of leasing-in households by cash or kind type tenancy for each size-class of operational holdings

Size class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Location A	Purely cash	53.85	9.09	36.36	100.00	100.00	41.03
	Purely kind	23.08	27.27	9.09	0.00	0.00	17.95
	Both	23.08	63.64	54.55	0.00	0.00	41.03
Location B	Purely cash	50.00	0.00	50.00	0.00	0.00	20.00
	Purely kind	50.00	100.00	50.00	0.00	0.00	80.00
	Both	0.00	0.00	0.00	0.00	0.00	0.00
All locations	Purely cash	53.33	5.88	38.46	100.00	100.00	36.73
	Purely kind	26.67	52.94	15.38	0.00	0.00	30.61
	Both	20.00	41.18	46.15	0.00	0.00	32.65

Source: Field survey of the researcher.

How does the scenario mentioned above tell a possible path of evolution of land relations in agrarian Bihar? The future and scope of redistributive land reforms that have been a core component of institutional reforms so far appear very limited and bleak. Not only the political will has almost completely vanished (it was never there in any significant way even earlier), but the real scope has also dwindled significantly, primarily because of demographic factors. Who gets to till how much land and under which tenurial conditions are likely to be decided under the pressure of demography, the scope of non-farm employment, government intervention of market and non-market type, and a plethora of conditions emerging out of growing penetration of commerce into agrarian life. Peasants' increasing integration into the growing networks of commerce will impact their willingness as well as their capacity to enter into land lease arrangements. Given the limitations of redistributive land reforms, the agrarian transition is likely to be through land lease arrangements under the evolving conditions mentioned above.

The importance of cash transactions in land lease arrangements is already visible in Table 4.36. Purely kind rent tenancies are limited to areas that are farther from places of commercial activities as well as from avenues of non-farm employment. It is expected, therefore, that as these relatively remote regions get increasingly integrated into different types of market exchanges, the scope for kind rent arrangement would most likely shrink. Reverse tenancy, the likely path of agrarian evolution in case a tendency towards concentration of operational holdings is witnessed, in present-day conditions, theoretically

speaking, may not be limited to cash rent arrangements. The researcher has come across instances during the field survey where the peasants have informed that the bigger landowners are able to manipulate the terms of the lease by switching from cash rent to kind rent and vice-versa, depending upon the prices of output harvested. But historically, it has been observed that a greater degree of market stability is likely to increase the attraction of cash rent on the part of bigger land operators. It is needless to say that a sustained increase in productivity coupled with better infrastructural support and an adequate supply of modern inputs will form the basis for this potential movement. How do these other aspects appear to be affecting the peasant economy in Bihar? The following sub-section discusses some of these aspects.

4.2.3: How does cultivation happen across cultivating classes?

It has already been discussed in the second chapter that the paddy-wheat cycle has entrenched its roots in Bihar agriculture over time. The present fieldwork also witnessed a similar pattern. There are slight differences, however, between the two locations. Location B displayed a greater area under cultivation of pulses than location A. More types of crops grown certainly imply a greater degree of crop diversification. But at the same time, this diversification in terms of the area should also be accompanied by greater commercialisation, i.e. marketing of crops. There is a distinct possibility that it may not happen.

The landholding pattern already suggests that possibility. Given the tiny size of landholdings and desperation to secure food supply on the part of cultivators, it is quite likely that the little diversification ends up in the kitchen of the cultivators – the diversified basket gets consumed within the households and not marketed. Further, village or region level diversification and household level diversification can be completely different with diverse outcomes for cultivating households. Village or region-level diversification can go hand-in-hand with monoculture practice at the household level. Whether the single crop grown during any particular season gets enough commercial return to the cultivators depends on the yield and marketing support that they get. It will also depend on how many crops are they taking out of their given net sown area.

Cropping intensity is one direct measure of the economic capacity of landholdings in this respect. On average, the net sown area is cropped less than twice, as shown in Table 4.37. Marginal holdings seem to be using land the least intensively. How different landholdings

and the total area are distributed by cropping intensity will tell the real potential of crop cultivation. Tables 4.38 and 4.39 present this information. Table 4.40 sums up the average area under different categories of cropping intensity.⁸⁸ Overall, about one-tenth of the operational holdings have low or medium cropping intensity. Roughly 30 per cent of them have high, and roughly 60 per cent of them report very high cropping intensity. There is a marked difference between the two locations, however. Location A has three fourth of all operational holdings with very high and roughly one-fifth as having high cropping intensity. The share of holdings with low or medium cropping intensity is negligible. In contrast, location B has roughly one-fourth of all holdings with very high cropping intensity and roughly half with high cropping intensity. More than one-fifth of all holdings fall under the low or medium category here.

Table 4. 37: Distribution and average of net and gross cultivated area (in hectares) and cropping intensity by size-class of operational holdings

Size-class of operational holdings	% distribution of		Average of		
	Net area cultivated	Gross area cultivated	Net area cultivated	Gross area cultivated	Cropping intensity
Nearly Landless	6.81	7.00	0.273	0.541	199.81
Marginal	22.65	21.95	0.772	1.444	185.17
Small	26.36	27.04	1.517	3.001	197.86
Semi-Medium	20.83	20.06	2.740	5.090	189.00
Medium	23.35	23.95	7.169	14.174	197.08
All size classes	100.00	100.00	1.212	2.337	192.91

Source: Field survey of the researcher.

Table 4. 38: Distribution of operational holdings by category of cropping intensity for each size class of operational holdings

Size-class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Location A	Low	0.00	6.25	0.00	0.00	0.00	1.96
	Medium	0.00	6.25	0.00	0.00	0.00	1.96
	High	12.50	12.50	27.27	50.00	50.00	21.57
	Very high	87.50	75.00	72.73	50.00	50.00	74.51
Location B	Low	20.00	9.09	0.00	0.00	0.00	8.70
	Medium	0.00	18.18	0.00	100.00	0.00	13.04
	High	60.00	36.36	80.00	0.00	100.00	52.17
	Very high	20.00	36.36	20.00	0.00	0.00	26.09
All locations	Low	4.76	7.41	0.00	0.00	0.00	4.05
	Medium	0.00	11.11	0.00	14.29	0.00	5.41
	High	23.81	22.22	43.75	42.86	66.67	31.08
	Very high	71.43	59.26	56.25	42.86	33.33	59.46

Source: Field survey of the researcher.

⁸⁸ Cropping intensity is classified, depending on their values, into four categories - low: less than 125, medium: 125 to less than 150, high: 150 to less than 200, and very high: 200 and above.

Though there does not appear to be any specific relationship between the size of the holdings and cropping intensity,⁸⁹ it is quite disturbing to see that the incidence of double cropping (having cropping intensity of 200 or more on the entire land) is overwhelmingly found in tiny or marginal holdings accounting for a large number but a small share in land area. This pattern appears so very prominently in location A. Large landholdings in location A generally have a higher cropping intensity than they have in location B. Near landless record the highest share in the very high category, but marginal holdings also record the highest share in the low and medium category.

Table 4. 39: Distribution of gross cultivated area by category of cropping intensity for each size class of operational holdings

Size-class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Location A	Low	0.00	2.40	0.00	0.00	0.00	0.44
	Medium	0.00	3.55	0.00	0.00	0.00	0.65
	High	15.78	11.24	23.10	46.16	31.07	27.68
	Very high	84.22	82.81	76.90	53.84	68.93	71.24
Location B	Low	1.43	5.68	0.00	0.00	0.00	1.82
	Medium	0.00	16.05	0.00	100.00	0.00	15.21
	High	95.35	36.09	75.46	0.00	100.00	62.71
	Very high	3.22	42.18	24.54	0.00	0.00	20.27
All locations	Low	0.20	3.73	0.00	0.00	0.00	0.83
	Medium	0.00	8.62	0.00	14.56	0.00	4.81
	High	27.09	21.32	38.96	39.44	52.93	37.70
	Very high	72.70	66.33	61.04	46.00	47.07	56.66

Source: Field survey of the researcher.

How close is the agrarian economy to its productive potential? It will depend crucially on the distribution of land by cropping intensity. Table 4.39 presents the distribution of gross cultivated area by categories of cropping intensity for each size-class of operational holdings. The impression that we get is roughly the same as in the distribution of operational holdings (with a small modification that the high category squeezes both the better and the worse category to increase its share slightly). Here also, location A has a better performance than location B in terms of cropping intensity, but the gap seems to be narrower if we look at the distribution of area than what was seen in the distribution of the number of holdings.

A result of these patterns is that the average gross cultivated area under double cropping is much lower than the area under the lower value of cropping intensity (Table 4.40). In fact, the average area under cropping intensity value of less than 150 is quite

⁸⁹ The researcher could not find any correlation between the size of the operational holdings and cropping intensity statistically.

significant. It is generally the tiny and marginal category of operational holdings that account for the majority of the gross cultivated area with lower values of cropping intensity. It clearly reflects their limitations to multiple cropping. Given their large numbers, it is imperative that they should be the focus of any effort to increase the intensity of cropping.

Table 4. 40: Average gross cultivated area per household by category of cropping intensity for each size class of operational holdings

Size-class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Location A	Low	0.000	0.556	0.000	0.000	0.000	0.556
	Medium	0.000	0.822	0.000	0.000	0.000	0.822
	High	0.841	1.303	2.577	4.681	9.017	3.189
	Very high	0.641	1.599	3.216	5.461	20.006	2.376
	Any	0.666	1.448	3.042	5.071	14.512	2.485
Location B	Low	0.025	0.898	0.000	0.000	0.000	0.462
	Medium	0.000	1.268	0.000	5.185	0.000	2.573
	High	0.562	1.426	2.741	0.000	13.481	2.653
	Very high	0.057	1.666	3.566	0.000	0.000	1.715
	Any	0.353	1.436	2.906	5.185	13.481	2.207
All locations	Low	0.025	0.727	0.000	0.000	0.000	0.493
	Medium	0.000	1.119	0.000	5.185	0.000	2.136
	High	0.673	1.385	2.671	4.681	11.249	2.909
	Very high	0.602	1.616	3.255	5.461	20.006	2.286
	Any	0.592	1.443	2.999	5.087	14.168	2.399

Source: Field survey of the researcher.

Table 4. 41: Average number of machinery per ten units of land for each size-class of operational holdings

Size-class of operational holdings →		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Grand Total
Tractors	Location A	0.00	0.00	0.00	0.00	0.02	0.00
	Location B	0.00	0.00	0.00	0.00	0.02	0.00
	All locations	0.00	0.00	0.00	0.00	0.02	0.00
Threshers	Location A	0.02	0.02	0.00	0.01	0.02	0.01
	Location B	0.14	0.01	0.02	0.03	0.02	0.02
	All locations	0.04	0.02	0.01	0.01	0.02	0.02
Tube wells	Location A	0.00	0.05	0.05	0.05	0.01	0.04
	Location B	0.27	0.04	0.08	0.00	0.05	0.06
	All locations	0.04	0.05	0.06	0.04	0.02	0.04
Pump sets	Location A	0.02	0.06	0.06	0.02	0.02	0.04
	Location B	0.41	0.13	0.07	0.13	0.05	0.10
	All locations	0.08	0.09	0.06	0.05	0.03	0.06
Other machinery	Location A	0.24	0.20	0.08	0.10	0.02	0.11
	Location B	1.09	0.27	0.13	0.10	0.07	0.19
	All locations	0.36	0.23	0.09	0.10	0.04	0.13

Source: Field survey of the researcher.

Irrigation will always remain the most important factor that could help or impair the possibility of more intensive cropping. This aspect is explored in the following chapter. Presently, other factors impacting land use, or even yield levels, are examined. Increasing usage of machinery is generally associated with better farm practices by augmenting the efficiency of other resources by timely completion of multiple tasks. It also helps to tide over the problem of inadequate availability of labour during periods of heightened demand. From the secondary sources, it is already established that agriculturists in Bihar lag behind their average Indian counterparts by huge margins. It would be useful to know, however, if all households lack agricultural machinery uniformly or otherwise. Table 4.41 gives a snapshot of the ownership pattern of different types of machinery across size-classes of operational holdings.

Large machinery, like tractors, is owned entirely by those owning 4 hectares or more. Threshers, tube wells, pump sets and other smaller machinery are owned by all size-classes of operational holdings. Location B generally has a greater number of all types of machinery (except tractors) per unit of land than location A. This difference is more pronounced in the case of pumping sets and other small machinery. Other than tractors, these types of machinery also seem to be populating the nearly landless and marginal landholdings more than the others in both locations.

Does a greater number of machinery per unit of area for tiny and marginal holdings imply their superiority? Perhaps not. It may be a result of failure to hire some of these pieces of machinery from the better-endowed cultivators on time. In order to evade this possibility, they prefer to own even if it may not be the most efficient allocation of resources of the agrarian economy. On the other hand, a smaller number on the part of bigger landholdings may be reflective of a more efficient use of machinery.

Such a possibility is very much indicated by data on the average cost of machinery, hiring as well as usage per unit of gross cropped area, as presented in Table 4.42. For all operational holdings up to 4 hectares of land, the average cost of machine hiring, as well as the average cost of machine usage (the latter is greater as it includes the cost of running own machinery as well), appear to be fairly similar. The operational holdings of 4 hectares or more do not show much hiring cost (as they own most of it) and a much greater amount spent on running machinery. Such large holdings, owning bigger machinery, particularly tractors, do resort to hiring out such assets to add to their earnings from farm-related activities. Speaking

of the inter-regional variations, location B also shows lower costs of machine hiring and greater cost of machine usage. It is not surprising as location B witnessed a greater number of productive assets per household.

Table 4. 42: Average machine cost per unit of gross cropped area for each size-class of operational holdings

Size-class of operational holdings	Location A		Location B		All locations	
	Machine hiring cost per unit of GCA	Machine usage cost per unit of GCA	Machine hiring cost per unit of GCA	Machine usage cost per unit of GCA	Machine hiring cost per unit of GCA	Machine usage cost per unit of GCA
Nearly landless	22.08	25.94	22.09	47.11	22.08	32.38
Marginal	27.21	33.81	15.53	39.44	22.45	36.10
Small	30.35	35.91	15.96	24.49	25.85	32.34
Semi-Medium	25.96	28.25	35.00	47.72	27.25	31.03
Medium	4.25	45.68	6.33	46.76	4.94	46.04
All size-classes	25.23	31.60	17.86	39.22	22.81	34.11

Source: Field survey of the researcher.

Table 4. 43: Mean cost of HYV seeds, chemical fertilizers and pesticides and weedicides per hectare

	Size class of operational holding →	Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Location A	HYV seed	214.1127	223.4873	231.3293	175.1724	164.2685	214.0461
	Chemical fertilizer	2362.794	2010.281	1854.625	2209.087	1573.075	2095.209
	Pesticide/weedicide	231.1901	235.768	227.1275	225.7202	71.31857	224.6185
Location B	HYV seed	718.8655	653.8414	320.3675	219.6533	304.1354	537.7806
	Chemical fertilizer	3016.496	5474.703	2742.182	3496.588	2840.777	4315.15
	Pesticide and weedicide	0	264.0632	0	0	608.2708	175.6483
All locations	HYV seed	270.1964	405.5602	259.1537	181.5268	210.8908	306.5417
	Chemical fertilizer	2435.427	3475.998	2131.987	2393.016	1995.642	2729.478
	Pesticide and weedicide	205.5023	247.739	156.1502	193.4745	250.3026	210.627

Source: Field survey of the researcher.

The field survey does not display the inequality in the ownership of farm machinery to the same degree as it is shown in land ownership. Better or worse performance in terms of output can still be made by differential use of modern inputs. In the following paragraphs, the

findings on input use and yield of paddy, the primary crop, are presented.⁹⁰ Table 4.43 summarises the pattern of input use measured in nominal terms.⁹¹ In order to understand the structural pattern, it presents the data for different size-class of operational holdings.

The use of modern inputs like chemical fertilizers and HYV seeds, contrary to popular belief, is seen to be used more intensively by near-landless and marginal peasants. This is true for both locations. However, in location B, this pattern is more pronounced. Not only the difference is high, but the absolute amount spent per hectare is also higher in location B. These findings coincide with a greater machine usage by these segments in location B than in A.

Table 4. 44: Mean yield (in quintals per hectare) on owned land and under different types of leased-in land for each size-class of operational holdings

Size class of operational holding →		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Location A	Owned	44.20	41.45	37.18	38.08	38.67	40.08
	Fixed rent	33.11	43.25	41.39	36.98	38.67	38.70
	Sharecropping	34.99	35.95	42.50	-	-	37.98
	All land operated	36.42	38.70	39.45	38.08	38.67	38.06
Location B	Owned	68.89	56.47	51.73	51.55	50.18	55.94
	Fixed rent	42.17	50.74	40.83	-	-	46.68
	Sharecropping	42.17	46.57	48.37	-	-	46.05
	All land operated	63.81	55.94	51.72	51.55	50.18	55.17
All locations	Owned	49.69	48.61	42.03	40.00	42.50	45.56
	Fixed rent	33.81	45.56	41.30	36.98	38.67	40.00
	Sharecropping	36.18	39.49	43.34	-	-	39.81
	All land operated	39.47	46.00	43.28	40.00	42.50	42.95

Source: Field survey of the researcher.

How do these factors, machine use or modern inputs, affect the yield level? Table 4.44 have disaggregated information on the average yield of paddy for land under different types of leasing arrangement for each size-class of operational holdings. Overall marginal cultivators achieve the highest level of yield. Though in location A, small cultivators are slightly ahead, while in location B, nearly landless households lead others by a significant margin. Generally, location B records a 45 per cent higher yield level than A.

⁹⁰ A disaggregated analysis is presented for paddy here. The patterns seen in the case of paddy are very similar to that of wheat, the other main crop. Only the data on paddy cultivation is discussed, though aggregate data for wheat is also presented in the Appendix Tables A4.2.7 and A4.2.8 to avoid repetition.

⁹¹ Price differences were not observed in any significant manner for these inputs across different classes of operators. Therefore, the value quantities can be a good substitute for real physical quantities to understand the structural patterns of input use.

Owned and self-operated holdings record a slightly higher yield level than leased-in holdings. Sharecropping generally records the lowest level of yield in both locations. Again this difference is more prominent in location B than it is in location A. This difference is also more pronounced for the smallest size-classes of holdings in both locations. It appears that ownership (or type of tenancy) matters more in location B as well as for marginal or sub-marginal holdings.

Overall, these variations or similarities across size-classes of operational holdings are also associated with fairly homogeneous occurrences across individual households. The standard deviation in the case of yield data is overall less than one-third of the overall mean. This is true for all size-classes individually, whether owned or leased-in under different types of tenancies in all locations. In the case of modern inputs, the standard deviation is even smaller in relation to the mean. In fact, in location A, one can say with brevity that there is hardly any variation in the application of these inputs across individual households. Location B shows greater values for standard deviation, but it is still fairly homogeneous.

In the case of wheat, the yield pattern is the same as in the case of paddy. Even input use pattern is very similar.⁹² Though location B, unlike in the case of wheat, shows a much smaller application of chemical fertilizers, particularly in the case of marginal and sub-marginal holdings. Large landholdings in this location come closer to the general pattern where they are seen to be using the same amount of fertilizers as their counterparts in location A. This divergent pattern on the part of marginal and sub-marginal operators can be explained by the fact that they choose to grow *masoor* as a substitute for wheat, which does not require much application of chemical fertilizers as per their perception. Even if they choose to grow wheat side-by-side, the area devoted is very small, and they do not spend much on fertilizers in this case. It is interesting to note that despite using less fertilizer than the bigger land operators in their own location or than their counterparts in location A, they do not witness any significant lowering of their yield – they receive roughly the same yield that bigger land operators get in their own location and a *higher* yield than any size-class in location A. Clearly, the input use pattern does not explain this finding. One important aspect, irrigation, has not been looked into so far in this sub-section. This will be taken up in Chapter 6 to see if this divergent pattern has anything to do with irrigation.

⁹² See Appendix Tables A4.2.7 and A4.2.8.

4.2.4: Economic condition and persistence of peasants

With the given levels and patterns of cropping and yield, how is the agrarian economy reproducing itself? What is the overall economic condition of the cultivating households? Answers to these questions have a direct bearing on the future of these peasants and the agrarian economy. Given the significant level of land leasing observed during the field visit, it is important to keep in mind the differences in analysis arising out of the classification of households based on ownership and operational holdings. It would be useful to categorise them into size-classes of operational holdings to understand the cultivation practices and their results. But if the objective is to understand the economic reproduction of peasant households, it is useful to start with the resources they *own* at the beginning and the net change in their resource position. This will provide an idea of any potential change in a largely private agrarian economy.

Table 4.45 shows the differential pattern of what the peasants are able to achieve economically in the agrarian economy of Bihar. For those who are nearly landless, cultivation gives them a negative return, although it is a negligible sum. Their positive farm incomes, which is again a paltry sum, are on account of their labour income. It is interesting to see that 67 per cent of their farm labour income and 85 per cent of their farm income goes into paying interest on loans taken. They have a big deficit of more than two thousand rupees every month that they have to cover through other means. In their case, it is entirely non-farm labour as their resource position dictates. Despite resorting to massive hiring-out of their labour in non-farm employment, they are still falling short of meeting their household expenses fully. How are they surviving? One way to survive is through the sale of assets – land or non-land. Given that they either own no land or own tiny patches of land, the puzzle of their survival has to be explained in terms of other assets. Given their poor inheritance, it is unlikely that the inherited assets would explain this puzzle. It leaves us with another possibility, that of the creation and sale of assets for survival. This is indeed the case. Most often, the deficit households are found to be rearing cattle and selling them. This activity will be explored a little later.

All other size-classes earn a positive income from cultivation.⁹³ In the case of marginal households, their income from cultivation is extremely small. Their farm income is roughly double that of their income from cultivation. As their farm labour income is

⁹³ Note that it is based on paid costs only, and no cost has been imputed to family labour.

negligible, this doubling of income from cultivation is because of rental incomes. This rental income accrues to them on account of hiring out of farm machinery and not leasing out of the land as they are, on average, paying (and not receiving) a net rent on land. It is also interesting to see that their average household expenses are slightly bigger than small or semi-medium households. However, more than 85 per cent of the difference in average household expenses is accounted for by interest payments. The average deficit of marginal households is very close to the level of nearly landless households. This is due to higher household expenses as well as higher farm incomes. However, in contrast to nearly landless households, they have a much bigger net household deficit after factoring in income from secondary sources.⁹⁴ This suggests their much greater dependence on cattle rearing to meet this deficit, or else rely on financial assistance from friends or relatives, or eventually, they migrate to seek wage employment elsewhere.

Table 4. 45: Average annual income, household expenses, net rent paid, interest paid, savings and net savings from all (farm and non-farm) sources (in Rupees)

Size-class of ownership holdings →	Nearly landless	Marginal	Small	Semi-Medium	Medium	Large	All size classes
Income from Cultivation	-579	7556	16247	28821	120401	284361	15536
Net rent paid	7335	2174	-1549	-22168	-151704	-29200	-4672
Cultivation Income without rent paid	6756	9730	14698	6652	-31304	255161	10865
Farm Income	2091	15663	23595	50571	266512	351611	28191
Farm labour income	2652	151	0	0	0	0	1280
Household Expense including Interest	26975	43510	38176	38467	133750	70500	37934
Amount of Interest Paid	1771	4313	381	667	12550	0	2158
Farm savings	-24884	-27848	-14581	12104	132762	281111	-9742
Net household balances (from all sources)	-1113	-18196	-1434	17971	154628	281111	7482

Source: Field survey of the researcher.

Notes: All calculations are on the basis of paid costs only. No imputed value has been taken either for family labour or other costs. The income from cultivation is net of land rent paid. Following are the definitions of relevant terms used in the Table and the text:

1. Farm income = Income from cultivation + all rental incomes (due from leasing-out of land and machinery) + farm labour income
2. Farm savings = Farm income – Household expenses, including interest payments
3. Net household balance = Farm savings + Income from secondary sources

⁹⁴ Income from secondary sources is mostly constituted by non-farm employment. Other than this, they may have a small shop, a small flour mill, or a member having a government job. Non-farm labour remains the most important source, however.

Small landowners, from cultivation, earn little more than double the income of their marginal counterparts. However, their average farm income is just a little over 50 per cent higher than their marginal counterparts. With their household expenses lower than marginal households, they have a much smaller deficit, which they are able to roughly meet through income from secondary sources (leaving only an insignificant deficit). Thus these three size-classes of households, on average, turn out to be deficit farming households, a deficit which they are unable to meet through income from secondary sources.

It is only those who own 2 hectares of land or more who have some surplus from their activities. This surplus, however, in the case of semi-medium and medium size-classes of ownership holdings, can be said to be entirely arising from their rental incomes from leasing-out land. If one takes away the net rental earnings, they turn into deficit households. In the case of semi-medium households, they would not meet their household expenses even with their incomes from secondary sources. The medium households would barely meet their expenses with these rental incomes. It is only the largest landholders who are able to earn significant surpluses from their farming activities and not rely on rental income to meet the household expenses. It is also interesting to see that their household expenses are smaller than medium landowners.

What are the conditions of reproduction of farming households prevailing in agrarian Bihar? Except for those owning 10 hectares or more (very rarely found), no other size-class of owner households, on average, can meet its household expenses with income from cultivation. Even farm labour income and rental income from leasing out machinery cannot make them meet these expenses. Nearly landless, marginal and small landowners cannot meet their expenses even with their incomes from secondary sources. Larger landowners of the semi-medium and medium categories are able to meet their expenses only because of their land ownership and leasing-out of land. Rent, therefore, appears to be an instrument tilting balance of earnings in the agrarian economy. For bigger landowners, it is their major source of farm income – on average, 44 per cent and 57 per cent of their total farm incomes come from rent on land for semi-medium and medium landowners, respectively. On the other end, if nearly landless can be given rent-free land to till, their income from cultivation as well as their overall household balance turns positive. Marginal landowners would still fall short. Small landowners with a very small income from rent on land will experience a bigger deficit.

The agrarian economy, as seen from these data, is clearly a deficit economy. Farming activities do not bring a positive surplus on an average, which may be utilised for productive accumulation. Its conditions of reproduction are not met from within the cultivation economy but from secondary sources of income. From the discussion above, it is yet to be explained how the lowest three size-classes of landowners carry on with their sustenance.

From Table 4.46, it becomes evident that cattle sale is one of the most common ways of meeting the deficit. Fifty-three per cent of total households are net saving deficit households, and 59 per cent of all households regularly sell cattle. Besides, about one-tenth of them also report selling land, the majority of them being nearly landless. Almost all except semi-medium landowners reported distress sale of land. Looking at different size-classes of landholdings also gives the same impression, all size-classes resort to cattle rearing and selling to meet their deficit. A separate data is presented in Table 4.46, considering only deficit households. About two-thirds of them resort to cattle rearing and selling, and one-tenth of them, all belonging to the sub-marginal and marginal category, also report selling land, almost entirely under distress. It still leaves a significant percentage of distressed households who are not seen selling land or cattle. What is their way of survival?

Table 4. 46: Percentage of net saving deficit households, percentage of households selling cattle, buying and selling land

Size-class of ownership holdings	Percentage of households			Percentage of net saving deficit households	Percentage of net saving deficit households selling	
	Selling land	Buying land	Selling cattle		cattle	Land
Nearly landless	11.11	22.22	61.11	58.33	61.90	14.29
Marginal	8.33	25.00	50.00	66.67	62.50	12.50
Small	5.56	27.78	50.00	50.00	55.56	0.00
Semi-Medium	16.67	33.33	83.33	33.33	100.00	0.00
Medium	0.00	0.00	66.67	0.00	0.00	0.00
Large	0.00	0.00	100.00	0.00	0.00	0.00
All size classes	9.21	23.68	59.21	52.63	62.50	10.00

Source: Field survey of the researcher.

Note: Net saving deficit implies an excess of household expenses over farm income plus income from secondary sources.

Field interviews did suggest a tentative but plausible explanation. Almost all these deficit households, unable to meet household expenses through any means available to them, have revealed that they take recourse to borrowing, if they think they can tide over such deficits over a year or two through their farming incomes or income from secondary sources. If the prospects of such “improvement” in their earnings are not expected by them, then they

decide to migrate for wage employment elsewhere. This migration is found to be temporary as well as permanent, depending on the nature of work, income and living conditions at the destination.

It is also interesting to see that about one-fourth of the households are buying land.⁹⁵ They are also concentrated in the marginal and near landless category (about two-thirds of all those buying land). About one-fourth belongs to the small category and the remaining one-tenth to the semi-medium category. The usual refrain would be that they are the fortunate ones among cultivating households, with better returns and most likely having some savings from farm business that they would like to put back into cultivation. But an economic examination of the land-buying households throws a puzzle. About two-thirds of these land-buying households are net saving *deficit* households, who are unable to meet their household expenses with all their incomes from farming as well as from secondary sources.

Apparently, it defies the usual economic logic. Why would they invest in land when they are not getting enough from it even to meet their household consumption requirements? Further, what would be the source of money with which they are acquiring land? This puzzle can be unravelled once we stop looking at these households as seeking profitable returns from land. This brings our notice to the character of the special “commodity” - land. If access to land guarantees basic food security, then it acquires a special character. Economic returns from farming get disconnected from the cost of accessing land (to an extent permitted by the resource endowments of peasant families seeking land). This phenomenon has already been noted by many scholars as “land hunger”. The respondent who had acquired land through purchase have clearly demonstrated that the sole reason behind acquiring land was to ensure survival and not economic returns. The fact that the majority of them are either nearly landless or marginal peasants, they cannot be visualised to be adding to their land to reap any economies of scale. Their landholding still remains tiny. Many a time, buying land was to facilitate making a homestead and not farming.

As far as the source of money is concerned, given that they are deficit households, and perpetually so, it could only come from outside. Borrowing to buy land is ruled out by

⁹⁵ The instances of purchase of land recorded during the field survey did not necessarily occur during the same year for which the income and expenditure data was collected. It was recorded by the researcher in cases respondent households have acquired land through purchase in the last ten years. Therefore, the purchase of land may not be connected with the household's financial condition during the year when the income-expenditure data was collected.

their resource position. Field interviews have shown that the source is usually financial assistance from their relatives or from family member/s or temporarily migrating to earn and save some money to buy land.

To sum up the findings so far, it appears that the conditions of economic reproduction of peasant households are not seen to be completely confined to the agrarian economy. A good majority survive only with financial assistance from outside. The exploration of these conditions has revealed that they are “rooted” in the agrarian economy by *compulsion*. Lack of non-farm employment and income makes their survival perpetually threatened, and this forces them to first secure themselves food-wise. Access to land remains key to their survival, given their apprehensions about securing food from the market. The persistence of marginal and sub-marginal households could only be explained by taking into account this comprehensive macroeconomic picture. As discussed in Chapter 3 previously, this finding concurs with the thesis that the Indian agrarian structure is generally not characterised by the classic case of class polarisation but by pauperisation.

In the next chapter, a theoretical explanation of this persistence of subsistence farming amidst conditions of land hunger is presented. How the agrarian structure is likely to evolve in the future will depend on the patterns of “stagnation” or even “improvement” in the yield levels. The discussion above has already demonstrated that there is little potential in the agrarian economy of Bihar to move forward as it lacks a surplus to be accumulated. Private investment cannot be assumed by any means to be the driver of growth as the returns from such investment are either not be found at all, or if they are found, it is not attractive enough. If it requires a big push to change its course, from the persistence of subsistence to propelling to prosperity, it has to come from outside. Also, this would not be a private initiative, as the pumping of whatever private surplus from outside that is taking place now is only to ensure the survival of those “rooted” in the land and is not directed towards rapid productivity growth. A massive public investment program with institutional modification targeted at ensuring remunerative prices, lowering transaction costs and much improved agricultural infrastructure is the big push Bihar agrarian society seems to be waiting for.

Appendix 4.1

Secondary sources: Distribution of landholdings and income and expenditure of agricultural households in Bihar

Table A 4.1. 1: Percentage distribution of number and area of operational holdings and average area operated by size-classes of operational holdings

Size-class of operational holdings	Percentage distribution of number of holdings	Percentage distribution of area operated	Average Size (hectare)
Marginal	91.67	59.65	0.244
Small	5.58	18.51	1.245
Semi-medium	2.32	15.86	2.567
Medium	0.41	5.57	5.057
Large	0.01	0.42	12.816
All Size-classes	100.00	100.00	0.375

Source: All India Report on Agricultural Census- 2010-11, Bihar.

Table A 4.1. 2: Average monthly income and consumption expenditure (₹) per agricultural household for each size class of land possessed (all social groups, all seasons combined, Bihar)

Size-class of land possessed (ha.)	income from wages (₹)	net receipt from cultivation (₹)	net receipt from farming of animals (₹)	net receipt from non-farm business (₹)	total income (₹)	Total consumption expenditure (₹)	net investment in productive assets (₹)	agricultural households (estimated)
<0.01	3631	9	1140	199	4979	4566	12	1442
0.01 - 0.40	1812	539	338	252	2942	5026	32	34000
0.41 - 1.00	586	1841	460	118	3005	5499	315	25109
1.01 - 2.00	767	3599	-858	576	4084	6446	252	7543
2.01 - 4.00	2675	7424	752	341	11192	7923	230	2355
4.01 - 10.00	498	24562	-394	186	24852	12884	1355	465
10.00+	0	35033	-572	0	34461	9499	1122	30
All (incl. non recorded)	1323	1715	279	240	3558	5485	171	70943
Estimated number of agricultural households (00)	22565	63872	46971	4548	70932	70943	45325	-

Source: Reproduced, NSS 70th Round, Report No. 576, Appendix Table 1, Page A-120.

Appendix 4.2

Statistical tables pertaining to field survey

Table A 4.2. 1: Definition of size-classes

Size-class	Land area in hectares	Land area in <i>Katthas</i> *
Effectively Landless	Less than 0.5	Upto 40
Marginal	0.5 - 1.0	41 – 80
Small	1.0 - 2.0	81 – 163
Semi-Medium	2.0 - 4.0	164 - 325
Medium	4.0 - 10.0	326 - 813
Large	10.0 & above	814 & above

Note: * These can be read in terms of *Bighas* by dividing the figures of this column by 20.

Table A 4.2. 2: Distribution and the average size of landholdings

Size-class	Percentage distribution of ownership holdings	Percentage distribution of operational holdings	Percentage distribution of area owned	Percentage distribution of area operated	Average size of ownership holding in Hectare	Average size of operational holding in Hectare
Effectively Landless	47.37	30.26	5.19	7.00	0.13	0.28
Marginal	15.79	35.53	11.03	23.10	0.84	0.79
Small	23.68	21.05	27.66	26.90	1.41	1.55
Semi-Medium	7.89	9.21	16.68	19.30	2.55	2.55
medium	3.95	3.95	27.03	23.80	8.26	7.31
Large	1.32	0.00	12.41	0.00	11.38	0.00
All	100.00	100.00	100.00	100.00	1.21	1.21

Source: Field survey of the researcher.

Table A 4.2. 3: Percentage distribution of leasing-in households under different types of tenancy by size-classes of operational holdings

Size-class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All
Tenancy type in Location A	Fixed	38.89	16.67	22.22	11.11	11.11	100.00
	Mixed	20.00	40.00	40.00	0.00	0.00	100.00
	Sharecropping	50.00	33.33	16.67	0.00	0.00	100.00
	All types	33.33	28.21	28.21	5.13	5.13	100.00
Tenancy type in Location B	Fixed	50.00	0.00	50.00	0.00	0.00	100.00
	Mixed	0.00	50.00	50.00	0.00	0.00	100.00
	Sharecropping	16.67	83.33	0.00	0.00	0.00	100.00
	All types	20.00	60.00	20.00	0.00	0.00	100.00
Tenancy type in All locations	Fixed	40.00	15.00	25.00	10.00	10.00	100.00
	Mixed	17.65	41.18	41.18	0.00	0.00	100.00
	Sharecropping	33.33	58.33	8.33	0.00	0.00	100.00
	All types	30.61	34.69	26.53	4.08	4.08	100.00
	Distribution of all operating households	30.26	35.53	21.05	9.21	3.95	100.00
Source: Field survey of the researcher.							

Table A 4.2. 4: Percentage distribution of leased-in area under different types of tenancy by size-classes of operational holdings

Size-class of operational holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All
Tenancy type in Location A	Fixed	12.77	7.66	21.17	14.60	43.80	100.00
	Mixed	8.61	40.77	50.62	0.00	0.00	100.00
	Sharecropping	37.95	51.34	10.71	0.00	0.00	100.00
	Any type	13.83	24.87	31.29	7.50	22.50	100.00
Tenancy type in Location B	Fixed	33.33	0.00	66.67	0.00	0.00	100.00
	Mixed	0.00	53.03	46.97	0.00	0.00	100.00
	Sharecropping	10.42	89.58	0.00	0.00	0.00	100.00
	Any type	10.42	54.17	35.42	0.00	0.00	100.00
Tenancy type in All locations	Fixed	13.84	7.27	23.53	13.84	41.52	100.00
	Mixed	7.41	42.49	50.11	0.00	0.00	100.00
	Sharecropping	29.69	62.81	7.50	0.00	0.00	100.00
	Any type	13.42	28.36	31.78	6.61	19.83	100.00
Percentage distribution of all area operated		6.96	23.06	26.88	19.34	23.76	100.00
Source: Field survey of the researcher.							

Table A 4.2. 5: Percentage distribution of leasing-out households under different types of tenancy by size-classes of operational holdings

Size-class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Large	All
Tenancy type in Location A	Fixed	12.50	12.50	50.00	12.50	0.00	12.50	100.00
	Mixed	0.00	0.00	33.33	66.67	0.00	0.00	100.00
	Sharecropping	0.00	0.00	100.00	0.00	0.00	0.00	100.00
	Any type	6.67	6.67	60.00	20.00	0.00	6.67	100.00
Tenancy type in Location B	Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mixed	0.00	0.00	33.33	0.00	66.67	0.00	100.00
	Sharecropping	0.00	44.44	33.33	11.11	11.11	0.00	100.00
	Any type	0.00	33.33	33.33	8.33	25.00	0.00	100.00
Tenancy type in All locations	Fixed	12.50	12.50	50.00	12.50	0.00	12.50	100.00
	Mixed	0.00	0.00	33.33	33.33	33.33	0.00	100.00
	Sharecropping	0.00	30.77	53.85	7.69	7.69	0.00	100.00
	Any type	3.70	18.52	48.15	14.81	11.11	3.70	100.00
Percentage distribution of all households		47.37	15.79	23.68	7.89	3.95	1.32	100.00
Source: Field survey of the researcher.								

Table A 4.2. 6: Percentage distribution of leased-out area under different types of tenancy by size-classes of ownership holdings

Size-class of ownership holdings		Nearly Landless	Marginal	Small	Semi-Medium	Medium	Large	All
Tenancy type in Location A	Fixed	5.94	3.33	12.35	2.38	0.00	76.01	100.00
	Mixed	0.00	0.00	24.10	75.90	0.00	0.00	100.00
	Sharecropping	0.00	0.00	100.00	0.00	0.00	0.00	100.00
	Any type	3.63	2.03	23.53	24.33	0.00	46.48	100.00
Tenancy type in Location B	Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mixed	0.00	0.00	7.20	0.00	92.80	0.00	100.00
	Sharecropping	0.00	18.80	26.07	25.64	29.49	0.00	100.00
	Any type	0.00	6.76	13.99	9.22	70.03	0.00	100.00
Tenancy type in All locations	Fixed	5.94	3.33	12.35	2.38	0.00	76.01	100.00
	Mixed	0.00	0.00	9.61	10.81	79.59	0.00	100.00
	Sharecropping	0.00	17.32	31.89	23.62	27.17	0.00	100.00
	Any type	0.95	5.53	16.47	13.16	51.77	12.12	100.00
Percentage distribution of total area owned		5.19	11.03	27.66	16.68	27.03	12.41	100.00
Source: Field survey of the researcher.								

Table A 4.2. 7: Mean yield of wheat (in quintals per hectare) on owned land and under different types of leased-in land

	Size-class of operational holding	Nearly Landless	Marginal	Small	Semi-Medium	Medium	All
Location A	Owned	20.87	21.10	22.68	19.40	23.67	21.31
	Fixed rent	22.73	26.92	25.62	18.61	23.67	24.39
	Sharecropping	22.71	25.89	24.67	-	-	24.60
	All land operated	23.60	23.01	23.17	18.85	23.67	22.76
Location B	Owned	28.50	26.73	30.28	26.00	22.92	27.71
	Fixed rent		40.00	31.60	-	-	35.80
	Sharecropping	30.00	23.64	30.00	-	-	27.88
	All land operated	29.70	26.57	30.33	26.00	22.92	27.73
All locations	Owned	22.39	23.60	25.40	20.34	23.42	23.40
	Fixed rent	22.73	28.37	26.22	18.61	23.67	25.06
	Sharecropping	23.93	25.61	25.43	-	-	25.07
	All land operated	24.28	24.29	25.41	19.87	23.42	24.06

Source: Field survey of the researcher.

Table A 4.2. 8: Mean cost of HYV seeds, chemical fertilizers and pesticides and weedicides per hectare in wheat cultivation

	Size-class of operational holding	Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Location A	HYV seed	14.51	14.46	9.20	14.09	24.49	13.69
	Chemical fertilizer	30.39	33.04	29.78	38.75	32.51	32.15
	Pesticide and weedicide	0.00	0.39	0.07	0.19	0.00	0.16
Location B	HYV seed	0.00	4.28	23.60	36.00	36.00	12.70
	Chemical fertilizer	18.75	21.10	29.19	31.10	31.60	24.22
	Pesticide and weedicide	0.00	0.00	0.00	0.00	0.00	0.00
All locations	HYV seed	12.90	10.79	13.70	17.22	28.33	13.43
	Chemical fertilizer	29.09	28.74	29.59	37.65	32.21	30.08
	Pesticide and weedicide	0.00	0.25	0.05	0.16	0.00	0.12

Source: Field survey of the researcher.

CHAPTER FIVE

The challenges to productive accumulation: A theoretical exposition

One of the important issues that have emerged in the recent literature around the growth dynamics of Bihar agriculture and its agrarian structure is an important observation made by many scholars, e. g. Basole & Basu (2011), Kishore (2004), and Sahay (2020) etc. They have analysed the data released by the National Sample Survey Organisation and the Agricultural Census on the pattern of landholdings and tenancy. They have opined that there is a trend towards *reverse tenancy* visible in Bihar.⁹⁶ This is normally considered a tendency that is emerging with growing capitalist penetration in the agrarian economy. This is also usually associated with improvement in agricultural performance as the tenants are relatively well-to-do peasants leasing in land with profit-making as their objective, reflecting more intensive and efficient use of inputs. This latter trend, where the leasing-in households are not the typical subsistence households, is sought to be established empirically based on NSS data as well as through some field studies.⁹⁷

While this tendency is not disputed at this stage, the underlying dynamics must be explained. This is important not only to explain how this may happen but also to unravel why and how this may not happen as well. The following section contains a theoretical construct that attempts to explain the underlying dynamics of the phenomenon of the *reverse tenancy*. The nature of this explanation, to start with, is simple and static. It tries to explain the occurrence or absence of reverse tenancy in a given situation. In a sense, this looks at the dynamics as contained in the Lewis model critically. Lewis (1954) has visualised dynamics operating in a *dual economy* where pull factors operating in the modern capitalist sector draw upon the "surplus" labour from the traditional subsistence sector over time. This transforms the economy's basic structure from an agriculturally (subsistence) dominated one to a situation where the two sectors start resembling one another in terms of their growth dynamics. This dynamic operates in a modern capitalist way: making a profit and reinvesting

⁹⁶ The same has been observed in many other states of India.

⁹⁷ Basole & Basu (2011) and Sahay (2020) are among the many more recent observers of this trend.

it to augment production and surplus continuously. It is to be noted that this entire transformation is explained in terms of growing labour employment in the modern capitalist sector, which remains the engine of growth. The process of economic development continues with an unlimited supply of labour from the subsistence sector in the beginning, and the process culminates in the economy becoming developed when the surplus labour is exhausted in the subsistence sector. As surplus labour gets fully absorbed in the modern sector, the subsistence sector also turns into a modern sector. *Dualism* vanishes as the economy gets integrated within the same growth dynamics everywhere.

If we consider the full implication of this process, it necessarily involves a process of agrarian transformation- the subsistence farming giving way to capitalist farming for profit-making. The assumption made by Lewis of "surplus" labour was to ensure that the output in the traditional sector does not fall when there is a transfer of surplus labour from it, for the entire growth process will be prematurely arrested otherwise. Also, the same assumption ensures that the start of the process does not fall prey to rising wages in the modern sector, again prematurely ending it. This assumption tells us that there is growing productivity in the subsistence sector, and it keeps growing, ultimately removing the wage gap between the sectors and bringing the "backward" on par with the modern sector. The present work intends to examine this process more closely.

It is also important to understand that the Lewisian dynamics entail a pattern of migration. The Harris-Todaro model of rural-urban migration is an important and influential theory connected to this (Todaro, 1969; Harris & Todaro, 1970). They have attempted to weave a theory of migration based on a dual economy on Lewisian lines where the urban sector attracts workers from rural areas. The crucial assumption in this model is an institutionally fixed minimum wage in urban areas. This becomes the source of urban unemployment, making migration decisions by rural workers risky. We shall come back to this assumption later in the present work to understand the limitations of making such an assumption to understand the political economy of migration in poor underdeveloped economies. Presently we shall use the insight of *risky migration decisions* of rural workers. It is presumed that the migrating workers are adult members of subsistence peasant families in the agricultural sector.

Before proceeding further, it is to be noted that a closer look at the Lewis model reveals that it may be deeply flawed to apply it to understand the economy's short- or

medium-run developments. At best, it can be applied to understand the long-run developmental trajectory. Further, despite being understood as a theory in the *classical* tradition, there are reasons to believe that it is closer to the neoclassical tradition with its emphasis on the subjective motives of economic agents as drivers of growth.⁹⁸ It is very clear in the case of the Harris-Todaro model that it is firmly rooted in the neo-classical tradition. It also explains the short-run dynamics of migration in contrast to Lewis. In fact, Basu (1984) suggests reading the two together as complementary texts. The Harris-Todaro model is good at explaining the short-run phenomenon. The Lewis model, in contrast, essentially makes sense only in the long run.

5.1 Dynamics of reverse tenancy: A basic theoretical explanation

With these points of departure, the present study attempts to explain the possible long-run dynamics of agrarian transformation. It presumes that this dynamic is located in an economy with no significant presence of old-fashioned landlordism. In the absence of landlordism, it visualises agrarian stagnation primarily in terms of the presence of a very large subsistence economy. Consequently, the agrarian transformation of such an economy implies gradually replacing a predominant subsistence farming with a predominant surplus-producing economy. Following the recent observations made by researchers, as mentioned above, regarding evidence of growing instances of *reverse tenancy*, which is present in varying degrees in different states with varying force, the present study proposes a simple theoretical explanation that would illustrate the underlying dynamics of it. Acknowledging that the question of agrarian transformation cannot be reduced completely to reverse tenancy alone, we proceed nonetheless with explaining it. Later, it is proposed that the broad dynamics explained here can also be used to explain other mechanisms of agrarian transformation as well. With this objective in mind, the following structure of the agrarian economy is assumed.

- (i) It is presumed that the agrarian economy consists of cultivating households producing food grains (in a predominantly paddy-wheat cycle) who can be either owner cultivators or tenant cultivators. Further, within each category, there can be subsistence peasant families cultivating tiny landholdings on the one hand or middle or large cultivating households with profit-making as their objective on the other.

⁹⁸ Basu (1984).

- (ii) The owner cultivators of both types are ignored to focus on the dynamics of the reverse tenancy. Only the tenant cultivators and their attempt to lease in as much land as possible are considered. In effect, at present, land transfer via sale-purchase is ignored. If there persists a high degree of land hunger, then the chances are slim that the small subsistence farmers will part away with their land. And to an extent, they do under conditions of distress; they are not different from the tenant subsistence peasant families who are forced to move out of cultivation.
- (iii) It is assumed that the agrarian economy is not differentially impacted by foreign trade. If participation in trade affects it, the effect is similar for both types of households.
- (iv) There is a given supply of cultivable land which is available for leasing in from the owners of land in the market. The return to the owner from land which is not leased-out is zero. Given this fixed supply of land, peasants willing to take land compete in the lease market. This produces a rental price for land at which all land gets leased out and distributed among those leasing in land.
- (v) The tenancy contracts are fixed cash rent tenancies. Later, this assumption is relaxed to consider the changes that may arise on account of changes in the nature of tenancy. Though the changes because of changes in the type of tenancy will be considered, the explanations for the existence of the different type of tenancy is beyond the scope of the present work. Though while considering the different forms, the observations made during the field work will be discussed to contextualise the reasoning. A growing literature on reverse tenancy also points out that gradually cash rent tenancy is replacing sharecropping tenancy. This is also considered the closest to capitalist farming. It is intended to show the dynamics underlying reverse tenancy in "the most advanced" form of tenancy contracts.
- (vi) There are two types of agrarian households that are looking forward to lease-in land from this market. First of these are capitalist-oriented modern cultivator families. The other families are the poor subsistence tenant families, producing just enough to meet their minimum food grain requirement. It is assumed that the yield level of the subsistence cultivators (y_s) is lower than that of capitalist-oriented cultivators (y_m). It is not very difficult to rationalise this assumption as the subsistence families are severely resource-constrained and cannot apply the required amount of inputs to raise the yield levels. For the sake of simplicity, it is

assumed that these subsistence peasant families do not incur any cost in cultivation other than the rental charges.

- (vii) Among the first type of households are those middle/rich cultivators who want to lease in as much land as possible to maximise profit from cultivation. Their demand for land in the lease market will essentially reflect their resource position, prices of inputs and output, and their yield level. Further, they are price takers in the land lease market. For the sake of simplicity, it is assumed that all the profit-maximising peasant families bidding for land in the lease market are homogenous. Their demand curve (D_m in the diagram below, Figure 5.1) will look like the usual downward sloping curve in land area – rental price space.
- (viii) Among the second type of households are those subsistence peasant families who have a demand for leased-in land, s . They operate a very small area of land that can produce just enough to meet their food requirement. Their demand for land in the lease market is not determined by any profit calculation but by desperation to ensure an adequate food supply for the entire year that they do not want to purchase from the market, given the uncertainties involved. Brenner (1997) has demonstrated, through historical analysis, the prevalence of this "market shirking behaviour" of peasants. For the sake of simplicity again, it is assumed that all the subsistence peasant families bidding for land in the lease market are homogenous. Their demand curve is not the usual downward-sloping curve. It is downward sloping only beyond a certain level of land area (L_s) and below the rental price r_{max} . It is horizontal between zero and L_s at r_{max} . Above r_{max} , their demand for land falls to zero. In the diagram below, it is represented by the D_s "curve", which is horizontal at r_{max} till L_s .⁹⁹

It is important at this point to elaborate on the behavioural assumptions underlying this specific demand "curve" of subsistence peasant families. The fact that they are very poor and severely resource-constrained makes it obvious that beyond a certain level, they cannot pay the rental price to lease in the land, and their demand for land in the lease market falls to zero. r_{max} is that level of the rental price. At that price, their demand for land is "unlimited" in a limited sense. Their land hunger drives them to lease in as much land as will provide them with sufficient food grain supply for the year. This land area is given by L_s , the minimum area that produces enough food grains for the year. Beyond L_s , their behaviour is also guided by

⁹⁹ It will resemble a "kinked" demand curve as conceptualised by Paul Sweezy (1939).

some cost-benefit calculations, although of a very limited nature. It is obvious that beyond this "land hunger limit", they would have a surplus of food grains to sell and earn cash income to meet other non-food consumption requirements. This is a much-desired income as it comes from a guaranteed source against uncertain wage employment. But two things make their supply response in the food grain market, and their demand behaviour in the land lease market very different from their profit-oriented peasant counterparts. One, their yield level is very low compared to the latter. Hence the additional quantity of food grain produced on an additional area of land leased-in will be relatively very small. Second, given their resource position, they would still be guided by their "market shirking" attitude. The price volatility will inhibit them from undertaking risk at any significant level. Their risk-shirking behaviour, coupled with their very low yield level, will make their downward-sloping portion of the demand curve very *steep*. This is to state that their elasticity of demand will be very low. Beyond their land hunger limit L_s , they are still conservative.

What would be the level of L_s in this case? It is presumed that it will be determined by the number of subsistence peasant families bidding for land in the lease market. One way to visualise it is by presuming that each of these homogenous families requires a certain minimum amount of food grain to survive during the year. Let this be given by a . Let us also assume that there are N_s such families. Then the total food grain requirement can be given as $a \cdot N_s = A$. Let the respective yield levels of capitalistic and subsistence peasant families be y_m and y_s . The total food grain that the subsistence families can grow on their leased-in land would be

$$Y_s = y_s \times L_s$$

The difference between the total food grain requirement and their output is given by

$$F_s = A - Y_s = A - y_s \cdot L_s$$

The subsistence families would like to push F_s to zero by increasing L_s such that their total output is equal to their total food grain requirement. The maximisation of L_s is subject to their capacity to pay the rental charges, which is r_{max} . Putting F_s to zero, we have

$$L_s = A/y_s$$

This is the area of land leased-in by the subsistence families who are willing to pay any rental charges between zero and r_{max} . Beyond this level of leasing-in, in case they are able to, they will resemble the capitalist farmers in terms of their behaviour, modifying their "subsistence" character. The reason is that once their minimum requirements are met, i. e. their "land hunger" is satisfied, they are no longer driven by the same degree of desperation to get land to cultivate, and they are more likely to weigh in cost-return calculations in their decision to lease in land further beyond L_s .

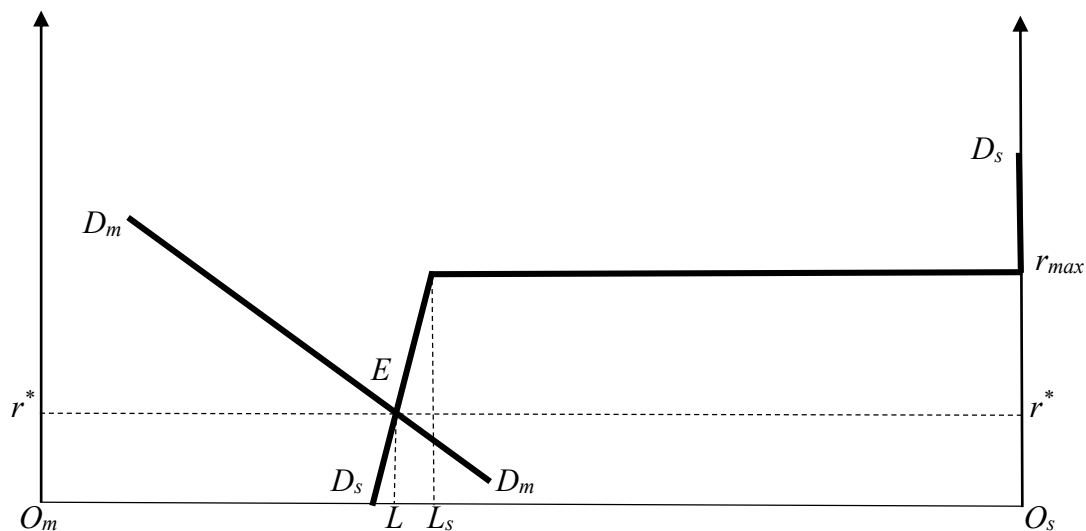


Figure 5. 1: Distribution of land in the lease market

In the diagram above, Figure 5.1, the two vertical axes measure rental prices on them. The horizontal axis depicts the land area leased-in: the distance between O_m and O_s representing the total land area available for leasing. O_m represents the origin of the profit-oriented peasant families, and O_s is the origin of subsistence peasant families. It is evident that in the situation depicted above, the lease market will have an "equilibrium" at the point of intersection of the two demand "curves", at rental price r^* where the total land will be distributed among modern capitalist tenants, and subsistence households at L . O_mL amount of land will be leased in by the capitalist tenants, and O_sL will be leased in by the subsistence households. This simple diagrammatic representation offers us some alternatives. Before we look at some of these alternative scenarios in Figure 5.2, we must note that any given distribution of land among profit maximising peasants and subsistence peasants has serious consequences for agrarian dynamics. The bigger the area of land taken by the subsistence peasant households, the smaller the growth potential of the agrarian economy. This follows

directly from our assumption of $y_s < y_m$. The observation that there are tendencies reflecting reverse tenancy is seen in a positive light precisely because it is associated with the transfer of land from subsistence households with lower yields to profit-making households with higher yields.

In Figure 5.2, the previous equilibrium at point E is depicted with some other possible equilibria that will prevail under different circumstances. As these equilibria are formed as points of intersection of two demand "curves", there are two possible sources of change in equilibrium outcome. First, it can change because of an exogenous shift in demand for leased-in land of profit-seeking households. This shift may occur on account of an exogenous change in prices of food grains or inputs or the yield level of their operational holdings. Second, a change in the equilibrium outcome may also take place because of a change in the "land hunger" of poor subsistence households. This may happen because of an exogenous change in the number of such families seeking land to lease in or because of a change in their yield levels. Interestingly, it may also happen due to their increased/decreased capacity to pay "hunger rent" (r_{max} in our analysis) for any possible reason.

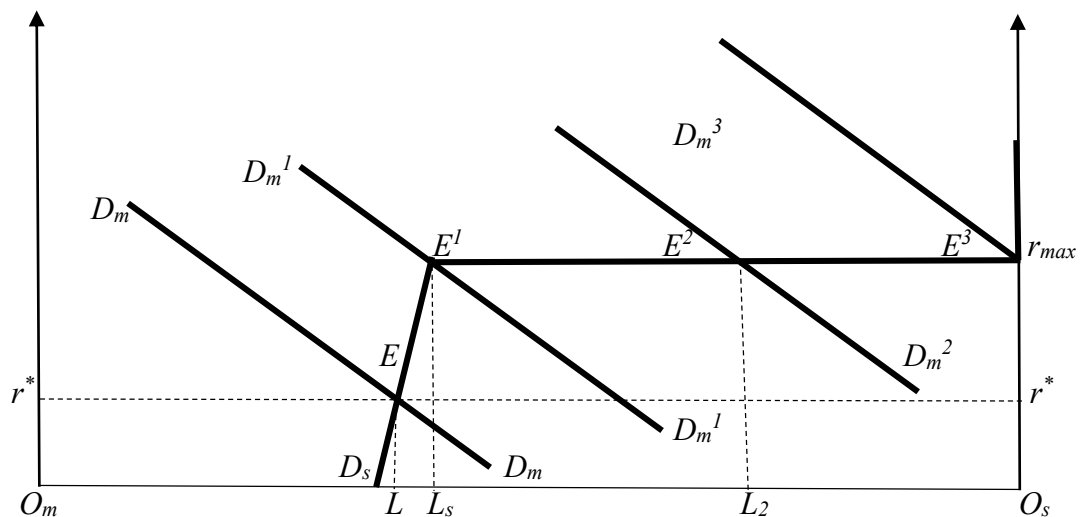


Figure 5. 2: Reverse tenancy via increased profitability of profit-oriented peasants

Figure 5.2 depicts the long-run dynamics very similar to Lewisian analysis. In the diagram above, these possible situations are depicted by different demand curves of profit maximising peasants. Let us consider a situation where there is a gradual outward shift in the demand curve of the profit-maximising peasants. This may arise because they invest their

surpluses in farming to achieve higher yield levels. If this happens in the long run, something very similar to Lewisian dynamics can be seen. Though in this case, there are three distinct phases of agrarian transformation.

In the **first phase**, the continuous outward shift in the demand curve of capitalist-oriented peasants resulting from their effort to increase the area of land leasing would bring little change. Increasing demand for leased-in land will largely be absorbed in an increase in the rental charges. This will happen as the point of intersection of the two demand curves moves from the point E to E^1 as the demand curve shifts from D_m to D_m^1 in Figure 5.2. *The net outcome of this process in this phase is that the distribution of land changes little between profit maximising peasants and the subsistence peasants, but the rental price rises to reach its "land hunger maximum" (r_{max}) as given by the "land hunger" conditions that remain unchanged.* The increased efforts of the profit-oriented peasants are largely "wasted" as increased rental payments. One can surmise that there is a different type of "depressor" at work that turns out to be more powerful than the efforts of the capitalistic-oriented peasants. It is interesting to see that the old-fashioned "depressor" of the Thorner variety¹⁰⁰ is modified to work without landlordism in sight. This also entails deepening exploitation of subsistence peasant families as they strive to pay more to secure their supply of food grains through increased rentals. This may, therefore, be termed a **survival-driven exploitation intensification phase**. Only those who could make higher payments in the form of rent out of their meagre wage incomes, which they earn in or outside the agricultural sector, can manage to cling on to the leased-in land. A bigger part of their wage income gets transferred to the owners of landed property. In essence, they manage to retain the same distribution of land in the lease market by effecting a redistribution of income from wage incomes to rental incomes- away from subsistence families in favour of landed property owners.

In the **second phase**, if the outward shift of the demand curve of the profit-oriented peasants continues, it starts bearing fruits for the capitalist-oriented peasants. In the diagram, this process is captured through a shift of the demand curve from D_m^1 to D_m^2 to D_m^3 , and consequently, the points of equilibrium keep shifting from E^1 to E^2 to E^3 . It is evident that during this phase, the outward shift in the demand curve will not affect the rental price as their competitors have exhausted all their limited means and cannot bid any higher. As the supply is elastic at this price also, they will get a higher share in the distribution of land. The

¹⁰⁰ The formulation was done by Daniel Thorner (1956).

increase will be reflected in the horizontal distance between the old and the new demand curves. *Therefore, during this phase, the net outcome is that an outward shift in the demand curve of the profit maximising peasants does not lead to any change in the rental price, but it does bring a redistribution of land in the lease market.* The classical "depressor" is no longer powerful enough to thwart the efforts of the profit-seeking peasants. This redistribution entails a transfer of land in the lease market away from subsistence peasants because they cannot pay any more to secure land leases. This happens despite that there is no change in the situation of land hunger. The result is more likely to be increased destitution of these subsistence peasant households, now thrown away without any security of supply of food grains and without any change in the prospects for non-farm employment. Their efforts to retain the same distribution of land in the lease market through an income redistribution away from them in favour of land owners have reached their limits and are failing. This phase, therefore, may be termed the **failing subsistence and forced displacement** phase. They are *forced* to seek survival outside agricultural production as their capacity to retain subsistence landholdings runs out in the face of the increased profitability of capitalist farming. A continued shifting out of the demand curve of profit-seeking peasants ultimately results in the complete annihilation of subsistence farming (at point E^3 in the diagram).

Any further movement of the demand curve in the agrarian economy, now in this **third phase**, merely increases the rental price as the supply of land in the lease market has been exhausted. In the absence of the subsistence peasant families, the competition is only among the capitalist-oriented peasant households. This is when we can say that the agrarian economy has passed into the **capitalist farming phase**, where the entire land is being sought for profit-making. Any other motive behind farming has effectively been displaced, and the maximisation of profit is sought in the lease market for land. The process of agrarian transformation is complete, and the "agrarian question" stands resolved. The agrarian economy is *fully* integrated into the dynamics of a capitalist market system.

These three phases of agrarian transformation can also be visualised through some other sources, other than an outward shift in the demand curve of profit maximising peasant households. First, these shifts may arise because of increasing yield levels of these peasants (y_m), as mentioned in the beginning. This increase in yield levels may also arise from public investment-led productivity growth apart from the peasants' productive accumulation. Increased irrigation cover, for example, through public investment, may boost agrarian

transformation by making private cultivation by profit-seeking peasants more profitable. Further, an increase in food grain price, *ceteris paribus*, will also have the same effect on capitalist agrarian transformation. An input subsidy, for that matter, will also have the same effect. All these changes have their source in the domain of profit-oriented peasant households.

The same direction of agrarian transformation may also be sourced through subsistence channels. One, if the incidence of land hunger is brought down, it will release more land for profit-seeking peasant households. Let's say if the number of such subsistence families (N_s) is brought down, then the demand curve of the subsistence families (D_s) shifts to the right (towards their origin O_s). It will not only have more land released for profit maximising peasant households, but the lease market will also settle at a lower rental price. This further releases some surplus for possible productive accumulation shifting the demand curve of the profit-seeking peasants to the right, hastening further transformation. The same outcome through the same mechanism may be achieved by subsidising the consumption of subsistence households (for example, by making secure provision of food grains at an affordable price for them).

There is yet another channel through which agrarian transformation can be brought. If the "hunger rent" (the maximum rental price affordable for the subsistence peasant families, r_{max} in our analysis) is brought down, it will bring down the resilience of subsistence farming. The overall rental charges will also come down. Ultimately this will also result in their relatively easier displacement from the land lease market by the profit-oriented peasants.

It can be seen that there are many ways to transform the agrarian economy - from the significant presence of a subsistence economy to a profit-oriented capitalist economy- may happen. Figure 5.2 reflects upon such possible mechanisms. But the same diagram also reveals that the exact opposite of the above change is also very likely. Falling profitability of profit-seeking peasant households for any extraneous reasons, yield decline, growing "land hunger", and increased "hunger rent" arising from growing "land hunger" may all diminish the prospects of agrarian transformation. Not only do these changes result in an increased resilience of the subsistence farming, but they may also very well *reverse* the course of "reverse tenancy". An agrarian stagnation may persist without the classic prevalence of landlordism. "Depressor" may still work, albeit without big landlords in sight.

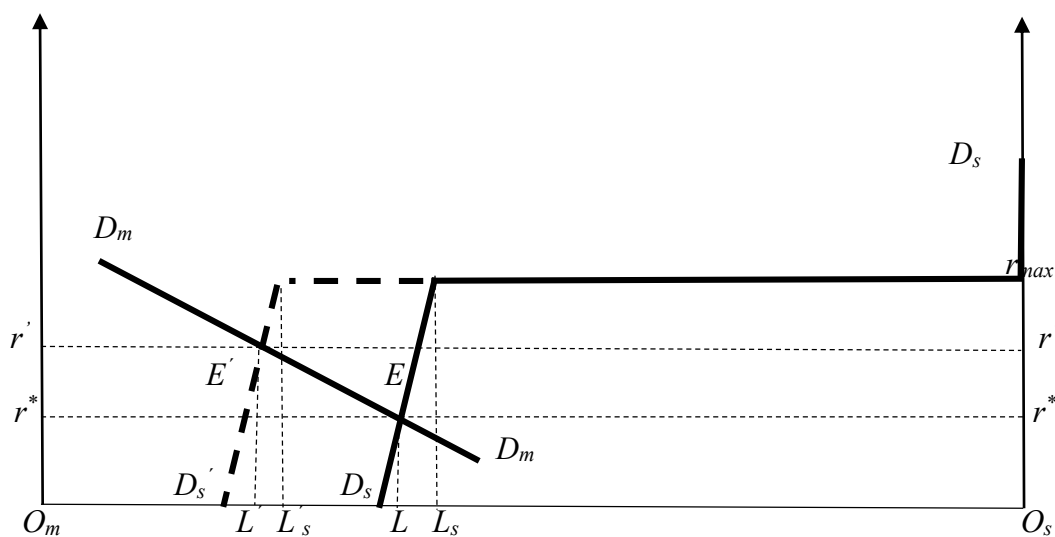


Figure 5. 3: "Reversing" of reverse tenancy

Figure 5.3 depicts one such possibility. In case the land hunger rises because more families are looking for land (maybe after the loss of employment elsewhere), the minimum area of land they would desperately seek out increases from O_sL_s to O_sL_s' . It will shift their demand curve (D_s) outward, away from their origin. It is now represented by D_s' . It results in a redistribution of land away from the profit-maximising peasants in favour of subsistence peasant families, albeit at an increased cost, at the new equilibrium E' . The rent in the agrarian economy rises to r' . It is interesting to see that the subsistence peasant families' capacity to effect redistribution of land in their favour is limited. As evident from Figure 5.3, the redistribution happens only at the cost of a higher rental price. Given that their capacity is limited by a maximum hunger rent r_{max} , once the equilibrium reaches that level of rent, they cannot change the distribution of land in the lease market, no matter what their level of land hunger is. Therefore, in the long run, increasing the level of "hunger rent" remains the only way through which they can stop or reverse the reverse tenancy. It is shown in Figure 5.4 as neutralising the impact of a shifting demand curve of profit-seeking peasants, from D_m to D_m^I , by an increase in the level of "hunger rent" from r_{max} to r_{max}^I . This prevents an impending redistribution of land in the lease market from L_s to L_s^n in favour of profit-oriented peasants. This arises because the subsistence peasant families can pay a higher rent out of their wage earnings. The importance of wage income in determining the outcome in the land

lease market brings us to the labour market in the local economy as the subsistence peasant families pay the rent out of their wage incomes.¹⁰¹

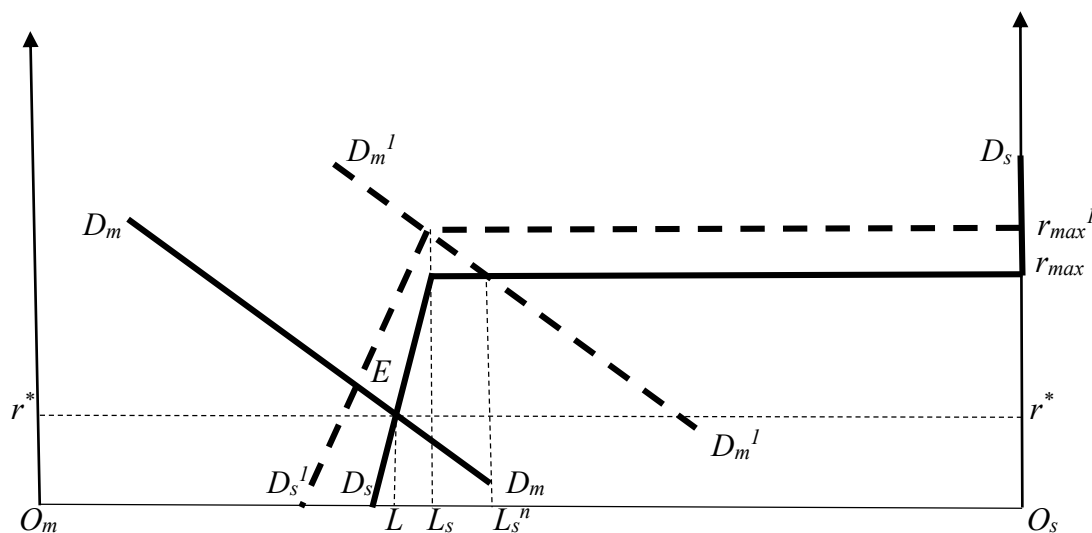


Figure 5. 4: Distribution of land under increased "hunger rent"

It is clear, therefore, that the prospects of successful agrarian transition depend on factors not entirely within the agricultural sector but are very powerfully determined by the overall growth dynamics of the macroeconomy. The role of non-farm employment in this regard is central to the question of agrarian transformation.

Before we close this section, a brief discussion on alternative forms of tenancy contracts is needed to be considered. After dropping the assumption of fixed cash rent tenancy as the only form, it needs to be seen whether alternative tenancy contracts, other than the fixed cash rent tenancy, modify the dynamics of agrarian change as discussed above. There are mainly two other prevalent forms: fixed rent in kind and sharecropping. Presently, a detailed discussion on the explanation behind such alternative forms of tenancy is avoided. Bardhan (1989) provides a good collection of essays discussing this aspect. Basu (1984, p. 124-135) also discusses some of these aspects. The following paragraphs discuss the implications of a change in the form of tenancy.

Under a fixed cash rent system, the person leasing-in land has to pay the cash rent upfront- before the cultivation season begins. It requires the availability of cash in hand. There may exist a few poor subsistence households who will find it difficult to arrange for

¹⁰¹ The discussion on wages is briefly done in a section below discussing the political economy of reverse tenancy.

this at the beginning of the season, in a short shopping window, when the contracts are being made. This is the time when there is fierce competition among leasing in households. The non-availability of cash may severely restrict the ability of these poor families to pay "hunger rent". With kind-rent contracts, there is no such hurry to pay for land in the beginning-payment is out of harvested crops at the end.¹⁰² The payment is made at the harvest time of the crop in which the rental charge in kind was quoted. Clearly, such forms of tenancy contracts make subsistence peasants better placed regarding cash requirements. Therefore, one crucial way in which these alternative forms of tenancy modify the outcome is by making leasing-in easier for the poor subsistence peasant families by reducing cash requirements. This significantly reduces their dependence on income from wage employment to lease-in land. However, the advantages favouring subsistence peasants with kind-rent arrangements are confined only to the *fixed kind-rent* contracts.

But in the case of sharecropping as the kind-rent arrangement, the land requirement of the subsistence peasants becomes double if their crop share is half. Given that the land supply is fixed in the lease market, the tight land supply constraint can make competition with the profit-oriented peasants more difficult. If the leasing in by the subsistence families is primarily driven by their insecurity regarding basic food grain supply to survive, they would need a much larger area to produce enough food grain for themselves after paying the crop share. In our explanation above, the annual food grain requirement was given by A . If we keep the purchased amount of food grain from the market (F_s) at zero, we have an area L_s that would be sufficient to produce enough given their yield level y_s . Given that they are leasing-in under sharecropping, they would have to part away with a portion of total output and are left with less than A , implying they have to take recourse to purchase food grain from the market ($F_s > 0$). If the crop share is half in the tenancy arrangement (a widespread pattern), it implies that to keep F_s to zero, given y_s , they have to lease in double the area, i.e. $2L_s$. If they successfully bid in the lease market, which is characterised mainly by sharecropping contracts, then the area left for profit maximising peasant households gets reduced. This would bring down the overall production in the agrarian economy. But there is a complexity involved in this case. Given that the yield level of subsistence peasant families is lower than that of profit-oriented peasants, the landowners would not like to lease out to subsistence peasant families at all. This is because the amount they would receive would be lower than

¹⁰² There may be cash required to meet the partial input cost if we consider that the poor subsistence peasants are also using modern inputs. Though it is going to be a much smaller amount than the entire cash rental to be paid in the alternative scenario.

what they would get if they leased out to profit-oriented peasants. Under the assumption of differential yields, subsistence peasants can only successfully bid in the lease market by reducing their crop share. But once they do it, given a certain minimum food grain requirement, the minimum area to be leased in to meet this requirement increases. Therefore, there is a limit to this adjustment. Any such arrangement will have to meet two requirements. One, the amount of the leased-in land by the subsistence peasant families should suffice for their food grain requirement after paying the crop share to the landowner. Second, landowners' share of production per unit of land should not be less than what the profit-oriented peasants are giving. It can be demonstrated that both these conditions can be met only when the output produced by the subsistence peasant families per unit of land is greater than the amount per unit of land received by the landowners from the leased-out land to the profit-oriented peasants.¹⁰³ This example also suggests that in an agrarian economy characterised by the predominantly sharecropping form of tenancy, the overall productive potential in the presence of significant subsistence farming is much lower than in a situation where the contract is fixed cash rent variety. This is because a much larger area has to be leased in by the subsistence peasants to survive if they can compete successfully with their profit-oriented peasant counterparts. Their struggle to get land costs them a higher crop share to the landowner to retain land. Subsistence farming can survive, but only through intensifying exploitation of subsistence peasant family labour.

It is also understood from this exposition that a similar kind of dynamics is seen here - similar to what was seen under fixed cash or kind rent tenancy. In that case, the subsistence peasant families could still retain their landholdings in response to a change in demand of profit-oriented peasants (e.g. increased yield level of the latter) by effecting a redistribution of income away from themselves in favour of the landowner by increasing the level of rent. This was subject to a limit beyond which they could no longer compete, and they were forced out of their subsistence cultivation. In the case of sharecropping, they are again responding to the changed circumstances by increasing the crop share of the landowner, implying a redistribution of income in favour of the landowners. This is also subject to a limit – the limit to which the crop share can rise. Further, as the share of the landowner rises, their

¹⁰³ This condition is incorporated in the small mathematical exposition presented in Appendix 5.1. This exposition is the sharecropping equivalent of the dynamics explained above for cash rent tenancy.

requirement for land will grow. This is also subject to a limit – the total supply of land in the lease market is fixed.¹⁰⁴

This also makes reverse tenancy relatively easier with sharecropping in the light of increasing yield levels. The limits of subsistence farming can be hit relatively easily under sharecropping. This also appears to be in tune with the empirical findings that show a much lower degree of prevalence of subsistence variety of sharecropping in agriculturally dynamic regions. It goes without saying that in the absence of yield increments, the agrarian stagnation becomes much deeper and more acute with sharecropping as the dominant form, and it may have a bearing on the overall agricultural prosperity. Even if the proportion of subsistence families remains the same under the two types of tenancy, it is obvious that the proportion of total area under subsistence farming will be much larger in the location that has sharecropping as the dominant form of tenancy. Consequently, the process of agrarian transformation will be much longer and tortuous in the latter.

It may still be argued that sharecropping-based subsistence farming can still be persistent if it is possible to match the yield increase of profit-oriented peasants in monetary terms. By changing the cropping pattern and switching to more cash cropping where the monetary value of the yield can be substantially higher than paddy-wheat cropping, the subsistence peasant families may be able to match and compete with the profit-oriented peasants. Therefore, they will be better positioned to retain their tiny operational holdings than in a situation where they remain tied up with the traditional cropping pattern. But this possibility raises two questions regarding its feasibility.

First, the switching to cash cropping invariably requires more cash expenditures to be made by the subsistence peasant families. If their weak resource/cash position comes in the way of this switching, which is more likely to happen, then this may not fructify. Second, if there is a chance of increasing the monetary value of yield through a change in the cropping pattern, then it is likely that the profit-oriented peasants will be in a much better position to bring in that change. If that happens, then the relative inferiority of subsistence farming in terms of physical yields will be directly translated into their inferiority in monetary terms as well. For both these two reasons, it is unlikely that subsistence peasants can take this route to their survival.

¹⁰⁴ Technically the share can rise to any level below 1. But the existence of the equilibrium will depend not only on the rise in the crop share but also on the overall limit of the available land to be leased-in.

The possibility of survival of subsistence farming through changing cropping patterns may be considered in somewhat modified dynamics. If switching to cash cropping requires intensive use of labour, besides cash expenses, then this may open up a small window for the subsistence peasant families to fight back in the land lease market. The subsistence peasant families can make use of their family labour more exhaustively and efficiently. In contrast, profit-oriented peasants rely on hiring labour to meet the intensive labour requirements. If there is a "seasonal/temporary scarcity of labour" in the agrarian economy, then switching to cash cropping may be *more difficult* for them. The balance of this competition in the context of two different constraints faced by two different types of peasant households (cash constraint for the subsistence peasants and labour constraint for the profit-oriented peasants) will depend on the relative capacity to overcome these constraints. The field observations by the researcher have actually pointed to this *possibility*. In many cases, relatively better-off peasants affirmed that they would like to switch to "profitable" crops but for the availability and reliability of the labour force at the *right* time. Not only do they require a much bigger labour force to tend to the new crop, but they also need it at a specified time, offering practically no space for *waiting for the labour to become easily available*. Surplus labour in the agrarian economy does not necessarily contradict this possibility –surplus labour may exist together with the scarcity of labour. Mechanisation, a possible alternative to this requirement, does not really solve the problem for them, either because of a much bigger and unviable cash investment except for the really rich ones (because the size of their holdings does not warrant such a big investment and indivisibility of this investment), or because of fragmented landholdings where the use of large machines may not be possible.

If this is the situation, then the survival of subsistence peasant families will have an interesting transformation waiting for them. Very soon, upon successful bidding in the lease market, will they realise that their cash incomes have grown and they are in a position to produce a much larger marketable surplus. Given the degree of confidence in the output market conditions, they would start bidding for more land in the lease market. This implies that they would be gradually shedding their subsistence character. Thus in this scenario also, the subsistence farming dies, albeit without increased destitution for the subsistence families. This offers a *democratic resolution of the agrarian question*, which has a lot of policy research potential.

To sum it up, it should be re-asserted that the question of agrarian transformation cannot be reduced to the dynamics of reverse tenancy only. Broadly speaking, it involves the substitution of subsistence farming with surplus production. This does not necessarily imply the removal of small and marginal peasants who own small areas. It is quite possible, with suitable policy interventions, that the yield level of currently subsistence peasant families, owners, and tenants can be raised. This will not only bring down the instances of "hunger leasing" but may also incentivise surplus production for them. Of course, it will require another kind of institutional support to make them leave their "subsistence behaviour" and be more confident in entering the market for both inputs as well outputs. The theoretical exposition outlined above can easily be applied to see such potential. It will involve making the demand curve (in this case for purchased inputs and not of land) of subsistence peasant families less steep, hence more responsive to market signals. This, together with institutional support to raise yield levels, may turn the characteristic tag of "subsistence farming" into a more surplus-oriented economy.

5.2 Choice of the form of tenancy: Some observations from the field

It is important to start with a disclaimer. This section does not intend to provide a theoretical explanation for the existence of different types of tenancy. The present work merely intends to put forward some of the observations that are relevant for any explanation regarding the choice of tenancy by the lessors and lessees. It is also important to point out that three forms of tenancy were observed: fixed cash rent, fixed kind rent, and sharecropping. Besides, the respondents pointed out the existence of *labour-tying* with leasing was found. In such cases, rent was either extracted in the form of kind, or in the form of "labour rent", or in some cases, both.¹⁰⁵ Such observations have been referred to as "attached labour" in the official documents or by *bandhua mazdoor* by many researchers. Each different connotation carries a different understanding of the labour process. In one case, it may be considered a "labour contract" where the payment was not in cash or kind but in terms of a land grant for the period of contract. This can be very much analysed within the capitalist arrangements. In fact, it was observed that in some cases, such labour attachment was associated with wage

¹⁰⁵ Labour rent in such cases comes very close to what was observed during the classical serfdom of medieval Europe. A small patch of land was given to the serfs for their subsistence, and in return, they were obliged to work on the lord's estate without being paid. This was known as *demesne farming* and the labour as *corvée labour*.

payments in cash or in kind for the work done by the labour households.¹⁰⁶ In some others, the labour households pay rent - in cash or kind, but usually a share of the crop - for the land which is "granted" to them. Therefore, many varied forms of "attachment" were observed. The peasants also mentioned the reason behind such an arrangement. In many cases, such arrangements appeared primarily to ensure labour availability at times when it is required in the field. Therefore, to an extent, such arrangements exist to ensure labour supply; this can safely be inferred as a capitalist arrangement. But in some other cases, the "attached" labour households performed some non-farm labour for the landowner.

Coming back to the most prevalent forms of tenancy, i.e., fixed cash rent, fixed kind rent, and sharecropping, it was observed that the inferior quality land was usually never leased in on fixed cash rent or fixed kind rent basis. This may be because of problems of "discovering the correct price" in the land lease market. Given that the yield is very low and uncertain, the "fixed" price that would ensure "equality of demand and supply" of land in the lease market may not exist. There is neither a *given* price around which bargaining may take place nor could it be *formed over time*. There may be an alternative reason for this as well. The rich/middle segment of the peasantry looking for a profit in cultivation may not be interested in leasing in such inferior quality land. The reason is the following. In order to maximise production, the peasants have to put in a greater amount of inputs to make it commercially viable. If this *additional* cost is subtracted from the rent charged on an average quality land, the peasants may be able to lease in this land. But usually, the labour used on such inferior quality land has to be more than proportional in relation to the normal quality land. If a labour constraint exists, the additional labour cost may be prohibitively high. In such circumstances, either it leaves profit-based farming economically unjustifiable, or it may reduce the rent so low (zero or negative) that the lessor may not be interested in leasing out land. Such possibilities were indeed observed during the field investigation. It comes close to the observation of Newberry (1977), however, with a disclaimer that his analytical framework is different from the present case. It seems that the present case is of the *uncertainty of labour usage* rather than of *uncertainty of labour enforcement*, as in his model that attempted to explain the prevalence of sharecropping.

The choice of sharecropping was found to be motivated differently for relatively better-off peasants and very poor households when it comes to leasing out. Many poor

¹⁰⁶ In such cases, the performance of unpaid labour was also observed along with paid work.

households leasing out the land (who could not cultivate it on their own for some reason, the inadequacy of family labour being the most common cause) preferred sharecropping as it guaranteed the supply of certain food items. For better-off landowners, the ease of disposing of output and price variability determined their choice of sharecropping. It was observed that these landowners try to switch between sharecropping and fixed cash rent tenancy depending on their expectations about the crop's price. This behaviour has its parallel in history during the colonial period (Chaudhuri, 1982a).

The choice of the form of tenancy is found to be not always tilted in favour of landowners. It was found that the demand for leased land had a powerful influence over the form. In areas where the degree of monetisation of farm activities was low, the tenants strongly preferred sharecropping. The observed correlation between the degree of monetisation and the form of sharecropping in such cases may be *extraneously* determined by the fact that the overwhelming majority of tenants are poor subsistence peasant families, whose decision is driven more by a sense of insecurity regarding basic food supply than cost-return considerations. Therefore, the choice may be heavily influenced by the distribution of operational holdings. However, the degree of monetisation does have an effect on the choice of poor subsistence peasants leasing in the land.

It was indeed noticed in the present fieldwork. The village, close to the trading centre and having better irrigation facilities, has fixed cash rent type of tenancy as the most prevalent form. In contrast, the villages relatively further located from the trading centre have sharecropping as the predominant form of tenancy. But this correlation can be misleading if it is read as causation. The reasoning can very well be in terms of better possibilities of wage employment in the trading centres (and not just the better marketability of produce) for the subsistence families who can relatively easily pay the cash rent. This reasoning was very much apparent in the two different locations. In the village, very close to a market centre, both the landowners and subsistence tenants preferred a fixed cash rent arrangement over any other form. The location further from trading centres not only had more sharecropping, but even the wage payment in the agrarian economy was mostly in kind. This reflects the vulnerability of the working families. Non-availability of wage employment outside the village was *told* as the main reason behind the practice of payment in kind.

Plenty of responses emphasised the problem of uncertainty as the main reason behind the choice of sharecropping. This appears to be in tune with the explanations given by Stiglitz

(1974) and Newberry (1977). Capitalist farming with wage labour and fixed-rent tenancy have risks completely born by the owner and the tenant, respectively. In case of high variance in the yield levels and if their behaviour is characterised by risk aversion, then both these two forms will be looked at with a great deal of scepticism, and sharecropping may be seen as an "efficient" system of risk-sharing. In fact, the problem of moral hazard that may arise in the sharecropping arrangement was also discussed. But, in many cases, the tenants have pointed out the "solution" to this problem adopted by the landowners. The labour application was enforced by a threat of eviction in the next cropping season. Given the situation of land hunger, this threat works to ensure that the subsistence peasants will try to increase their yields on leased-in land through more intensive and extensive use of family labour in the absence of adequate capital to be put in the form of better inputs. This is more in tune with the line of the analysis presented in this work. Many middle rungs of cultivators have also pointed out the "scarcity" of labour as well as problems of moral hazard. In the light of the above, the landowners choose fixed cash rent if they are risk-averse (both production and market risk considered) and if the tenants are not that risk-averse. Otherwise, they also appear to choose sharecropping with *threat-based enforcement of labour application*.

The existence of sharecropping with other forms of tenancy also indicates a low degree of monetisation of the agrarian economy. Similarly, payment of wages in kind is also indicative of the same fact, even if it is not as much prevalent as sharecropping. These economic exchanges denominated in kind seem to be emanating from many factors – (i) uncertainty of yield, (ii) low level of marketable surplus, (iii) uncertainty of crop prices, (iv) low level of diversification, (v) lack of alternative sources of income and employment. For a fuller understanding of the existence of sharecropping, it is useful to read it also as a non-monetised exchange. Such economic exchanges appear to result from the typical risk-averse behaviour of economic agents. Whether closeness to market centres will change the nature and degree of monetisation of economic exchanges will depend on the degree of confidence in the market-based exchanges. This, in turn, will depend on (i) whether markets are developed and relatively competitive and (ii) if they are stable and not very volatile.

Further, there are many instances where the same household leases in the land while also leasing out. In most of these cases, the reasons were the physical location of the plots. Through such a leasing pattern, the operating households tend to make their operational

holdings more compact in terms of physical location. The distance of the plot from the homestead is the most important determinant of such a leasing pattern.

5.3 The political economy of reverse tenancy

The ability of the subsistence peasant families to lease in the land, which is driven by their land hunger, depends on their capacity to pay "hunger rent". This is facilitated through wage income. As illustrated above, the role of the labour market in the local agrarian economy becomes very crucial. But it is usually agreed that only a sustained increase in non-farm employment can reduce the dependency of poor families on subsistence farming. The importance of creating sustainable and dignified non-farm employment can be viewed through another lens. This is done by bringing into the picture the ethical and political considerations of the dynamics of agrarian transformation. It is very clear that in a non-dictatorial market economy, the prospects of agrarian transformation hinge on the balance of competition between the profit maximising peasant households and subsistence peasant households. It is also very clear that the competition in the land lease market in our model representation is not the usual one often referred to in the textbooks. The two types of *competitors are driven by different motives*. Whereas one section is trying to get as much land as would maximise their returns, the other section is driven primarily by desperation, a threatened survival. The typical "market shirking behaviour" of the subsistence peasant families of the Brenner (1997) variety cannot be wished away as irrational behaviour. Markets, to them, mostly appear as a hostile place where their vulnerabilities are exposed without the necessary resource base to tide over the potential threats. The market "opportunities" may not be lucrative enough to them, given their poor resource base. Therefore the balance of competition between these two sections is not really balanced- it is already tilted in favour of profit-seeking peasants as the possible progress always threatens the existence of subsistence peasants.

It is evident that there may be many ways and many factors that would cause the decline of subsistence farming and a concomitant increase in capitalist-oriented farming. Even when we consider all such ways as ultimately resulting in the demise of subsistence farming, the differential impact in terms of welfare outcomes is necessary to take into account. Broadly speaking, there are two possible ways of achieving the agrarian transformation. First is where the balance of competition gets pushed in a direction where the

power of capitalist farms overwhelms the subsistence farms. *Biased yield increments*,¹⁰⁷ inflating prices of food grains, subsidising inputs which the profit-maximising peasants use, and depressing the capacity of the subsistence peasant families to pay "hunger rent" - are all that push the distribution of land in the lease market in favour of profit-seeking peasants. This results in displacement and destitution for subsistence peasant families as they are left with no viable alternatives to secure the supply of food grains. This may happen without any reduction in the degree or nature of "land hunger" and "hunger rent". This mechanism may be termed the *undemocratic path of agrarian transformation*. Besides ethical concerns, this mechanism can be questioned on welfare grounds also. The political feasibility of this path in a democratic society also remains questionable.

The second possible way of the same transformation is by reducing the "land hunger" of subsistence families. This may be ensured by providing relatively secure employment all through the year. They may also be enticed to diversify their income generation towards non-farm activities inside the rural economy by supplying the necessary capital base. A relatively easier way would be to ensure that they are given the necessary food supplies either freely or at a very low price that secures their survival. This may encourage them to look for sources of livelihood elsewhere without worrying that their families would not have enough food at home in case only adult male members are migrating in search of work. Alternatively, they may be provided with a sufficient supply of food grains at the location where they are choosing to migrate. This mechanism would release both land and labour from the subsistence segment of the agrarian economy for more "efficient" usage elsewhere. This mechanism may be termed the *democratic and sustainable path of agrarian transformation*. Not only it is much better placed on ethical grounds than the previous mechanism, but it is also welfare-enhancing and politically far more acceptable in a democratic set-up.

With the above consideration in mind, an attempt is made to understand the broad contours of the political economy of agrarian transformation in general and in the context of the agrarian economy of Bihar in particular. Given that the process of agrarian transformation is largely through the market mechanism, it is crucial that we consider the possible outcomes in the light of various social-political pulls and pressures on this mechanism. The first thing is

¹⁰⁷ When the yield increments are not generalised, they may remain specific and concentrated on middle or large farms. There are plenty of such instances where an improvement in the farming conditions is cornered by the large and middle landholding households. This may happen through a technological innovation that gets embedded in the new but costly inputs. Or alternatively, it may happen through an expansion in irrigation cover that is differentially distributed in favour of middle/large farms.

to consider the motivations of the landowners who are leasing out their land. It may consist of both types of households at two extremes. On the one hand, they may be members of the rural elite who have large landholdings that they do not operate fully and hence lease out a part of their ownership holding. On the other, they may be absentee large/middle landowners who have adopted other means of livelihood that are more or less secure and hence do not have active interest left in cultivation. In a survey of nine villages in Andhra Pradesh, Vijay (2012) and Vijay & Sreenivasulu (2013) find evidence of the growing importance of *non-cultivating peasant households* measured in terms of both their share in numbers of leasing out households as well as in area leased out. They are largely moved out of agriculture except for retaining land ownership which they are using as a rent extraction asset or as an asset whose price is expected to rise and hence is a lucrative asset to hold on to. On the other hand, the leasing out households may also be drawn from poor/marginal peasantry who have migrated out in search of alternative livelihood more or less on a permanent basis. The rental income for the absentee variety of leasing-out households is an additional income that they receive from land ownership. Despite permanent migration, they do not want to sell off their land for many reasons. The cost of landholding is zero. Given the situation of "land hunger," it gets them an annual income in cash or supply of food grain (in case of sharecropping) that is more secure than many non-farm informal sector employment. Further, many would like to come back to spend their "post-retirement" life. Also, the land may be considered a valuable real asset to be retained either as a shield against unforeseen contingencies or in expectation of land price appreciation. It is not unusual to find that despite the significant presence of land lease markets, selling and purchasing land is not a frequent activity witnessed in the agrarian economy. The land market in rural areas remains limited and highly localised. It is rare to find instances of land being sold off to an "outsider". In the absence of old types of interlinkages between credit-land-labour markets, the instances of transfer of land from the impoverished peasantry to landlord-moneylender are rare and no longer a regular feature. The decline in such instances of transfer of land is nevertheless accompanied by quite an active land lease market.

The form of tenancy notwithstanding, the extraction of rent and its usage will remain relevant for agrarian dynamics. What happens to this surplus? Is it productively accumulated in the agrarian economy? Is it taken out to be used to finance consumption of leasing out households, or is it used to finance non-farm productive activities inside the rural/local economy? These will have a bearing on the dynamics of agrarian transformation too. If it is

largely used to hedge against "consumption risks" in the case of poor peasants leasing out, it implies that it is part of the subsistence economy, even in cases where the land is leased out to middle/large peasants farming for profit. It constitutes a leakage from the surplus that could have been deployed in maximising production and profits. In the case of non-cultivating absentee households, this leakage is greater and rising with time.

As rent is paid out of profit in the case of middle/rich cultivating households leasing in the land, they are interested in keeping it low. Suppose the land is largely owned and leased out by the traditional rural elite, who have favoured leasing out to poor subsistence families. In that case, it is possible that the middle rung of the peasantry, interested in leasing in more land for greater profit, could forge an alliance with the subsistence families to keep the rental price low. As it is beneficial to both segments in the short run, it becomes a viable strategy to follow. This seems to be the case in Bihar, where peasant movements have been able to reduce the "dominance" of old rural elites.¹⁰⁸ However, in the long run, it will work in favour of profit-maximising peasant households who, through the usual process of accumulation and growth, will eventually displace the poor subsistence peasant families from the land lease market. This also seems to be largely the case in Bihar. However, this process started about a century back with the first major tenancy reforms in India undertaken by the colonial government. The caste-class dynamics since the mid-1930s reflect this change which seems to have culminated with the radical peasant movements of the late 1960s and afterwards. With old landlords largely vanishing from the scene, the conflict has transformed into a competition where the middle and small peasants cultivating to reap profits are trying to oust the poor subsistence bidders from the land lease market. The growing conflict over rural wages, about which a brief discussion is carried below, is also symptomatic of this conflict.¹⁰⁹ Therefore, the particular balance of power prevailing in the agrarian society may tilt the dynamics of agrarian transformation in favour of or against reverse tenancy.

As discussed in the paragraph above, there is another possibility that may arise independently or as a result of a possible change in the balance of social-political power in the agrarian economy. This seems to be a real scenario prevailing not only in Bihar but in many other parts of India. There are often references to a rise of "new landlords". This

¹⁰⁸ Of course, this transformation is enmeshed in the caste dynamics as well.

¹⁰⁹ There is a very useful and insightful work by Choudhary & Shreekant (2010) in this regard. It is a comprehensive survey of major social movements since the early nineteenth century that profoundly affected the evolution of caste-class dynamics in Bihar.

usually refers to a more commercially oriented peasantry, residents as well as absentees.¹¹⁰ Given the failure of the government to initiate and implement meaningful land reforms,¹¹¹ it is not surprising to see that the "new" elites of the rural society also wield significant influence over state policies. There are increasing instances of collusion between the "new" and the "old" elites. The contradiction between the two is managed through deepening exploitation of the subsistence peasant families. The fact that the latter is also selling labour in the local economy makes it even more economically attractive for this alliance of rich/middle peasantry cultivating for profits and the class of rentiers. They would like to exert their influence over the state to implement policies that will protect/increase profits and, at the same time, will also protect rents. The demand for "better" food grain prices is very powerful politically, as it tries to achieve a higher profit without requiring rents to be controlled. In our simple illustration, this will be reflected in a shift in the demand curve of profit-oriented peasants resulting in displacement and destitution of subsistence families. The same demand, if met, makes subsistence peasant families even more "land-hungry". Rising food grain prices, in the absence of a comprehensive food subsidy programme, send them a dangerous signal, further strengthening their resolve to stay away from the food grain market. Still, their failure to secure tenancy contracts works to the advantage of the politically-socially more powerful sections of the agrarian society. This is discussed below when the labour market dynamics are brought into the picture.

Even the public investment in the agrarian economy may have a differential impact. First, the nature of public investment itself may be biased in favour of profit-maximising peasant households. Subsidising farm machinery, for example, will tilt the balance in favour of middle/large peasant families in our illustration and will make reverse tenancy easier through the displacement of subsistence peasants easier. Even the apparently "class-neutral" public investment (e.g. irrigation expansion, electricity subsidy, etc.) may have a contextual bias in favour of profit-seeking peasant households. Byres (1981), Harris (1985) and Wilson (2002), among many others, have noted down the differentiating impact of the "new technology". Usually, the technocratic solutions to agrarian impasse look over this aspect (examples of which are Hayami, (1981) and Fujita (2014)). It is easier to see, though, that if the benefits of public investments are more evenly distributed, it may still lead to agrarian transformation through reverse tenancy, but in this case, it is not accompanied by forced

¹¹⁰ Vijay (2012) talks of the latter variety, which he refers to as non-cultivating peasant households.

¹¹¹ Jannuzi (1974).

displacement of subsistence peasant families. Increased yield levels uniformly also imply that the subsistence peasant families need a smaller area of land to produce the necessary food grain, and therefore, their "hunger-induced demand" for land will come down, releasing more land for cultivation for profit.

A more complex problem of the political economy of agrarian transformation pertains to labour market dynamics. In our illustration also, it is clear that the subsistence peasant families leasing in the land also sell their labour services in the local economy (farm or non-farm activities). With this income, they pay the cash rent for the leased-in land. This is the only source from which they secure land to secure food grain supply. A typical behaviour observed during the fieldwork was that these poor peasant households hired themselves out as much as the local economy offered them wage employment. It is clearly neither sufficient nor guaranteed; therefore, there is every effort to save these wage earnings to pay for the leased-in land at the beginning of the cropping season. It is definitely enormous if we look at the extent of out-migration of rural workers from Bihar to all parts of the country. But it is also a characteristic feature of this migration from Bihar that overwhelmingly consists of workers engaged in low-paid work in the informal economy, including farm work. It gets reflected in the fact that despite having a large share of total migrant workers in the country, the state's share in inward remittances is very low at just 1.13 per cent, and the state is placed in 11th position among all Indian states.¹¹² Given the precarity of this source of income, it may suggest that their hunger for land and their capacity to pay hunger rent can be relatively higher.

Further, the fact that they are the workers seeking employment in the local economy, including agricultural work, also indicates that the local employers will have an interest in keeping the wage levels low. This eventuality, which means keeping land and labour productivity low, was acknowledged even by Lewis (1954), who realised the limitations to structural transformation in his model arising out of a specific political-economic context. It is useful to quote him to appreciate the point that he was making:

"The fact that the wage level in the capitalist sector depends upon earnings in the subsistence sector is sometime of immense political importance, since its effect is that capitalists have a direct interest in holding down the productivity of the subsistence workers. Thus, the owners of plantations have no interest in seeking knowledge of new techniques or new seeds

¹¹² Table 5.22 of *Economic Survey of Bihar, 2019-20*, page 192.

conveyed to the peasants, and if they are influential in the government, they will not be found using their influence to expand the facilities for agricultural extension. They will not support proposals for land settlement, and are often instead to be found engaged in turning the peasants off their lands."¹¹³ (Lewis, 1954, as reproduced in Agarwala & Singh, 1958, pp. 409-410)

With no scope for an alternative employment opportunity, their desperation to maintain an adequate food grain supply further intensifies their exploitation. Different possibilities for agrarian change in this situation may arise depending upon the nature of "class-collusion" prevailing in society.

If the rentier-capitalist class alliance is powerful, they will like to keep the wages down, rents high, cost of high rents sought to be offset through "artificially" kept high food grain prices. This will keep the capacity of the subsistence peasant families to pay "hunger rent" under check, and with some manipulation, they can be easily pushed out of the land lease market. This definitely implies agrarian transformation through capitalist take over, but it is done through increased misery and destitution of subsistence peasants. There is another possibility of *extreme stagnation*. There may be reverting back to old-style rent-based exploitation even by the existing capitalist-oriented peasant families. If the return from cultivation falls low enough and the non-farm economy is in bad shape, offering no employment to the impoverished peasantry; the "hunger rent" might push back land distribution in favour of subsistence families trying even more desperately to acquire some land in the lease market. Though, given the current political economy of agrarian Bihar, it is most likely to be a short-run phenomenon at best. Therefore, to an extent this alliance is able to hold down wages through their influence over state schemes and policies, the reverse tenancy may gather steam and proceed through the *undemocratic path of agrarian transformation*. Their almost successful opposition to any expansion of programmes of employment generation, e.g. food-for-work, MGNREGA, etc., has effectively tried to ensure this. In this context, it is interesting to see the trends of job creation in rural Bihar through the MGNREGA scheme. During the five years from 2014-15 to 2018-19, the number of households *provided with employment* has nearly trebled – rising from 10.4 lakhs to 29.2 lakhs. But if we look at the number of households *obtaining 100 days of employment* as guaranteed under the scheme, it has actually stagnated or declined – from a mere 30 thousand households in 2014-15 to a mere 20 thousand households in 2018-19. Therefore, the

¹¹³ It should be noted that he included plantations in the capitalist sector.

substantial increase in the number of person-days generated under the scheme remains awfully short of meeting the employment generation requirement in rural Bihar.¹¹⁴ This clearly indicates that despite massive demand for rural employment, the government has fallen awfully short of supporting such an employment generation scheme. This may reflect upon the political character of the state. But effective labour mobilisation may still increase the resilience of subsistence peasants in the land lease market despite the state's reluctance to support wage employment programmes.

It is concluded from the above discussion that any *democratic, ethical and politically sustainable* way of resolving the "agrarian question" in a democratic market economy must reduce the land hunger of subsistence peasant households. An exclusive effort to increase the yield levels of the "most dynamic segment" (the middle farmers in the present context) may have an immediate result in the expansion of capitalist farming by the rich/middle peasantry, but it may simultaneously produce misery and destitution in the agrarian economy.

5.4 Conclusion: The limits of reverse tenancy-based explanation in explaining the agrarian transformation

The theoretical explanations illustrated above give a simple expression of the underlying dynamics behind reverse tenancy. The overall growth dynamics, though, have to look at the phenomenon of subsistence farming which is not limited to the lease market. As mentioned in the beginning, there may be subsistence families who are owner peasants and do not lease in any land from the lease market. The number and share of such families are not insignificant. It can very well be asked- what is the relevance of reverse tenancy in determining the overall dynamics of the agrarian economy? Does the power of "land hunger" and "hunger rent" in determining the overall dynamics become doubtful?

Two possible propositions can be made in response to this question within the theoretical framework of the present work. As far as growth dynamics of the agrarian economy are concerned, the overwhelming presence of subsistence peasant households presents a serious challenge to productive accumulation. This challenge is essentially in the form of a lack of any investible surplus. This is either because of poor yield and the rising cost of cultivation in the case of owner peasants or extraction of "hunger rent" in the case of

¹¹⁴ Department of Rural Development, Government of Bihar. Cited from *Economic Survey of Bihar, 2019-20*, Table 8.3, page 283.

tenant peasants. If they are not producing any surplus, the agrarian economy is likely to remain trapped in a "low-level equilibrium" through an overwhelming presence of such subsistence farming. The logic of dynamics of agrarian transformation explained through reverse tenancy or a possible *reversal of reverse tenancy* may very well be applied to owner subsistence peasant families as well. As they may not be able to survive solely on the meagre land ownership, they are also looking forward to non-farm income, which given their resource base, is most likely to be earned by hiring themselves out. The only difference between these two types of subsistence peasant households is likely to be the degree of their *compulsory* involvement in the local labour market as sellers. Operation of their meagre landholding is, like their tenant counterparts, primarily driven by subsistence requirements rather than any profit-making. Though it is true that they are closer to turning into profit-seeking agents, if there is a sustained increase in land productivity of significant order, putting them into a position of surplus producer. Therefore, to the extent they behave similarly to the tenant subsistence peasant families, their presence remains an obstacle to any substantial progress in the agrarian economy.

Second, as they are owners of the land they are operating, they do not have to pay rent to retain land for cultivation, and there is no threat of losing access to land, at least directly. But as in the case of shifting out of the demand curve of profit maximising peasant households may exert "indirect" pressure on them. This pressure will emanate from and will follow the market logic. If the rent offered by the prospective capitalist tenants is high enough, they may be *induced* to lease out their tiny landholdings. If the prospects for non-farm employment are good, they may also consider this option. The difference, therefore, in this case, is that the transformation is likely to follow the democratic path, i.e., they are not likely to go through destitution and forced eviction from cultivation as they are owners of their land. But in the very long run, over a generation or more, they will increasingly be forced to lease in more land to survive as their landholding becomes smaller after divisions and sub-divisions.

But this is not sufficient yet. Once that land is released in the lease market, the capitalist-oriented peasant families have to compete with land-hungry subsistence families to get access to that land. If the degree of land hunger is high, making subsistence peasant families offer higher "hunger rent", the land may still not go to *high yield usage* in the hands of the profit-seeking peasants. But this is unlikely if the change comes in the short run from

increased land hunger. Because non-farm or any wage income is very precarious, a higher degree of land hunger suggests that the owner subsistence families may not like to quit cultivation, given the precarious nature of employment and cash earnings. This is besides a possibly volatile food grain market. But a prolonged agrarian stagnation may further induce the reversal of reverse tenancy by making earlier owners of tiny landholdings competitors in the land lease market as the size of their landholding goes down critically. In this sense, their future is tied closely with their tenant counterparts. Both receive the circumstances of precarious and insecure labour income and the volatility of the food grain market, and both are likely to be guided by desperation to ensure food grain supply through the non-market channel. Therefore, the persistence and perils of subsistence farming of both kinds, the owners as well as the tenants, are explained in the proposed dynamics through exogenously given expected non-farm employment and income.

These *exogenously given* variables – the prospects of non-farm employment, income and agricultural output prices – pose the most serious limit to the theoretical explanation given above. Given the scope of the present work, that limit is not breached here. But the line of argument can easily be extended in a more comprehensive analytical framework where these variables are endogenised. This exercise will necessarily involve the growth dynamics of other sectors of the economy as well as the terms of trade between the agriculture and non-agricultural sector. But the intuition applied here can easily be applied in the extended model to explore further the dynamics of agrarian transformation in a broader macro setting.

Appendix 5.1

Reverse tenancy and the response limit of the subsistence peasants under sharecropping contract

This appendix chapter tries to formalize the dynamics of reverse tenancy under sharecropping contracts in the same way in which it is explained for the fixed cash rent tenancy. Here also, the subsistence peasant families compete with the profit-oriented peasants to get land in the lease market for producing food grain for consumption. As the profit-oriented peasants benefit from yield increases and, therefore, can pay a higher absolute amount of rent per unit of land in kind, the subsistence peasants will have to offer a higher amount per unit of land as well. But their yield level is low and relatively stagnating. Therefore, they can only compete by reducing their crop share to offer an increased amount to the landowner. This reduction in their own share is driven by the same land hunger that is witnessed in the case of fixed cash rent tenancies. However, this reduction is subject to the condition that they can still get enough land to produce enough food grains for their annual requirement. This is also subject to the limit of available land supply in the lease market. Failure to meet any of these conditions will imply that they are driven off the lease market by the prosperous profit-oriented peasants. To an extent they are able to do so, they may be able to stall the progress of reverse tenancy. The present chapter tries to understand these dynamics and their limits as well.

Let y , L and r be the yield level, land area leased in and rental share paid to the landowner, respectively. Subscripts m and s refer to profit-oriented and subsistence peasants, respectively. Let A be the minimum food grain requirement of subsistence families.

1. Condition of food grain requirement: The land leased in by the subsistence peasant families should be able to meet the minimum food grain requirement of the families after paying the landowners their share of the crop. We write it as an equality for simplicity.

$$y_s \cdot L_s (1 - r_s) = A \quad [1]$$

2. Condition of rent requirement: The crop share received by the landowner per unit of land area from the subsistence peasant families should not be lower than what the profit-

oriented peasants would be giving. For the sake of simplicity, an equality condition is assumed.

$$y_s \cdot r_s = y_m \cdot r_m \quad [2]$$

3. Land constraint: Total land leased-in by the subsistence peasants and profit-oriented peasants should not exceed the available supply of land in the lease market.

$$L_s = \bar{L} - L_m \quad [3]$$

It is assumed that r_m is institutionally fixed. This indeed is the case as it is a historical legacy. This does not mean that it is fixed in an absolute sense – it can also change, but it remains conservative. For our purpose, as a simplifying assumption, we take it as given.

The second condition gives us the crop share of the landowners in the case of the subsistence peasants in terms of yield levels and r_m . This is

$$r_s = y_m \cdot r_m / y_s \quad [4]$$

Putting this into first condition [1], we have

$$\begin{aligned} y_s \cdot L_s \left(1 - \frac{y_m \cdot r_m}{y_s}\right) &= A \\ \rightarrow L_s &= \frac{A}{y_s - y_m \cdot r_m} \end{aligned} \quad [5]$$

Further, if the subsistence peasant families are to receive any positive amount of food grain output from the leased-in land, their share has to be greater than zero. Which is to say that

$$r_s \leq 1$$

Substituting [4] in it, we have

$$\begin{aligned} y_m \cdot r_m / y_s &\leq 1 \\ \rightarrow y_m \cdot r_m &\leq y_s \end{aligned} \quad [6]$$

This inequality ensures that $L_s \geq 0$ in condition [5].

But this solution still does not guarantee an equilibrium as it has to satisfy [3] as well. With given values of A, y_m, r_m and y_s , it does not ensure that L_s is not greater than L . Therefore, this equilibrium is subject to [3], and its failure to satisfy it implies that beyond a particular value of y_m , the subsistence peasants cannot find enough land to sustain themselves and, consequently, will be forced to leave. This limit of viable subsistence farming is explored below.

The first limit to consider is the range within which the crop share paid by the subsistence peasants can vary. In the limiting case, it approaches 1. As there is a direct relationship between r_s and y_m , we can find out the maximum yield level of profit-oriented peasants that the subsistence peasants can compete with by increasing r_s . This upper bound can be expressed as

$$\lim_{r_s \rightarrow 1} y_m = y_s / r_m \quad [7]$$

The lower bound is set by virtue of our assumption that

$$y_m \geq y_s \quad [8]$$

The upper and lower bounds in [7] and [8] give us the range of values for L_s .

$$\frac{A}{y_s(1-r_m)} \leq L_s \leq \infty \quad [9]$$

The upper bound in this can be termed as the **universal upper bound** set by the institutionally fixed share of the crop for the profit-oriented peasants. This arises as y_m approaches y_s / r_m . But as described by [3], there is a limited supply of land in the lease market. Given this, the subsistence peasants will face a limit to their capacity to lease in the land, even when they are able to depress their share of crop further to fight off yield increases of profit-oriented peasants. Let us say that at $y_m = \bar{y}_m$, their land requirement reaches the total supply of land in the lease market. At this limit, the crop share that they are offering to the landowner will reach

$$\bar{r}_s = \frac{\bar{y}_m}{y_s} r_m \quad [10]$$

This condition gives us the **local upper bound** set by the land supply limit. Therefore the actual range of adjustment in the land lease market will be between the two following limits:

At the lower bound

$$y_m = y_s, r_s = r_m, L_s = \frac{A}{y_s(1-r_m)}$$

At the upper bound

$$y_m = \bar{y}_m, \bar{r}_s = \frac{\bar{y}_m}{y_s} r_m, L_s = \bar{L} - L_m$$

To understand the available land supply for the subsistence peasants in the land lease market, we need to write the behaviour of $(\bar{L} - L_m)$. Let us say that the demand of the profit-oriented peasants for land is a direct function of the return from the land. Their return is $y_m \cdot (1 - r_m)$ per unit of land area. Let us say their demand is given by

$$L_m = \alpha \cdot y_m (1 - r_m), \text{ where } \alpha > 0. \quad [11]$$

The leftover (effective) supply for subsistence peasants is given by X , which is equal to $(\bar{L} - L_m)$. From [11], we can write for X as

$$X = \bar{L} - \alpha \cdot y_m \cdot (1 - r_m) \quad [12]$$

This is represented by the XX line in the diagram. This captures the effective land supply limit for the subsistence peasants. Expression [12] can be rewritten as an expression for the yield of the profit-oriented peasants, which is measured on the y -axis of the diagram.

$$y_m = \frac{\bar{L}}{\alpha(1-r_m)} - \frac{X}{\alpha(1-r_m)} \quad [13]$$

Thus [13] gives a linear relationship between y_m and leftover supply of land in the lease market for the subsistence peasants, which is $X = (\bar{L} - L_m)$. This is a downward sloping curve with a vertical intercept equal to $\frac{\bar{L}}{\alpha(1-r_m)}$ and the slope $\frac{X}{\alpha(1-r_m)}$. It is clear that the movement of y_m will impact the land lease market in two ways. One, by changing the availability of supply of land in the lease market for the subsistence peasants, which changes because the demand of the profit-oriented peasants changes; and second, by forcing the

former to adjust their crop share to compete with the latter to retain land for subsistence farming.

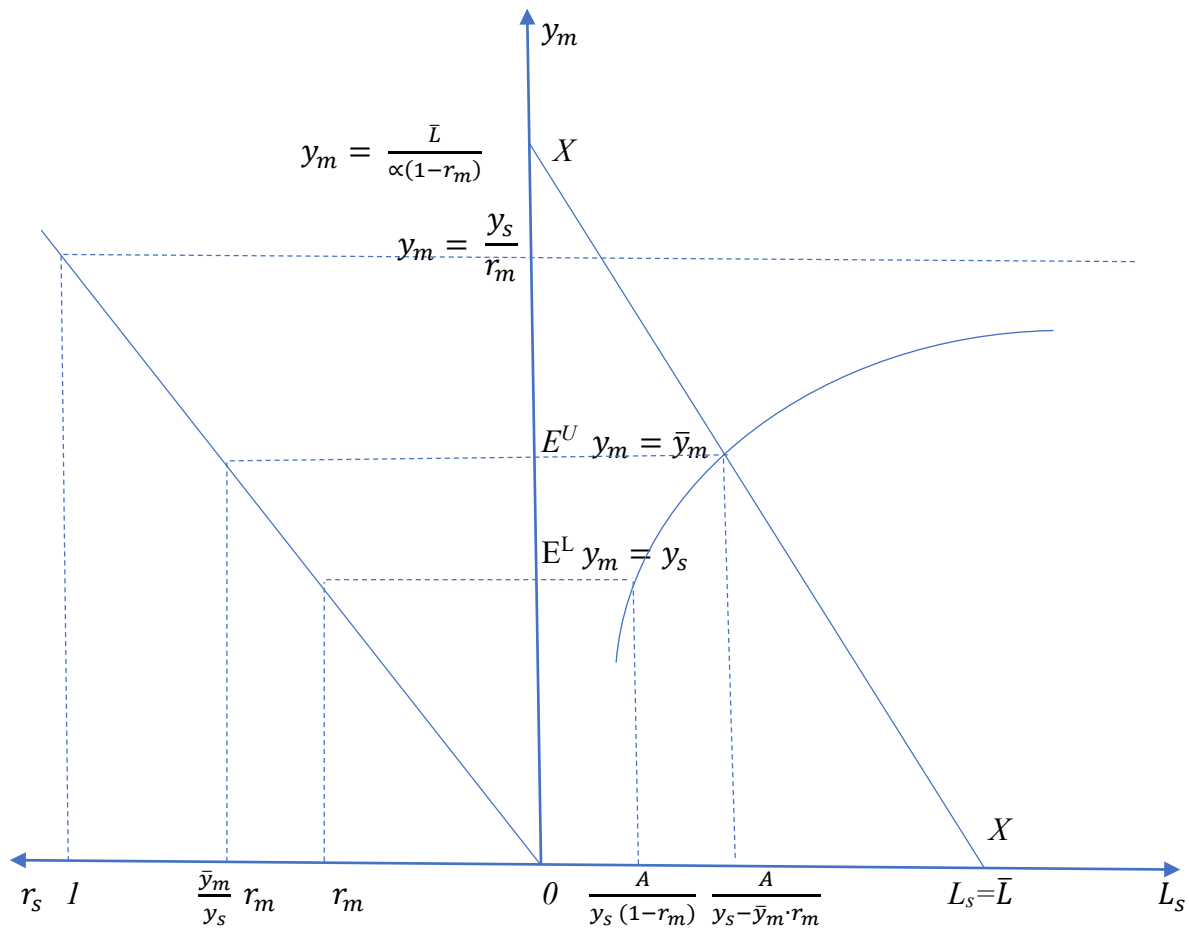


Figure 5A. 1: Reverse tenancy in sharecropping type of land lease market

The first of these will be determined by the demand response factor of profit-oriented peasants, which is captured by α . α itself will have both impacts – intercept effect and slope effect. Intercept effect will be positive, i.e., the bigger is the value of α , the greater will be the value of y_m that will leave no land for the subsistence peasants. But the slope effect will have a negative impact on subsistence peasants. The greater the value of α , the smaller will be the slope (absolute value, disregarding the sign). It means that a greater demand response from the profit-oriented peasants will leave smaller land available for the subsistence peasants. The net impact of a change in α will be decided on the basis of the relative strength of these two mutually opposing forces.

The second way in which a change in y_m affects the land lease market outcome is by adjustment in crop share of the subsistence peasants. Effectively, given the land supply limit, as explained in the previous paragraph, we can see that the only possible range of adjustment is given by a certain range of values of y_m . This range is given by $y_s \leq y_m \leq \bar{y}_m$. We can visualize this adjustment in Figure 5A.1. At the lower bound, the equilibrium is set at E^L , corresponding to $y_m = y_s$. At the upper bound set by the land supply limit, the equilibrium will be at E^U , at which point $y_m = \bar{y}_m$. This is the limit of yield increase that the subsistence peasants can fight off by depressing their crop share, still guaranteeing them some land (at this point, it reaches the maximum limit of X to fulfil their food grain requirement A).

We can find out the maximum value of y_m that the subsistence peasants can withstand given the land supply limit. This can be found at the point of intersection between the two curves in the first quadrant. This point constitutes the equilibrium in the lease market for land and determines the distribution of total available land in the lease market between the two types of peasants. This value of y_m can be derived by equating the demand function for the land of the subsistence peasants given in [5] and the effective supply that they face in the land lease market, which is given in [12]. The demand in [5] can be rewritten as

$$y_m = \frac{y_s}{r_m} - \frac{A}{r_m} \frac{1}{L_s} \quad [14]$$

Equation [13] is the rearranged effective supply function for the subsistence peasants. For the maximum value of y_m , we equate the two. Note that X is nothing but L_s from [3]. By using this substitution from [3], the effective supply function can be written as

$$y_m = \frac{\bar{L}}{\alpha(1-r_m)} - \frac{1}{\alpha(1-r_m)} L_s \quad [15]$$

[14] and [15] can be solved for L_s . If we equate the two, we get

$$r_m L_s^2 + [\alpha(1-r_m)y_s - r_m \bar{L}] L_s - A\alpha(1-r_m) = 0 \quad [16]$$

This is quadratic in L_s and has two roots. The roots are real because

$$[\alpha(1-r_m)y_s - r_m \bar{L}]^2 + 4r_m A\alpha(1-r_m) > 0$$

This is guaranteed by the fact that r_m is a fraction lying between $0 \leq r_m \leq 1$. Further, the term $-(-4 \cdot r_m \cdot A\alpha(1-r_m))$ is positive. This implies

$$\sqrt{[\alpha(1-r_m)y_s - r_m \bar{L}]^2 + 4r_m A\alpha(1-r_m)} > [\alpha(1-r_m)y_s - r_m \bar{L}] \quad [17]$$

This ensures that the larger root lies in the first quadrant and is positive. This also implies $L_s > 0$. Substituting this value of L_s in [14] will give the maximum value of y_m that will exhaust the land supply in the lease market. It should also be noted that this is the equilibrium in the land lease market. The equilibrium depends on the value of α as mentioned above. A change in α (which captures the demand response of the profit-oriented peasants) shifts the effective supply curve for the subsistence peasants and, consequently, their fortunes in the lease market.

This exposition can be used to understand the variations that are found within the sharecropping contracts. The adjustment in the real world may take many possible ways, not necessarily only through the crop share. It may reflect in different forms of cost-sharing as well. There may be different sharecropping arrangements in terms of different cost-sharing arrangements while the share of the crop remains the same. If we start from a benchmark arrangement of crop-sharing and cost-sharing and allow cost-sharing to change while crop sharing remains unchanged, the changed arrangements can still be expressed as different crop-sharing arrangements. This is possible if monetary conversions are feasible, i.e., if the monetary value of inputs (explicit or imputed) can be expressed in terms of the value of output. The advantage of the above explanation lies in its ability to explain the variations through variation in the yield level. If the yield level of subsistence peasants is increased by using purchased yield-raising inputs, there can be different forms of cost-sharing (that would essentially capture the change in crop sharing in a different way) that can still provide the subsistence peasant families with the land.

CHAPTER SIX

Irrigation and its Control

The provision of irrigation historically has mainly been public in nature. Beginning from the great empires of antiquity, judicious rulers tried to create irrigation systems to ensure water supply for crops to an extent possible with the geographical specificity, water resources, and the existing technical knowledge. Many empires' survival depended on their ability to harness water resources for cultivation. Given the centrality of agricultural practice and reliance on agricultural surplus for survival and growth, this remained a concern throughout history. The colonial administrators of late-nineteenth-century India also realised the importance of having developed irrigation. With the growing importance of the worldwide food grain trade in the second half of the nineteenth century and the possibility of benefitting from it, given the colonial subjugation of the Indian economy, the British developed an elaborate canal irrigation system. It is also true that by the late colonial period, the twentieth century witnessed a decline in the irrigation infrastructure due to the British's declining interest in the food grain trade involving India. For this reason, on the eve of independence, India largely inherited a much-depleted canal irrigation infrastructure, besides other traditional sources of irrigation (in the case of Bihar, these included wells, ponds and the *aahar-payin* system). The importance of a well-maintained irrigation infrastructure today cannot be overemphasised in achieving and sustaining a high growth rate of agricultural output.

It would be useful to recall the recent pattern of agricultural growth in Bihar as presented in Chapter 2. The recent trends clearly indicate that given the cereal-dominated cropping pattern in the state, when wheat appears to be losing steam, it is essentially paddy production, through yield improvements, that has taken the dynamic role. It is also noted that over many decades, within paddy cultivation, it is the *agahani* variety that has increasingly replaced all other varieties. It is commonly accepted that the reason behind the loss of the *garma* variety of rice was on account of erratic and uncertain irrigation. Given the dependence of *agahani* rice on assured irrigation and timely drainage, the state government's failure to control the menace of flooding during the monsoon season appears to be limiting the potential of any irrigation expansion and yield improvement. Further, the other two crops

(groups) that have shown some dynamism in recent years are fruits and vegetables and sugarcane. Both require controlled irrigation and drainage. It is necessary to guarantee the water condition needed for paddy, sugarcane, vegetables, and fruits to sustain the recent agricultural growth.

Based on the foregoing discussion and abundant empirical evidence, there is no need to further test the same hypotheses as done by Boyce. Studies cutting across particular perspectives and methodologies have accepted that irrigation expansion, its coverage and its intensity remain the principal way to raise land productivity.¹¹⁵ Therefore, it is assumed in the present study that irrigation constitutes a binding constraint and holds the key to the further growth of agricultural production in Bihar. Our main focus will be the institutional context in which the extension of irrigation takes place. Since irrigation is the key input in the production process, production relations between those who own and control this particular input and those who are dependent on the former assume significance. This will have crucial implications for growth as well as differentiation of peasantry. This is what is discussed below.

6.1 Irrigation expansion in Bihar: Context and extent

The initial efforts to increase agricultural output were through more intensive and judicious use of these sources of irrigation. But very soon, the limit to irrigation expansion through these means became evident. The constraints on financial resources also prohibited massive investment in canal irrigation. Most of the public expenditure was directed toward reviving and maintaining the existing canal systems. There were much fewer real efforts to create new canals. In the devastating experience of the years 1967 and 1968, all governments became very desperate to increase land productivity. It is now a matter of common knowledge that the central as well as state governments adopted the "New Agricultural Strategy", better known as the Green Revolution technology. It was based on much intensive use of modern inputs (seed-fertiliser technique), which in turn required an assured and controlled supply of moisture. Given the existing limits to surface water-based irrigation systems, the focus shifted to groundwater sources for the success of the new strategy, given its dependence on controlled and assured irrigation.

¹¹⁵ NCAER (2019), Government of Bihar (2015), Kishore (2004), World Bank (2007), and Hoda, Rajkhowa & Gulati (2017) are some of the recent works highlighting the same despite differences in their perspectives.

Diffusion of Green Revolution technology to other parts of the country, including Bihar, has also demonstrated that the claim of irrigation as the binding technological constraint appears quite visible by the beginning of the 1990s. The application of HYV seeds is closely associated with irrigation.¹¹⁶ If we look at the state's two most important food grains, wheat and *agahani* rice, the application of HYV seems to be heavily dependent upon irrigation. More than 94 per cent of the area under HYV wheat and more than 70 per cent of the area under HYV *agahani* rice was irrigated in 1993-94.¹¹⁷ Irrigation also appears to increase the degree of association between other inputs constituting the Green Revolution technology. The application of chemical fertilisers and pesticides appears to be concentrated over the area under HYV, and this concentration is higher if the area is irrigated.¹¹⁸ It also appears that the yield level of different crops is also strongly correlated with irrigation. This correlation between irrigation and the use of other modern inputs has been a constant feature of cultivation practices to date.¹¹⁹

It immediately became a favoured policy choice for governments for many reasons.¹²⁰ It was much easier to create and maintain. The capital and revenue expenditures involved are much less than that in the case of canal irrigation. It took much less time to create this, reducing the long gestation period associated with canal irrigation. Given the geographical benefit of the Gangetic river basin having a good water table, it appeared quite attractive to sustain irrigation expansion in the future. The expansion of groundwater irrigation started appearing much more prominently in the government's major and minor irrigation projects. However, the experience shows that the growth of groundwater-based irrigation, harnessed through deep and shallow tube wells, remained slow till 1980. By 1980-81 tube wells could account for a little over one-fourth of gross irrigated area in the state, which was very close to the share of 'other sources' of irrigation. Canals remained the largest source irrigating 40 per cent of the gross irrigated area (Sharma, 1987, p. 202). The renewed focus on reviving public expenditure in the agricultural sector did see a turnaround after 1980. That is precisely the

116 Out of 52,40,240 hectares of the total area under HYV, the land area of 34,22,992 hectares was under irrigation, and out of 41,03,338 hectares of total irrigated area, more than five-sixths was under HYV (*Input Survey, Agricultural Census of Bihar, 1991-92*).

117 *Cropwise and Districtwise Estimates of Area and Production of Different Crops*, Directorate of Statistics and Evaluation, Govt. of Bihar.

118 Source: *Op. cit.*

119 The field survey by the researcher has also strengthened this impression. An inability to ensure adequate water to crops leading to a reduced and sub-optimal application of fertilisers is widely observed.

120 Sengupta (1987) and Sharma (1987), among others, have noted these in the context of Bihar.

period that saw the spread of Green Revolution technology to other parts of the country from the North-Western part, where it remained confined till then.

However, a closer look reveals that the benefit and turnaround that was witnessed in some other states like West Bengal or Uttar Pradesh was not seen in the case of Bihar post-1980. The way input intensification could succeed in these two states was seen to be absent in Bihar. It is also noticeable that West Bengal and Uttar Pradesh were able to achieve this in varying contexts. Whereas the state of West Bengal relied heavily on institutional restructuring in the form of tenancy reforms (*Operation Barga*), ensuring the security of tenure and rent regulation, Uttar Pradesh relied mainly on the consolidation of holdings to facilitate more input-intensive farming. These two different cases suggest that there can be multiple facilitative contexts in which such input intensification through private means could take place. The lessons from this experience could be deployed to understand the dynamics of irrigation expansion, primarily through shallow tube wells, in the state of Bihar as well.

While the governments created the deep tube wells, shallow tube wells largely remained privately owned and operated. In the case of the former, public investment was direct. In the latter's case, it was spent mainly on subsidising the installation of shallow tube wells. From the beginning, it was also evident that this mode of providing irrigation through shallow tube wells would remain private. The presumption behind such a move was that this way would be superior to the public provision of irrigation, mainly through canal irrigation (and to some extent, also superior to government-owned deep tube wells). It was assumed that it would be cost-effective and more efficient in providing irrigation, resulting in higher yield returns per unit of cost of irrigation. From the literature on agrarian structure, one should be mindful that a given agrarian set-up may or may not be encouraging to use such opportunities created through markets or government initiatives. Further, the use of this facility could be manipulated to appropriate surplus in a way that is either counter to productivity growth or to an equitable distribution of gains, or both.

It has been noticed from a reading of rich literature around the issue of efficacy and efficiency of expansion of irrigation cover that whatever the mode may be - groundwater or surface water, canal irrigation or tube-well irrigation - there may be structural problems involved. This is irrespective of whether one attempts to expand yields through the public or private provision of irrigation facilities. Many problems in private financing of irrigation arise due to indivisibility and lumpy investment. Public provision of irrigation can help tide

over the initial difficulty of installing it, but the problem persists at an operational level. Labour-intensive techniques of developing irrigation cover through canals, ponds or reservoirs are expected to be more suited to the rural economy. But many structural problems make the construction and operation of such facilities largely underutilised. Voluntary labour mobilisation for this purpose is made impossible because the potential labour contributors may not be the potential beneficiaries. Even cooperation among richer farmers is challenging due to the 'free-rider' problem. Price and cost structures can also make capital (machine) intensive methods more attractive. Further, the question of profitable investment in agriculture itself will pose serious hurdles given that it has to compete with more lucrative alternatives to this productive investment. Lastly, but very importantly, the political consequences of a large labour mobilisation are seen as a veiled threat posed by labour to the existing power structures. These factors are already discussed by Boyce (1987). Government financing of irrigation facilities, as mentioned above, can overcome the initial hurdle. However, due to the possibility of siphoning off investible resources through corruption, a great degree of underutilisation of these facilities will still exist. At the operational level, however, problems of large-scale inefficiency may still exist due mainly to the unequal agrarian structure.

The capital-intensive techniques solve some of these problems but cannot overcome the problems posed by unequal agrarian structure. It has been found that the threshold size of individual farms for tube wells, deep or shallow, is large enough to exclude a large number of holdings of smaller size. The threshold size depends on the cost of tube wells, wherein subsidies and interest rates play an important role. It also depends on the number of parcels per holding and their spatial distribution. One study has found that, in the case of shallow tube wells, the threshold size of individual holdings increases as one moves from west to east, increasing from 1.4 acres in Punjab and Haryana to 19.4 acres in West Bengal (Dhawan, 1977). With a reduction in subsidies, it is expected that this will increase further. Thus even in the case of shallow tube wells, it appears that installation of these is not viable for a large majority of operational holdings unless the state's support reduces this threshold (for example, by increasing subsidies) or institutional reforms make it more attractive.

This problem of a 'high' threshold further gets compounded if one looks at a very high degree of parcellization of landholdings in Bihar. Without any successful drive towards land consolidation, each landholding is spatially dispersed widely, making the installation of tube

wells even more problematic. Table 6.1 shows that the area per parcel is just about one-fifth of a hectare (roughly 16 *katthas*, in local parlance) on average for more than 96 per cent of all operational holdings and 76 per cent of all area operated. The area per parcel exceeds half a hectare only for the operational holdings of 4 hectares or more. Given the tiny size of parcels and their spatial dispersal, purchased irrigation is likely to remain the only viable alternative for an overwhelming majority of cultivators. The dynamics of water markets will remain crucial for the prospects of efficient and effective irrigation.

Table 6. 1: Degree of parcellization and distribution of number and area of operational holdings by size classes of operational holdings in Bihar

Size-class of operational holding (ha)	avg. area operated (used for agri. Activities) per holding (ha)	Average number of parcels per holding	Average area operated per parcel (ha)	% distribution of holdings	% distribution of area operated
Nil	0.000	0	0.000	0.00	0.00
0.000 & ?0.002	0.000	0	0.000	0.00	0.00
0.002-0.005	0.001	1	0.001	0.80	0.00
0.005-0.040	0.007	1	0.007	11.80	0.18
0.040-0.500	0.177	2	0.089	53.70	19.87
0.500-1.000	0.722	5	0.144	20.20	30.45
1.000-2.000	1.223	6	0.204	9.80	25.11
2.000-3.000	2.248	6	0.375	2.40	11.39
3.000-4.000	3.339	8	0.417	0.60	3.98
4.000-5.000	4.232	7	0.605	0.20	2.02
5.000-7.500	5.578	6	0.930	0.30	3.32
7.500-10.00	8.523	7	1.218	0.20	3.00
10.00-20.00	11.222	5	2.244	0.00	0.19
>20.00	23.001	11	2.091	0.00	0.46
All sizes	0.478	3	0.159	100.00	100.00

Source: NSS 70th Round, Report No. 571, Appendix Table 13, page A578.

Further, the experience of irrigation expansion in Bihar through tube wells also warns against any simplistic reading of the suitability of a given mode of irrigation. Despite appearing to be superior to any other mode, privately owned shallow tube wells' efficiency remained curtailed for other reasons. The initial operation of these tube wells was mainly based on electricity-run lifting machines. Given the erratic supply of electricity very soon, two deviations were noted. First, given the scarcity of electricity, the cultivators resorted to 'overcapitalisation' by increasing the load of electricity-run lifting devices to corner as much water as possible in a short period (reduced pumping hours on account of erratic supply of

electricity). This led to the installation of larger tube wells (Sharma, 1987). This practice continues as we see that three fourth of all shallow tube wells run on pumps having 4 to 6 horsepower despite the fact that almost no tube well goes deeper than 35 meters under the ground.¹²¹ This would undoubtedly have grave consequences for the relatively poorer landholders unable to finance this new requirement of machinery. Second, the persistent electricity supply problem soon forced cultivators to go for diesel-run lifting devices. "Dieselisation" of irrigation further compounded the tendency visible with 'over capitalisation' (Sharma, 1987). Not only did it require capital expenditure during installation, but it also required current expenditures to be incurred in cash. Cash-strapped peasantry would face another serious impediment to their efforts of increasing irrigation cover. This remains one of the most significant constraints in expanding controlled irrigation. The said constraint is also evident from the fact that pumping machines running solely on diesel are used in 72 per cent of all shallow tube wells, and another 20 per cent use both diesel and electricity. Electricity as the sole source of power account for only 6 per cent of cases.¹²² The lack of reliable electricity also affects the use of efficient lift pumps. Submersible pumps, which are more efficient than centrifugal pumps, account for only about 6 per cent of all lift pumps. Without a reliable electricity supply, 77 per cent of tube wells run exclusively with centrifugal pumps.¹²³ Of all the tube wells facing constraints in utilising potential, 39 per cent are constrained by the non-availability of power.¹²⁴

Despite these limitations, the number of tube wells has increased substantially, though the average area irrigated per tube well has gone down. This trend was, however, already visible during the decade of 1970s and 1980s (Sharma, 1987, p. 207). However, these observations raise certain questions. First, how do we explain this contradictory development? How has the structural constraint been overcome? Joint ownership can help, but the problems mentioned above (free-rider problems, resource capture problems, etc.) may still hold back the realisation of potential in the absence of institutional mechanisms to solve these. At the operational level also, similar problems crop up. Markets can provide an institutional solution to it by transferring land to the 'water lords'. But the imperfection in the water market generating imperfections in the land market may also prohibit this. The historical experience does not find this happening in the case of Bihar at any significant scale.

¹²¹ *Report of 5th Census of Minor Irrigation Schemes*, Table 2.13, p. 178. The reference year for the 5th Census is 2013-14.

¹²² *Report of 5th Census of Minor Irrigation Schemes*, Table 2.12, p. 177.

¹²³ *Report of 5th Census of Minor Irrigation Schemes*, Table 2.11, p. 175.

¹²⁴ *Report of 5th Census of Minor Irrigation Schemes*, Table 2.19, p. 198.

A more plausible answer could be large expenditures made by the government in subsidising the installation of shallow tube wells.¹²⁵ The financial assistance from the state to the desperate peasants - marginal and near-landless - has resulted in a significant expansion of tube well irrigation over decades, particularly after 1980. The question of efficiency, however, remains. Shallow tube wells have been more efficient than deep tube wells in terms of cost per hectare based on their discharge differentials. But, other structural features, including the high degree of parcellization of landholdings, render the efficiency level much below its potential. The typical 'tail-end' problems associated with canal irrigation also appear in the case of shallow tube wells, making access to water either difficult and uncertain or prohibitively costly for a vast majority. Eighty-seven per cent of all the shallow tube wells use a surface pipe to take water to the field. Another 11 per cent use a *kutchra* channel, which is a highly inefficient mode of transporting water.¹²⁶ Given the weather and rough terrain, these pipes need frequent replacement, adding substantial costs to cultivation. Therefore, with a high degree of parcellization, even when water is drawn relatively easily from under the ground, taking it to the field remains either costly or inefficient.

Overall it is clear that irrigation is essentially through shallow tube wells currently. The share of the gross irrigated area by tube wells has hovered between 63 to 66 per cent during 2011-12 and 2017-18, with a slight decline towards the last years. The share of canals in the gross irrigated area has been between 28 to 30 per cent during this period. The rest, 3 to 4 per cent, is accounted for by other sources.¹²⁷ This observation suggests that the area irrigated through tube wells is also reaching a plateau, and it is ceasing to be a source of the increasing area under irrigation. However, this does not mean that there is no increase in the number of tube wells installed. An increase in the number of tube wells could still happen for two reasons. One, there could be replacement of the old by new. Two, if the area irrigated per tube well goes down, there could be a constant area irrigated with a growing number of tube wells. The second possibility cannot be much off the mark as the tendency of a falling area irrigated per tube well is already noticed. This could be because of groundwater depletion or the fragmentation of holdings, or both. The increase in the gross irrigated area has been modest during this period – growing only at a compound annual growth rate of 0.61 per cent. Growth in irrigation cover has also been moderate during this period. The ratio of the gross

¹²⁵ The most ambitious programme to expand irrigation has been the Million Shallow Tube wells Scheme run by the government.

¹²⁶ *Report of 5th Census of Minor Irrigation Schemes*, Table 2.10, p. 174.

¹²⁷ Source: *Directorate of Economics and Statistics*, Government of Bihar, cf. *Bihar Economic Survey 2019-20*, p. 108.

irrigated area to the gross cropped area has increased from 67.45 per cent in 2011-12 to 71.94 in 2017-18.¹²⁸ It should be noted that this entire increase in the ratio is not due to an increase in the irrigated area but also due to a moderate decline in the gross cropped area. This observation appears to be supporting the impression that irrigation expansion is reaching a plateau in the state.

Even intensive use of groundwater through tube wells can have crucial implications for other modes of irrigation and consequent differentiation of peasantry dependent on surface water sources (Bhardwaj, 1990). A fall in water tables (and there is evidence of the declining tendency of the water tables) leaves these other modes less efficient or even completely useless. If it is said that canal irrigation has proved inefficient and unreliable, resulting in 'opting-out' of it to tube-well mode (Wood, 1995), one still has to answer why other forms were not attempted.¹²⁹ This question must be examined in the context of the predatory behaviour of larger farmers.

Over time, the gradual collapse of canal irrigation has made peasants more dependent on other sources of irrigation, notably on groundwater sources made available through tube wells. Even where canal irrigation is available, it is proving unreliable, particularly in the lower reaches of the canals. In this situation, even the water available through canals is used through diesel-run pumping sets. As noted above, if we look at the state's figures, it appears that the most important source of irrigation is tube-wells, though canal irrigation remains an important source. The share of the area irrigated by tube wells is higher than that of canals, and the difference is higher if we take the gross irrigated area than the net irrigated area.¹³⁰ This observation reflects that increase in the intensity of irrigation depends more on tube wells. This conclusion and the fact that there may be a positive relationship between gross area expansion and irrigation intensity make irrigation through tube wells a crucial variable determining production.

Suppose there is a very high degree of inequality in the ownership of farm implements, including tube wells and pump sets. In that case, there may be crucial implications for the growth pattern and further differentiation of the peasantry. The

¹²⁸ Source: *Ibid.*

¹²⁹ This question was one of the important concerns of many commentators on agrarian Bihar during the 1980s and 1990s. Sengupta (1987) is one such example, among many others.

¹³⁰ Source: Net Area Irrigated and Gross Area Irrigated by Source, *Indian Agricultural Statistics*, Vol. II, different years.

differentiating impact may be further accentuated by the fact that tube wells can only be used with another purchased input, diesel, with an almost total collapse of a reliable electricity supply system. If irrigation holds the key to growth, and private financing of irrigation is increasingly becoming critical with the gradually but steadily diminishing canal irrigation facilities, which are primarily state-owned, the pattern of ownership of this input will determine the nature of growth as the owners of this input will have control over the process of production.

6.2 Irrigation and differentiation: Questions to explore

Relating this to some of the theoretical formulations discussed before, we can have different possible outcomes. It can be expected that if the sellers of irrigation facilities are also cultivating households, then the surplus earned by selling this can be ploughed back into agriculture. But if the owners are not cultivating households and their primary interest lies in trade or money lending, the surplus thus appropriated will most likely be siphoned off from agriculture. Evidence of such owners can be found.¹³¹ A field study from Bihar has found a large-scale surplus transfer from the buyers of water to water sellers through monopoly control in the water market (Shah & Ballabh, 1997). This has grave consequences as far as the distribution of income is concerned. Though the authors conclude that despite this distributive injustice, it has no negative impact on output expansion.¹³²

Though the secondary sources of data do not reflect any significant extent of interlinkages, and despite the commonly held perception that such incidences have declined greatly, they can resurface in the most unexpected of manners. A study from Karnataka has exactly confirmed this. While illustrating a process of privatisation of public resources (canal water), it has been demonstrated that the owners of pump sets did link transactions in the water market with the transaction in other markets to appropriate a part of the surplus produced by mainly small and marginal peasants. This has also aggravated poverty in such villages (Prasad, 2002).

131 NSS Reports also show that there is a small number of households who own pump sets but do not operate any land.

132 "Pump irrigation markets have emerged serving virtually as the sole powerhouse energising north Bihar's new-found agrarian dynamism...

"The distributive impact of monopoly water pricing was significant, but the productive impact was not. The marginal product of irrigation was so much larger than the price of pump irrigation that buyers were unmindful of the high price they were paying." (Shah & Ballabh, 1997, pp. A-188-89).

The relation between the polarised agrarian structure and irrigation expansion can be viewed alternatively by comparing the contrasting regions of Bihar. The areas of South-western Gangetic plain in Bihar, particularly Bhojpur, Buxar, Rohtas, Bhabhua, Gaya, Aurangabad and Jehanabad districts, traditionally have been relatively better canal irrigated areas (covered under Sone Command Area) than some other parts of the North Gangetic belt (flood-prone). One can be tempted to explore the possibility of a positive relationship between the better irrigation cover in this region and the agrarian structure obtained herein. But it is not that simple. It can be questioned both on the grounds of empirical as well as analytical validity. It indeed fares relatively better as compared to other parts, but it appears that it is still way behind in terms of the availability of ideal water conditions. Further, the agrarian scene of Central Bihar stands out both regarding the growth and the agrarian structure. The relatively equal distribution of socio-economic power in this region is a result of a strong and militant peasant movement (Das, 1983). This aspect raises a rather peculiar question. This paradoxical result was visualised by Bhaduri et al. (1986). In circumstances of relatively equal distribution of economic and social power, the structural backwardness will be reinforced, as the manipulability of the distributive shares in favour of rural elites can be effectively resisted. This scenario does not appear to be the case in this region today. The alternative explanation was that even in such circumstances, state intervention could break the critical barrier. But looking at the trends in government expenditure, there is little evidence that the deadlock has been broken by the state. Then what explains the relative prosperity of Central Bihar's agriculture? It is easier to say that the framework of analysis that anticipated such a result does not have descriptive validity and, therefore, the result does not hold. This is to say that the in-built depressor is not working to hinder growth (Athreya et al., 1990; Harriss, 1992), and certain factors causing specific conjuncture explain more of this growth phenomenon. But this explanation raises more questions than it answers, for one of the most critical conjunctural factors responsible for rapid growth was once again state intervention.

It would be useful to explore the key to this puzzle in another way in which the agrarian economy is exposed to the external world, i.e. its linkages with the latter through output, input and, most importantly, labour markets. In one of the emerging scholarship around this issue, the contrasting cases of two villages have been analysed wherein such connections, mainly through labour markets, play crucial roles in the evolution of the agrarian economy (Datta et al., 2014). The recent crisis that Bihar's agriculture faces, where

farm prices have crashed with government procurement extremely patchy, also points to another linkage affecting farm profitability and growth.

There can be another possibility and another way of looking into the relationship between irrigation expansion and institutional manoeuvring. If resources needed for irrigation are mobilised through some sort of cooperative organisation, then the negative implications associated with some other forms of organisation can be warded off. However, this can happen under certain conditions relating to land distribution and other resources. Relative equality in distribution is more conducive to generating viable cooperative forms because of lesser chances of occurrence of 'resource capture'. Such cooperative formations exist in agrarian Bihar, though they may initially result from caste or community ties. However, the extent of such cooperative organisation among the very small and marginal peasants can be extremely limited, given their precarious resource position and inability to get institutional credit. Middle peasants have better potential in this regard.

The above discussion regarding the extent and nature of irrigation coverage in Bihar poses important questions that demand focused attention. Given the centrality of this crucial input in achieving productivity growth, the nature of exercising control over this input has severe implications for the prospects of agricultural development. From our observations in the preceding section, the following questions turn out to be crucial to our understanding of agrarian dynamics:

- (i) What are the forms and sources of provision of irrigation in agrarian Bihar, and how do they vary across different groups of cultivators?
- (ii) How is the cost of irrigation met?
- (iii) Which groups of cultivators are leading in achieving higher irrigation coverage?
- (iv) What is the nature of the market involvement of cultivators in the water market?
- (v) How are prices in water markets formed, and how do different groups of cultivators respond to it?

The findings in this regard can be used to evaluate the existing theoretical formulations critically and to understand the dynamics of the current agrarian economy of Bihar regarding irrigation expansion. It is expected that answers to these questions will throw light on the future prospects of growth and the nature of this growth in terms of its impact on the process of differentiation.

6.3 Irrigation and differentiation: Evidence from secondary sources

Before examining the pattern and the extent of irrigation in Bihar, it is necessary to consider the divergent trends shown in different data sources. The two data sources used in this study - the NSS reports from the 70th Round, and the Agricultural Census reports for 2010-11 - present substantially different extents of irrigation in the state. *Minor Irrigation Survey Report* (with the reference year 2013-14) published by the Ministry of Water Resources is yet another source. It also has a divergent set of data contained in it. The data presented in the agricultural census will be relied on mainly to ensure consistency. It also contains the most comprehensive information on farming households unless mentioned otherwise.¹³³

Table 6. 2: Irrigation status of operational holdings by size-classes

Size-class	Wholly irrigated		Wholly unirrigated		Partially irrigated				Receiving irrigation	
	Number	Area	Number	Area	Number	Total area	Irrigated area	Per cent of irrigated	Number	Area
Below 0.5	52.50	53.15	42.40	41.52	5.10	5.33	3.45	64.73	57.60	56.60
0.5 - 1.0	51.97	51.81	39.63	40.12	8.40	8.07	5.32	65.90	60.37	57.13
Marginal	52.40	52.53	41.89	40.87	5.71	6.60	4.32	65.40	58.11	56.85
1.0 - 2.0	50.95	51.87	39.07	38.68	9.99	9.45	6.40	67.74	60.93	58.27
Small	50.95	51.87	39.07	38.68	9.99	9.45	6.40	67.74	60.93	58.27
2.0 - 3.0	51.19	52.26	36.67	36.57	12.14	11.17	7.36	65.89	63.33	59.62
3.0 - 4.0	53.64	54.71	34.09	34.21	12.27	11.08	7.27	65.59	65.91	61.98
Semi-medium	51.92	53.19	35.90	35.67	12.18	11.14	7.33	65.77	64.10	60.52
4.0 - 5.0	51.84	52.63	35.03	35.29	13.13	12.07	7.92	65.58	64.97	60.55
5.0 - 7.5	50.03	52.09	34.33	34.01	15.64	13.90	9.37	67.38	65.67	61.46
7.5 - 10.0	58.14	59.60	31.46	31.22	10.40	9.18	5.89	64.14	68.54	65.49
Medium	51.90	53.48	34.51	34.28	13.60	12.23	8.08	66.08	65.49	61.57
10.0 - 20.0	55.89	56.92	34.20	34.22	9.91	8.87	5.95	67.15	65.80	62.87
20.0 & ABOVE	27.01	29.97	71.53	68.84	1.46	1.19	0.57	47.56	28.47	30.54
Large	52.45	50.64	38.65	42.28	8.90	7.08	4.70	66.38	61.35	55.34
All classes	52.30	52.56	41.53	39.19	6.17	8.24	5.44	66.05	58.47	58.01

Source: Calculated from Agricultural Census 2010-11, TABLE 4: Estimated Number of Operational Holdings by Size Classes and Irrigation Status, State: Bihar.

Table 6.2 presents an overview of the irrigation status of operational holdings in Bihar for the year 2010-11. A little more than half of all the operational holdings and the operated area are wholly irrigated. Roughly 40 per cent of the holdings and the area are entirely

¹³³ All the data is collected from the website <https://agcensus.dacnet.nic.in/StateCharacteristic.aspx> of the Agricultural Census of India, and calculations were made afterwards. The NSS data is from *Report No. 571: Household Ownership and Operational Holdings in India*, Table 27, p. A 1521.

unirrigated. The remaining area is only partially irrigated. Overall, 58 per cent of the entire area operated gets irrigation. Of the partially irrigated holdings, two-thirds of the area receive irrigation. A comparison with the state of irrigation twenty years back tells that there is a significant improvement in terms of irrigation coverage. Only 20 per cent of the operational holdings and 18 per cent of the operated area were fully irrigated in 1990-91. The share of both increased to more than 52 per cent in 2010-11.¹³⁴

With an increase in irrigation cover, two observations need to be stated. First, the inter-class disparity between operational holdings in their status has narrowed down considerably. Except for the largest size-class of holdings of 20 hectares and above, the irrigation cover measured in terms of percentage of the area receiving irrigation varies roughly between 56 to 66 per cent. The extent of disparity is approximately the same when looking at the number of holdings. The disparity for the wholly irrigated holdings in the year 1990-91 was between 10 and 26 per cent for the number of operational holdings and between 8 to 21 per cent for the operated area. Second, the decline in the degree of disparity is also associated with a reversal of the pattern of disparity. There used to be a negative relationship between the size-class of holdings and the percentage of wholly irrigated area in 1990-91. This has reversed in the year 2010-11. Except for the largest size-class, the said relationship has become positive – bigger size-classes have a higher percentage of area fully irrigated. To sum it up, not only the irrigation coverage has improved substantially, but it has also shown a greater degree of uniformity between different size classes. Within the limited disparity it reflects, bigger size classes fare better than the smaller ones except for the largest holdings of 10 hectares and above.

The relative superiority of bigger holdings is far more clearly reflected in Table 6.3. The shares of the net and the gross area irrigated in the net and the gross area cropped, respectively, show a rising trend with the growing size-classes. This is in contrast with the much-talked-about 'inverted-U' shape of the curve depicting the relationship between the size- class of the holdings and irrigation coverage (Kishore, 2004; Sangwan, 1987). The situation in 1990-91 was somewhat similar to the said pattern, even when the 'bulge' in the middle was very small.¹³⁵ However, cropping and irrigation intensity have been recorded as

¹³⁴ The data for the year 1990-91 is taken and calculated from the respective tables given in the Agricultural Census for the state of Bihar, 1990-91.

¹³⁵ The researcher found out that the operational holdings of 3 to 4 hectares recorded the highest percentage of the irrigated area in the gross cropped area at 37.75 per cent, as noted in the Agricultural Census of 1990-91. The classes above and below this size had a smaller percentage of irrigated area.

the highest for the marginal holdings in recent years. But the larger holdings' advantage is again reflected in their better capacity to irrigate multiple crops grown. The last two columns capture this aspect.¹³⁶ When more than one crop is grown in any area, larger holdings water multiple crops better than the smaller ones. The loss of position of middle-sized holdings and increasing superiority of larger holdings is visible in Figure 6.1.

Table 6. 3: Irrigation intensity (overall and under multiple cropping) for each size class of operational holding

Size-class	In per cent				Irrigation under multiple cropping	
	NIA/NSA	GIA/GCA	GIA/NIA	GCA/NSA	Two crops grown	More than two crops grown
					Area under both crops irrigated/Total irrigated area	Area under 2 or more crops irrigated/total irrigated area
Marginal	56.74	61.96	152.17	139.35	88.82	86.55
Small	59.94	62.20	136.70	131.73	86.41	94.86
Semi-medium	60.97	62.89	136.69	132.53	87.53	91.06
Medium	59.53	63.37	141.30	132.72	91.72	99.02
Large	64.10	70.76	149.50	135.44	94.39	100.00
All groups	58.21	62.28	145.98	136.45	88.46	88.59

Source: Calculated from Input Survey 2010-11, State Bihar, TABLE 1A. Data downloaded from the official website <https://inputsurvey.dacnet.nic.in/statetables.aspx>
Note: NIA: Net irrigated area, GIA: Gross irrigated area, NSA: Net sown area, GCA: Gross cropped area

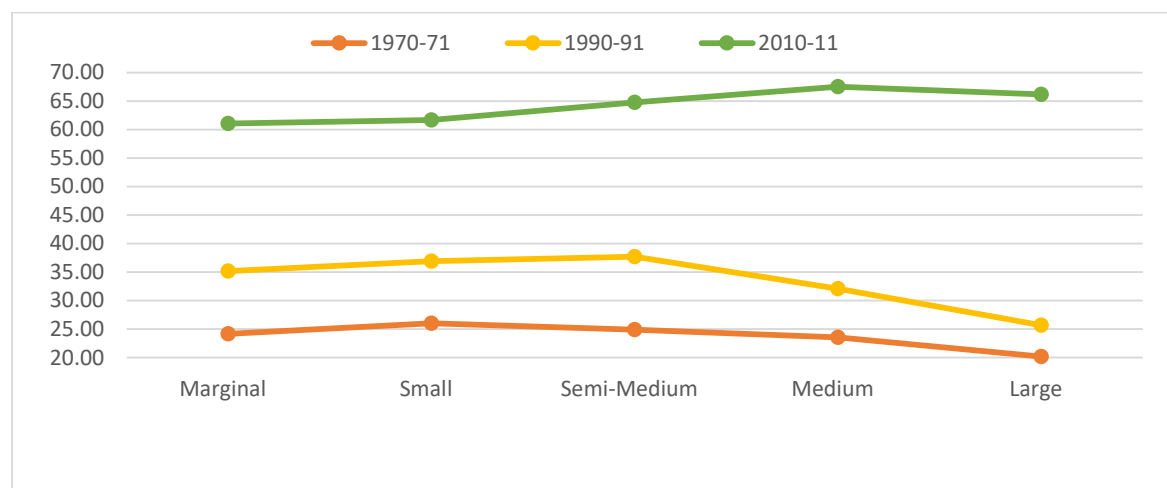


Figure 6. 1: Gross irrigated area as a percentage of gross area
Source: Agricultural Census, Bihar, different years, Author's own representation

¹³⁶ At this juncture, it is important to note the different pictures shown in the NSS data for the 70th Round. The coverage of irrigation is much higher, hovering between 86 to 100 per cent in the case of the area and between 89 to 100 per cent in the case of the number of holdings. But as far as the inter-class difference is concerned, it is similar to the Agricultural Census or the Input Survey data. Larger holdings are better irrigated than their smaller counterparts.

Canals and tube wells remain the largest sources of irrigation for cultivators in Bihar. Table 6.4 shows that roughly two-thirds of the holdings and a similar share of the area operated get water from tube wells. One-fourth of the holdings and 28 per cent of all operated area receive water from canals. The remaining holdings use wells and other sources for irrigating their fields. Therefore, tube wells have come to dominate the irrigation situation in the state. This is a long distance that Bihar agriculture has travelled from a position where tube wells accounted for a tiny share of 2.67 per cent in 1960-61.¹³⁷ Even in 1990-91, the share of tube wells in the total irrigated area was only about 30 per cent. On a more general note, it is worth mentioning that a massive increase in the share of tube wells in all irrigated holdings and areas is not only because of a decline in the share of canals. More prominently, it results from a massive dwindling of other sources (wells and the traditional *aahar-payin* system) of irrigation.

Table 6. 4: Distribution of operational holdings by sources of irrigation by size classes of operational holdings

Size-class	Canal		Tube wells		Other sources	
	Number	Area	Number	Area	Number	Area
Below 0.5	24.95	27.80	68.78	65.94	7.79	6.25
0.5 - 1.0	28.46	29.30	64.15	63.34	10.13	7.37
Marginal	25.62	28.50	67.90	64.72	8.24	6.78
1.0 - 2.0	27.00	27.00	66.86	66.14	10.00	6.86
Small	27.00	27.00	66.86	66.14	10.00	6.86
2.0 - 3.0	26.80	27.05	67.00	65.87	10.65	7.07
3.0 - 4.0	30.34	30.58	65.89	63.47	8.72	5.94
Semi-medium	27.89	28.43	66.66	64.93	10.06	6.63
4.0 - 5.0	30.99	30.85	64.36	62.32	9.64	6.83
5.0 - 7.5	28.48	29.66	64.10	62.83	12.57	7.51
7.5 - 10.0	38.51	39.16	61.99	58.45	5.69	2.39
Medium	31.00	31.77	64.06	61.88	10.10	6.35
10.0 - 20.0	37.68	35.69	62.02	60.75	6.82	3.56
20.0 & ABOVE	32.05	20.09	62.82	79.11	12.82	0.76
Large	37.37	33.69	62.07	63.11	7.15	3.20
All size-classes	25.81	28.45	67.78	64.83	8.41	6.72
Source: Calculated from Agricultural Census 2010-11, Table 5A: Estimated Number Of Operational Holdings By Size Classes Receiving Irrigation And Area Irrigated By Different Sources, State: Bihar.						
Note: Share of all individual sources may not add up to exactly 100 due to rounding off.						

¹³⁷ Source: Directorate of Statistics and Evaluation, Bihar, as cited in Sharma (1987, p. 202). The figures pertain to undivided Bihar in this case and hence may not be directly comparable. But the magnitude of change is too big to be discounted by this fact.

The size-class variation in the sources of irrigation does not appear significant. However, irrigation from canals seems to be a little more prevalent in the case of larger holdings than marginal ones. But the difference is not significant, and it may be due to data inconsistency. While this pattern is more discernible if we look at the distribution of the number of holdings, this does not seem to be the case in the distribution of irrigated area. A comparison with 1990-91 data also reflects a change. In terms of the number of holdings, marginal and small holdings had a bigger share of canals as well as tube wells than the medium and large holdings in 1990-91. In terms of area, however, the share of tube wells displayed the typical "inverted-U" shape, whereas the share of canals increased with the size. The lowest size-class also used canals as (or more) extensively as the larger size-classes. Their greater use of canals may be on account of their problems in accessing the tube well irrigation, as the data suggests.¹³⁸ The above observations show that the inter-class disparity in the sources of irrigation has reduced over time; all size classes of holding have come to rely on tube well irrigation decisively.¹³⁹

Table 6. 5: Distribution of tube wells, operational holdings and total area by size-classes of operational holdings

Size-class	Tube wells (Electric)	Tube wells (Diesel)	Tube wells, any	Total holdings	Total area
Below 0.5	56.28	68.56	68.16	74.44	30.44
0.5 - 1.0	22.37	17.57	17.73	16.62	26.99
Marginal	78.65	86.13	85.89	91.06	57.44
1.0 - 2.0	11.06	7.68	7.79	5.86	18.56
Small	11.06	7.68	7.79	5.86	18.56
2.0 - 3.0	5.57	3.26	3.34	1.79	10.36
3.0 - 4.0	2.96	1.55	1.60	0.77	6.44
Semi-medium	8.53	4.81	4.94	2.56	16.80
4.0 - 5.0	1.19	0.79	0.81	0.31	3.44
5.0 - 7.5	0.39	0.39	0.39	0.14	2.07
7.5 - 10.0	0.12	0.13	0.13	0.05	0.99
Medium	1.71	1.31	1.32	0.50	6.50
10.0 - 20.0	0.05	0.05	0.05	0.02	0.50
20.0 & above	0.00	0.01	0.01	0.00	0.21
Large	0.05	0.06	0.06	0.02	0.71
All size-classes	100.00	100.00	100.00	100.00	100.00

Source: Calculated from Agricultural Census 2010-11, Table 5 B: Estimated Number of Wells & Tube wells by Size Classes, State: Bihar.

¹³⁸ Source: Agricultural Census, Bihar, 1990-91.

¹³⁹ The 70th Round of NSS data shows a highly divergent picture. Groundwater irrigation accounts for 84 per cent share, and canal irrigation just 7 per cent. Only the medium size-class of holdings shows any significant use of canals in watering their fields – size-class of 2 to 3 hectares having 11 per cent share and the size-class of 3 to 4 hectares having 33 per cent share of canals. But this divergence does not invalidate the massive increase in reliance on tube wells in Bihar. It only shows an almost complete reliance on tube wells.

With tube wells controlling the irrigation expansion, the nature of control over this input will significantly impact the agrarian economy's evolution. Table 6.5 presents the distribution of tube wells by size classes of operational holdings along with distributions of operational holdings and area operated. Marginal holdings have the largest shares in all. But this is primarily because of their preponderance in the agrarian economy. However, there are signs of inter-class variations in the distribution of tube wells. In terms of numbers, marginal holdings have a lesser number of tube wells per holding. In terms of area, they have a much smaller area irrigated per tube well.¹⁴⁰

This observation seems to validate the impression of over-capitalisation as the irrigated area per tube well is very small. The inefficiency in resource use turns out to be true as the area irrigated per tube well is far below the threshold as suggested by Dhawan (1977). This overall inefficiency of the agrarian economy is also due to its peculiar structure. An overwhelming majority are marginal peasants; the existing water markets fail to deliver an adequate and timely supply of water, and subsidies bring down the economic threshold for a good majority of marginal cultivators. This inefficiency is further corroborated by the usage of shallow tube wells, which account for an overwhelmingly large share of all tube wells. Roughly three-fourths of all shallow tube wells are run just for 200-400 hours during both Rabi and Kharif seasons. With much better coordination among cultivators, the number of hours can be raised; consequently, capital requirements may come down substantially. But with a poor experience with the deep tube wells, primarily state-owned, this does not seem to be happening. Ironically, the spread of shallow tube wells through the 'Million Shallow Tube Well Scheme' has been taken as an alternative to coordination failure seen to be happening in the case of deep tube wells. In this policy thinking, water markets are assumed to be resolving the problem of 'failure of collective action'. However, the issue of overall inefficiency of resource use remains unaddressed.

If we look at the irrigation coverage under different crops, wheat is the best-irrigated crop (Table 6.6). Roughly 87 per cent of the area under wheat is irrigated. Sugarcane records 70 per cent irrigation coverage. Paddy, the most widely grown crop, has 61 per cent of

¹⁴⁰ The evidence from the 5th Minor Irrigation Survey Report, however, is completely different from the distribution shown in the above table. The shares of marginal, small, semi-medium, medium and large operational holdings are 13.92, 37.86, 34.69, 6.96 and 6.57 per cent, respectively (Source: *5th MI Census, 2013-14*, shallow tube wells, Table 2.3, p. 164). These figures are, however, only for the shallow tube wells, whereas the figures in the Agricultural Census are for all tube wells. But this difference cannot explain the difference in the figures, particularly when the shallow tube wells constitute an overwhelmingly large share of all tube wells.

cropped area irrigated. Given the recent trends, where the increase in wheat yields has flattened, and paddy has been recording significant yield increments, the lesser irrigation coverage does not augur well. The smaller coverage may also be because of the loss of the *Garma* variety of rice over time.¹⁴¹ There is substantial scope for improvement for most of the crops.

Table 6. 6: Percentage of the irrigated area under different crops for all size-classes of operational holdings

Size-class	Gross area irrigated	Paddy	Wheat	Total cereals	Total pulses	Sugarcane	Vegetables
Below 0.5	61.43	60.79	89.35	62.59	32.34	55.44	62.25
0.5 - 1.0	60.57	59.70	84.14	62.04	23.65	69.02	63.26
Marginal	61.03	60.28	86.80	62.33	27.92	62.47	62.68
1.0 - 2.0	61.69	59.54	84.54	62.69	25.42	75.75	70.02
Small	61.69	59.54	84.54	62.69	25.42	75.75	70.02
2.0 - 3.0	63.70	61.90	85.52	64.97	18.07	68.82	75.97
3.0 - 4.0	66.47	66.17	88.68	67.89	17.77	79.59	79.21
Semi-medium	64.76	63.51	86.70	66.08	17.95	72.49	77.26
4.0 - 5.0	65.85	64.77	90.28	67.72	14.02	79.95	71.66
5.0 - 7.5	68.17	67.79	91.63	68.62	31.47	87.14	71.39
7.5 - 10.0	71.99	68.43	93.52	72.97	23.55	79.98	52.43
Medium	67.51	66.29	91.24	68.81	19.48	82.60	69.70
10.0 - 20.0	71.95	61.38	96.98	72.77	29.03	89.98	78.79
20.0 & ABOVE	43.58	30.33	95.11	37.81	0.00	99.63	0.00
Large	66.13	53.22	96.84	65.91	28.99	96.04	78.00
All size-classes	62.22	61.00	86.74	63.46	25.31	70.43	66.11

Source: Calculated from Agricultural Census 2010-11, Table 6A and Table 6B: Estimated Irrigated And Unirrigated Area By Size Classes Under Different Crops, State: Bihar.

The inter-class differences in the coverage of irrigation across crops also present a diversified picture. In cases of wheat, the larger holdings have better irrigation coverage than small holdings. Among paddy growers, larger holdings only fare marginally better than smaller holdings, except for the largest, with the lowest coverage. Generally, there is a much smaller variation across size classes in the irrigation coverage for paddy. Irrigation of pulses shows a 'U-shaped' relationship between the size class of holdings and irrigation coverage. The state's two most dynamic cash crops in recent times, sugarcane and vegetables, have a clear trend. Bigger holdings are much better irrigated than smaller holdings.

The picture that emerges over the last twenty years is that of an overall improving situation in terms of irrigation coverage. In this process of recording improvement, larger

¹⁴¹ As the *Garma* rice is grown during the summer months, its dependence on irrigation is critical. With the loss of canal irrigation and the collapse of (free) electricity for pumping water from tube wells, cultivators moved away from this variety of rice.

holdings are pacing ahead of their smaller counterparts. However, the inter-class disparity in irrigation coverage has narrowed down over the years. There is not much proof of an inverted-U shape relationship signifying a loss of position of the middle-sized holdings. The spread of tube wells drives the irrigation expansion. Given the policy focus, the massive expansion of shallow tube wells has resulted in better irrigation coverage. These are largely privately and individually owned. Out of 361952 shallow tube wells, 358137 (98.95 per cent) are privately owned, of which 355609 (98.25 per cent) are individually owned.¹⁴² They are also located mainly outside of medium or major irrigation projects.

About 28 per cent of all the installed tube wells are financed through the own savings of the cultivators, and only less than 7 per cent with institutional credit/grants combined with their own savings or other non-institutional means. A vast majority, more than 57 per cent, is financed through 'other sources'.¹⁴³ The role of traditional moneylenders, or other informal sources of moneylending, in financing this investment is not significantly big. A large share of tube wells is likely financed through interest-free loans from friends and relatives.

There is no information on the structure of the water market in the secondary sources. To fully comprehend the underlying dynamics of irrigation expansion and its possible impact on the process of differentiation of peasantry, it is necessary to supplement the findings with the results from the field survey. It would corroborate or would contradict, as the case may be, the picture presented by the secondary sources, mainly from the Agricultural Census for the year 2010-11.

6.4 Irrigation and differentiation: Evidence from field survey

The conclusions from the preceding section are clear. It is the expansion of shallow tube wells that dominates the emerging patterns of irrigation. Canal irrigation, however, has not become redundant. The loss in the area irrigated by canals is because of the gradual decline of what once was the most important source of water for crops in the state. This decline also has a pattern. Because of the lack of de-silting of canals and irrigation channels and inadequate and untimely discharge of water into the canals, the first victims are the cultivators located at the tail-end of the canals. The lack of proper maintenance of the canal system implies that the cost of accessing supplementary sources is not uniform for all. There would be areas where

¹⁴² Source: *5th Census of Minor Irrigation Schemes Report*, Table 2.1, p. 160.

¹⁴³ Source: *5th Census of Minor Irrigation Schemes Report*, Table 2.6, p. 169.

the water supply is relatively better and timely. In other places, it may be completely redundant.

Given that canal irrigation is cheap (almost free), cultivators would look for alternative sources only when it does not fulfil their water requirement. Expansion of privately owned tube well irrigation has to be located in this context. Tube well irrigation involves substantial costs, whether owned or rented. Therefore, the behaviour of peasants utilising them must be studied to understand the emerging dynamics. It is presumed that they would resort to canal irrigation if it meets their water needs. Their compulsion, willingness and ability to pay for water have to be located in their specific contexts. Only then can any meaningful inference can be drawn about their water market involvement. This would, in turn, have important implications for the future of cultivation. The focus of this section is to find out from the field survey the extent and nature of their water use and their involvement in the water market.

Table 6. 7: Average depth of irrigation (in %), the average ratio of the cumulative irrigated area (CIA) to the gross cropped area (GCA), and average cropping intensity for all size classes of operation holdings

Size class of operational holdings →		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Location A	Depth of irrigation (%)	254.15	268.43	244.06	262.35	200.50	255.31
	CIA/GCA (% , Average)	122.96	140.41	119.59	133.45	100.03	128.04
	Cropping intensity	202.03	189.65	203.06	197.72	200.44	197.80
Location B	Depth of irrigation (%)	126.63	179.25	206.06	196.67	91.07	172.56
	CIA/GCA (% , Average)	92.49	105.03	111.21	143.90	47.84	103.32
	Cropping intensity	215.89	178.65	186.43	136.67	190.36	185.81
All locations	Depth of irrigation (%)	228.64	232.10	232.18	252.97	164.03	230.37
	CIA/GCA (% , Average)	116.87	126.00	116.97	134.95	82.64	120.59
	Cropping intensity	204.80	185.17	197.86	189.00	197.08	194.19
Source: Field survey of the researcher.							
Note: Depth of irrigation is the ratio of the cumulative irrigated area (CIA) and the net irrigated area (NIA) expressed as per cent. Cumulative irrigated area (CIA) is the net irrigated area multiplied by the number of times it is watered.							

Table 6.7 summarises irrigation coverage for different size classes of operational holdings. Overall, the depth of irrigation is moderate, with location A recording a greater depth than location B. As cultivators in both locations are growing roughly two crops on average, the cumulative irrigation coverage over the entire cropped area (CIA/GCA) is very

poor. This is approximately true in both locations. On average, their cumulative irrigation coverage is just 120 per cent of their gross cropped area. While the depth of irrigation is much better in location A, on the other two counts, the advantage of location A is very slim.

The depth of irrigation can be high or low, independent of irrigation coverage. If only a small fraction of the total sown area gets irrigation, but if it is irrigated frequently, then the depth of irrigation will be high. It can also be high when there is a substantial area that gets irrigated more frequently. In the first case, there is a low irrigation coverage with a greater depth of irrigation, and in the second, there is a greater depth as well as coverage of irrigation. Further, the cropping intensity will also be associated with the depth of irrigation. A high degree of cropping intensity will imply, for a given net sown area, a higher gross cropped area. Thus, if there is limited irrigation available, the peasant has to choose between a smaller area that gets better irrigation or a larger cropped area with lesser irrigation. However, this pattern has to be studied seasonally, as the crops grown are seasonal. If the availability of water has a seasonal pattern, then the potential has to be assessed separately for different seasons. This indeed seems to be the case where the peasants have to contemplate, particularly when they are leasing-in land to cultivate, whether to go for 'intensive' irrigation or to settle for 'extensive' cultivation with less than optimal irrigation. However, the choice of tenancy is not determined exclusively by this dilemma.

In location A, the nearly landless and the small peasants have the highest cropping intensities but moderate irrigation depth and coverage. The marginal and semi-medium peasants have the greatest depth of irrigation but have the lowest cropping intensities. This pattern indicates that there may be supply constraints on water, and the peasants are forced to choose between increasing their gross cropped area and increasing the depth and coverage of irrigation. In location B, the nearly landless seem to be facing the same dilemma. However, here the relationship appears very weak. This may be due to a much larger share of tube wells in the total irrigated area, which is relatively easily available even if it is costly. Much extensive use of tube wells makes the trade-off between expansive irrigation and depth of irrigation weaker.

Contrary to the data from the secondary sources, canal irrigation is more widely used in the villages surveyed (Table 6.8). Overall the total irrigated area is shared between the canal irrigation and tube well irrigation in the proportion of two-thirds and one-third respectively. The greater area irrigated with canal water is because of both locations'

proximity to canals. However, this pattern is more pronounced in location A than in B. Location B has relatively equal shares for both the sources of irrigation.

Table 6. 8: Distribution of gross irrigated area by the source of irrigation for each size class of operational holding

Size class of operational holdings →		Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Sources of irrigation ↓							
Location A	Canal	81.90	62.21	55.69	65.16	98.13	69.51
	Tube wells	18.10	37.57	44.31	34.84	1.87	30.44
	Other sources	0.00	0.23	0.00	0.00	0.00	0.05
Location B	Canal	38.82	47.23	59.47	20.34	100.00	54.10
	Tube wells	61.18	51.02	40.53	79.66	0.00	45.32
	Other sources	0.00	1.76	0.00	0.00	0.00	0.59
All locations	Canal	77.46	57.42	56.75	58.07	98.47	65.93
	Tube wells	22.54	41.87	43.25	41.93	1.53	33.90
	Other sources	0.00	0.71	0.00	0.00	0.00	0.17

Source: Field survey of the researcher.

Table 6. 9: Percentage distribution of operational holdings by a reported change in sources of irrigation over time

	Size class of operational holding	Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size-classes
Location A	Canal down, tube well up	0.00	6.25	9.09	16.67	0.00	5.88
	Canal up, Tube well down	6.25	0.00	0.00	16.67	0.00	3.92
	Other sources up	0.00	0.00	0.00	0.00	0.00	0.00
	No change	93.75	93.75	90.91	66.67	100.00	90.20
Location B	Canal down, tube well up	0.00	18.18	0.00	0.00	0.00	9.09
	Canal up, Tube well down	0.00	9.09	20.00	0.00	0.00	9.09
	Other sources up	0.00	0.00	20.00	0.00	0.00	4.55
	No change	100.00	72.73	60.00	100.00	100.00	77.27
All locations	Canal down, tube well up	0.00	11.11	6.25	14.29	0.00	6.85
	Canal up, Tube well down	5.00	3.70	6.25	14.29	0.00	5.48
	Other sources up	0.00	0.00	6.25	0.00	0.00	1.37
	No change	95.00	85.19	81.25	71.43	100.00	86.30

Source: Field survey of the researcher.

In location A, nearly landless and medium operators almost entirely use canals to water their crops. The rest of the classes use tube wells to irrigate at least one-third of all irrigated area. The highest share of tube well irrigation is seen for the small size class. In location B, the medium size-class entirely depends on canal irrigation. The highest share of tube well irrigation is recorded for the semi-medium size-class. There does not seem to exist any relationship between the size class of holdings and sources of irrigation.

The pattern as presented above seem to be fairly stable. A large majority report that there has been no change in their sources of irrigation in the last ten years (Table 6.9). Of less than one-tenth of the household that reports a change in their sources of irrigation, the percentage of households reporting a declining share of canal irrigation and an increasing share of tube wells are slightly higher than those who report the opposite. In location A, the decrease in the share of canals was seen for all size-classes except the nearly landless, who saw an increase in the share of canals. In location B, a bigger percentage of relatively smaller holdings saw an increase in the share of tube wells. But overall, the percentage of households experiencing a change in the source of irrigation in either direction was the same.

Table 6. 10: Average paid cost of irrigation and percentage of households purchasing water for each size class of operational holdings

Size class of operational holdings	Nearly Landless	Marginal	Small	Semi-Medium	Medium	All size classes
Cost per hectare (in Rs.)	2698.22	481.10	609.06*	207.36	24.49	1084.16
% of households purchasing water	55.00	59.26	56.25	71.43	33.33	57.53

Source: Field survey of the researcher.

Note: * The divergent figure of Rs. 609.06 for the small size-class is due to one outlier case. Removing it from the sample brings the figure to Rs. 359.92, which makes the relationship between the size class and irrigation cost per hectare neatly negative.

If we look at the cost of watering the crops (Table 6.10), for all size-classes together, it stands at Rs. 1084 per hectare. There is a clear inverse relationship between the size-class of the holding and the cost of irrigation per hectare. The most striking fact is that the nearly landless peasants are spending a whopping two and a half times this average amount. This shows their vulnerability as well as desperation. The largest landholdings have effectively no paid cost of irrigation. The very small amount may either be due to less intensive irrigation practised by them or their use of canal water, or both. The only cost remains that of diesel to run their pumping machines. It is also apparent that not everyone is purchasing water. It is

just a little more than half of the cultivating households that purchase water. This implies that the rest either rely on canal irrigation or have their own tube wells/pumping machines. However, there is no pattern between the size-class of operational holdings and the status of being a buyer in the water market.

Table 6. 11: Percentage of holdings and irrigated area having difficulty in receiving irrigation and receiving untimely irrigation for each size class of operational holdings

Size class of operational holding	% of holdings purchasing but having difficulty in receiving irrigation	% of the gross irrigated area under holdings receiving irrigation with difficulty	% of holdings purchasing but not receiving timely irrigation	% of the gross irrigated area under holdings not receiving timely irrigation
			No	No
Nearly Landless	40.00	36.86	54.55	61.71
Marginal	31.25	35.78	68.75	71.18
Small	55.56	65.54	88.89	65.23
Semi-Medium	20.00	18.85	80.00	60.44
Medium	0.00	0.00	100.00	81.82
All size classes	36.59	35.48	71.43	68.20

Source: Field survey of the researcher.

Table 6. 12: Percentage of holdings and operated area by the extent of irrigation status as perceived for each size class of operational holdings

Size class of operational holding	Percentage of holdings that have irrigation which is			Percentage of operated area under holdings that have irrigation which is		
	Acutely deficient	Deficient	Sufficient	Acutely deficient	Deficient	Sufficient
Nearly Landless	5.00	30.00	65.00	1.77	24.93	73.29
Marginal	0.00	44.44	55.56	0.00	43.56	56.44
Small	6.25	18.75	75.00	4.69	21.06	74.25
Semi-Medium	0.00	57.14	42.86	0.00	60.29	39.71
Medium	0.00	66.67	33.33	0.00	54.12	45.88
All size classes	2.74	36.99	60.27	1.35	42.16	56.49

Source: Field survey of the researcher.

The reliance of the peasants on purchased water for their fields is established. The question, however, remains regarding the nature of the market supply of water. If shallow tube wells, or pumping sets used to draw canal water, become the reliable mode of providing water, it is assumed that they would be efficient in supplying water through the market. Contrary to this assumption, the field interviews suggest that it is not the case. Table 6.11 tells that more than 70 per cent of the holdings purchasing water, involving 68 per cent of the total irrigated area, reported that they do not receive it on time. The extent of irregularity of water

supply through the market shows an increasing trend with the size class of holdings. Roughly half of the nearly landless and all medium cultivators responded that their holdings do not receive timely irrigation. Similarly, a little more than one-third of all holdings and the gross irrigated area had some or other difficulty in receiving irrigation. Small landholdings face this problem more frequently and extensively in relation to other size classes.

Not surprisingly, the difficulty in receiving water even through the market, and uncertainty over getting it at an appropriate time, leaves many peasants and their operated holdings without sufficient water for crops. This was already suggested in Table 6.7 as well. The cumulative irrigated area (CIA) was just 20 per cent higher than the gross cropped area. The highest figure was for the small holdings, where the CIA was 35 per cent higher than the GCA. The lowest coverage was for the medium holdings, where the CIA was about 20 per cent *lower* than the GCA. Table 6.12 shows that about 40 per cent of all the households with 44 per cent of all operated area have a perception that their irrigation is either deficient or acutely deficient. Looking at the inter-class variation, the smaller peasants' perception of their irrigation coverage and intensity is relatively more satisfactory than the larger holdings. Specifically, those operating between 1 to 2 hectares have the most satisfactory perception.

A bigger percentage of larger landholdings perceiving their irrigation may arise from the real difficulty in getting adequate and timely water due to a higher average number of parcels per holding and the non-availability of wage labour on time to water the fields. It may be read from Table 6.11 too. Given their resource position and social status, it may not be difficult for them to access water, if available. A small percentage of them have said that they have difficulty purchasing water in the market. But there is a large percentage, between two-thirds to three-fourths, who say that they do not receive timely irrigation even when they are paying. This was due to their large holdings, which were also scattered, and they couldn't find sellers who would irrigate their fields when they demanded. The problem of transporting pumping sets associated with the problem of prioritising fields puts them in a disadvantageous situation. Typically the seller, who is also a cultivator, uses the facility to irrigate his own field first and then looks for a prospective buyer. This suggests a demand-supply mismatch in the context of fragmented and very small holdings dominating the water use. This raises the question that if they are not resource-poor, why cannot they invest in their own irrigation rather than depending on a water market so clearly inefficient. The answer may be in terms of the high degree of parcellization of their holdings. But it must also be

noted that the overall income from cultivation, crucially depending on their output prices, may not justify multiple tube wells and pumping sets. The problem of incentives does arise in all such cases.

The better perception among the marginal or small landholders may be due to the very small size of their holdings. The water requirement for their fields, as per their perception, may be low and hence, easy to meet. In other words, the target irrigation coverage and depth may be lower than the larger holdings.

Table 6. 13: Size-class composition of buyers and sellers in the water market

Size class of sellers →	Marginal	Small	Medium	All sellers
Size class of buyers ↓				
Nearly Landless	30.77	69.23	0.00	100.00
Marginal	62.50	31.25	6.25	100.00
Small	44.44	44.44	11.11	100.00
Semi-Medium	20.00	80.00	0.00	100.00
medium	0.00	0.00	100.00	100.00
All buyers	43.18	50.00	6.82	100.00

Source: Field survey of the researcher.

The question of unequal power and its exercise in the water market needs to be ascertained before any conclusive remark on the nature of the market-based irrigation expansion can be made. In the literature around water markets, we often come across instances where sellers may be interested in capturing surplus and land. Such cases would influence the evolution of the agrarian economy in profound ways. From Table 6.13, it can be seen that half of the sellers in the market are small landowners. Another 43 per cent are marginal landowners. Sellers in the water market being large operators is effectively non-existent (confined to less than 7 per cent). Sixty-four per cent of all transactions happening in the water market is between the nearly landless and the marginal peasants as buyers and the marginal and the small peasants as sellers of water. This rules out any widespread phenomenon of controlling irrigation to extract surplus by the 'dominant' partner. About 20 per cent of all transactions happen between the nearly landless and the small landowners, where one may want to look for instances of 'exercise of control' to extract surplus. The surplus extraction may happen from the water market directly or through 'interlinking' transactions in the water market with a transaction in the labour/product/credit market. However, during the field survey, there was not much evidence that supported it. In a few isolated cases, there were friendly arrangements between the sellers and buyers involving labour supply.

The field evidence is against any 'surplus extraction'. More than 90 per cent of sellers belonging to the small landowning segment, constituting half of the sellers in the water market, are saving deficit households. Their total farm income, including rental income from hiring out machinery, is less than their total household expenses. Similarly, two-thirds of sellers who are marginal landowners are deficit households. Even two-thirds of the sellers belonging to the medium landowners' category are deficit households.

It can be argued that these deficit households might still be extracting small surpluses from the buyers. It can be true. But the question is not merely of whether extraction is taking place. The moot question is how is it utilised, and what are the implications of such instances of surplus extraction for the productivity growth in the agrarian economy. As far as the usage of surpluses from the water market is concerned, it is effectively utilised to meet the consumption needs of the 'surplus extracting' households, and not really to strengthen 'control' in the water or any other market or elsewhere.

Table 6. 14: Changing terms of purchase of water across seasons and across crops for each size class of operational holdings

Size class of operational holding →	Nearly Landless	Marginal	Small	Semi- Medium	Medium	All size classes
% of respondents reporting a change in terms of purchase ↓						
Across seasons	30.00	52.94	55.56	60.00	100.00	50.00
Across crops	50.00	47.06	33.33	80.00	100.00	50.00
% distribution of holdings purchasing water	23.81	40.48	21.43	11.90	2.38	100.00

Source: Field survey of the researcher.

The issue of 'surplus' in the water market is inextricably linked with the nature of prices formed in it. In the literature, there are suggestions that the water markets in Bihar tend to be more competitive over time (Kishore, 2004, p. 3487). The field survey results, however, demonstrate that the basis of price calculation varies across seasons and crops. Usually, it was noted that the sellers charged the buyers a price per unit of land during the *rabi* (winter) season and a price per hour during the *kharif* (summer/monsoon) season. Table 6.14 presents the extent of this variation found among buyers. Roughly half of all buyers faced these changing terms of water purchase. Larger holdings seem to be encountering these changing terms more often than others.

The changing terms of selling water might appear as evidence of 'monopoly' power and control exercised to extract the maximum surplus (a la 'discriminating' monopoly). But a closer examination reveals that it is resorted to by the sellers more to adjust according to changing costs across seasons and crops than to exercise monopoly power. Therefore, even these changing basis of price formation does not invalidate the proposition stressing the absence of 'rent-barrier' or 'depressor' as might be suggested to be working through the water market.

The visible absence of the old-style obstacles posed by the agrarian structure in achieving yield improvements through productive accumulation brings to the fore a need for an alternative narrative for the relative backwardness of the Bihar peasantry. During the field survey, the complexity of the situation is further reflected in the absence of any definite pattern of relationship between the use of fertilisers and irrigation, between yield levels and irrigation, between the use of fertilisers and yields for the different size -classes of operational holdings (Table 4.43 and Table 4.44 from the previous chapter and Table 6. 7 above). Size-class differentials are neither systematic nor produce any convincing pattern of 'structural' obstacles to irrigation expansion. This does not necessarily run counter to the logic of the Green Revolution technology. The yield levels are much lower than those prevailing in the 'successful' states. Below the standard yields warranted by the technology, it could be a result of a lack of multiple factors. This is a more likely scenario as the resource position of the peasants, and their stressed economic reproduction only warrant a limited adoption of the Green Revolution technology.

The adoption of better cultivation techniques, its dependence on better irrigation cover and the internal challenges to accumulation has to be read differently from the direct relationship postulated between the agrarian structure and lack of growth. It would be useful to summarise the core findings of the present and the preceding sections that presented pieces of evidence from the secondary and primary sources.

6.5 Conclusion: The control and expansion of irrigation

Despite seeing a substantial decline in its share in the total irrigated area, canals remain an important source of irrigation. The sample interviewed by the researcher was the most important source. Tube well irrigation, without doubt, has emerged as the alternative to canal irrigation and has established itself as the dominant source for the entire state. With a shift

from the canals to the shallow tube wells, the public provisioning of water has also reduced. This has resulted in the emergence and expansion of a market in water for the crops. Any question pertaining to the control and development of irrigation has to be located in this context.

Evidence from both the secondary and primary sources clearly indicates that the tendency of controlling/monopolising water use found within the agrarian structure has either considerably weakened or been reduced to insignificance. Without explaining the causes of this structural shift, it is sufficient to say that there has been a massive penetration of tube well irrigation in agrarian Bihar, mainly due to government subsidies. The ownership of shallow tube wells is relatively more equitably distributed than land. Therefore, this aspect would not explain the overall agrarian stagnation. The literature on 'feudal/semi-feudal' agrarian structure suggested that the control of irrigation existed in two forms. As the provision of canal irrigation is public, the control reflected in denial of/obstruction in getting water from the canal by use of non-economic methods, deployment of violence/threat of violence being common. In the areas where tube-well irrigation assumed importance, which was private in nature, the control was exercised through the monopoly position of the dominant sellers. This monopoly control could be exercised in more than one market by 'interlinking' transactions in one market to those in others. With a gradual but decisive decline of the social power of the erstwhile rural elites, this old-style control has also become obsolete. The scope of 'interlinkages' certainly is limited today, such instances sporadic, if not absent altogether. However, it should be kept in mind that this does not mean redundancy of rural power but a mere reconfiguration. The exercise of rural power has become more diversified and more intertwined with the market and the state apparatus (Wilson, 2002).

Therefore, the role and nature of water markets have to be analysed carefully. Water markets have become more pervasive than observed in the last century (Shah & Ballabh, 1997). These have also freed themselves from the old shackles of monopoly control (Kishore, 2004). Does that mean that Bihar agriculture has come of age? If not every aspect of it, at least irrigation? The limited expansion of irrigation cover does not seem to answer this question in the affirmative. The rate at which the net or the gross area irrigated has increased falls significantly behind the rate at which the number of tube wells has increased. Apart from raising the concern about the overall efficiency of resources utilised, this dichotomous

development also begs the question of the overall inadequacy of irrigation. Why do the markets in water have no solutions for these questions?

Perhaps the question of 'structure' is not redundant but needs to be formulated on different terrain. If we look 'inside' the agrarian structure, one of the limiting forces seems to be an overwhelmingly large majority of small and marginal peasants (second only to Kerala on the scale) having limited resources for expansion. The field interviews threw many instances where the peasants were constrained enough to generate even a tiny sum for productive investment that could have propelled them on to a dynamic accumulation path. Credit markets and institutions are inadequate and unable to meet their demand. The evidence suggests that either they are 'deficit' households or have precarious little to put in productive investment requiring a large sum. Those who may have access to agricultural surplus are practically negligible in numbers. If they happen to be a tenant, the question of investment is ruled out, given the uncertainty of their tenure. Government subsidies to install a tube well could be availed only by the *owners* of the land and not by *tenant operators* of the land. With a growing number of agricultural households moving out of agriculture, leasing out land to others to till may have a negative impact on the expansion of irrigation. Government subsidies would counteract this force but cannot eliminate the problem.

The economic problem of overall lack of resources as well as its distribution gets further compounded by a high degree of parcellization that keeps growing with every generation. The more dispersed landholdings ask for more investment in purchasing surface pipes to take the water to the fields from the tube well. This asset gets quickly run down by wear and tear and requires frequent replacement. It is noted that a huge majority, 87 per cent of all shallow tube wells (from the Report of the 5th Minor Irrigation Schemes as mentioned previously), use a surface pipe to irrigate the widely spread fields.

The agrarian structure, dominated by the overwhelming presence of marginal peasants, presents a peculiar problem. It is not that no surplus gets appropriated through the water market. But the sellers who appropriate this surplus themselves are deficit households. This makes the surplus appropriated in the water market sink in the consumption bowl of the selling households, unable to generate productive accumulation. This is true even for the larger landowners. Therefore, these smaller surpluses, even if a large sum for the agrarian economy, do not fructify into a productive investment due to the given agrarian structure

distributing it in a manner that precludes any possibility of productive accumulation. These little surpluses do not attract even the *outsiders*, particularly traders, to venture into the rural economy to take control of the surplus generation and appropriation.

There is some evidence to suggest that the small peasantry, not the lowest in the hierarchy but much below the larger holdings of 4 hectares and above, leads the irrigation expansion. Their water usage is more intensive than the larger holdings. It may be asked if this is a sign of the existence of non-productive, lethargic landlords living off the agricultural surplus. However, the field survey has demonstrated that their relative inferiority is more due to problems of inadequate and non-availability of labour at the correct time. Small and very small holdings have been able to make more intensive and productive use of their family labour, facilitating more intensive use of irrigation. The formidable challenge of labour mobilisation makes the large holdings often reluctant to make a decisive move towards high-intensity cropping based on higher irrigation intensity.

Thus, the overwhelming presence of marginal holdings, insecurity of tenure of tenant cultivators, and highly parcellized landholdings appear to be a formidable obstruction to irrigation expansion from *inside* the agrarian structure. The question of structure, however, goes beyond it. The larger political economy of irrigation expansion in particular, but of agrarian development in general, has more to do with the lack of dynamism in irrigation expansion in the state. The restraining tendency among the policy circles regarding state expenditure puts a limit to realising the potential. Given that the size of landholdings is very small, and there are further divisions and sub-divisions of it because of demographic factors, the necessity of pumping in more money cannot be discounted. Of course, a vibrant and efficient market in water for irrigation can ease this necessity by augmenting the area irrigated per tube well. But the preceding analysis seems to suggest that this may not be happening. The main reasons for the tube wells not being more efficient can again be traced back to recurring expenses it demands such that a large majority are either not inclined to make or are unable to make. This seems to suggest a 'vicious circle'. The poverty of peasants restrains them from breaking the barriers of 'structure', and the 'structure' reinforces their inability to generate more economic resources. The functioning of the water markets gets trapped in the vicious circle instead of breaking free the peasants from it.

These structural aspects of the agrarian economy suggest that breaking the impasse requires a push from the *outside*. Increased public investment in further expanding the irrigation coverage would be necessary. But the direction of this spending must move beyond just increasing the number of tube wells. Canal irrigation needs to be rejuvenated as it can easily cater to a larger number of cultivators without the problems associated with the water markets of tube well irrigation. Moreover, reviving and expanding the older *aahar-payin* mode of irrigation would also be useful. Both these modes are much more environmental friendly than tube well irrigation. The direction of spending in the shallow tube well has to be widened to include grants/subsidies to construct *pakka* irrigation channels that convey water from the source to destination fields. Not only it will reduce the economic burden on the peasantry, but more importantly, it will also make the water markets more efficient by increasing the area irrigated per tube well. To sum up, tenancy regulations, particularly those that would record and guarantee the security of the tenure, with judiciously directed public investment may be the key to breaking free the shackles of the existing agrarian 'structure', unleashing the irrigation potential of the state.

CHAPTER SEVEN

Conclusion and Policy Implications

The present work attempts to examine the growth experience and its structural aspects in the agricultural sector of a particular state of India and locates itself in the macroeconomic perspective of the Indian economy, now firmly and fully immersed in the globalised world economy. The insights of the inter-sectoral analyses, as pointed out in the first chapter, form a core analytical framework for this study. This work is also supplemented with a historical background that informs the political economy lens applied to the macroeconomic perspective. In the present chapter, the overall observations and results are presented, and theoretical constructs are revisited to highlight essential implications that follow from them.

Agricultural growth experience in post-colonial Bihar is characterised by an overall modest growth rate. Even this modest growth has not been of a sustained nature – it has taken place in short-lived growth spurts. Production and yield of crops are also characterised by high year-to-year fluctuations. Bihar's cropping pattern has been overly dominated by food grain production, particularly cereals, and this trend has further deepened over the decades. Adoption of Green Revolution technology, though progressed, has been limited by both technological (mainly lack of reliable irrigation and drainage facilities) and structural reasons. Over time irrigation in the state has come to depend on shallow tube wells heavily.

Given these characteristics, the future evolution of agricultural growth depends heavily on paddy-wheat performance in the short run. Wheat yields are reaching a plateau, and paddy has demonstrated some dynamism in the last decade. Yield levels of these two crops are still way behind the highest obtained in this country and, therefore, possess the potential to augment them further. Effective flood control measures will go a long way in increasing paddy production in the state. In its absence, it will mainly rely on developing a flood-resistant variety of paddy in the short run. But in the long run, it is necessary to increase crop diversity to reap the benefits of intensive and high-value cropping, particularly in the context of heavy dominance of marginal and small landholdings among cultivators. The preponderance of subsistence farming does not create a conducive context for crop diversification or productive accumulation without institutional support. Merely relying on a

technocratic vision may turn out to be ineffective in turning the state's agrarian stagnation into sustained agrarian prosperity. This brings the focus of analysis to structural aspects of Bihar's agrarian economy.

7.1 Revisiting the theoretical constructs

Both the secondary and the primary sources suggest that the agrarian relations in contemporary Bihar do not conform to patterns that the stagnation models of the 1970s suggested, whether explained in terms of "rent barrier" or "interlinked transactions". The power of landlords denominated in huge rental extractions or in usurious money lending is not seen in the state, at least as much as visualised by the models then. The phenomenon of a landlord-moneylender-trader nexus, or all collapsing into one as suggested by the framework of the market interlinkages, also does not seem to characterise the state's agrarian landscape. The prospects of economic benefit arising out of rental or usurious extraction appear to be very limited if it exists today. This is borne out by the patterns of leasing of land, which has become a "marginal" phenomenon – limited to the small and marginal segments of peasantry leasing among themselves. Similarly, patterns of surplus extraction, as contained in Bhaduri's model, also appear to have receded considerably.

Agrarian stagnation arising out of backward agrarian relations, therefore, needs a rethinking in the current context. Lack of investment is largely on account of poor expected profitability in case there are investible resources with the larger segment of cultivators. The high degree of risks and uncertainties, coupled with rising costs of cultivation, leaves the investment highly vulnerable to huge potential losses. Outside players, like traders of material inputs or agricultural output, are also not attracted to controlling agricultural production. On the other hand, the vast mass of small and marginal landholders prefer subsistence farming to commercial farming, primarily guided by the compelling concerns of food security. This aspect has been noted by the official narratives elsewhere too.¹⁴⁴

¹⁴⁴ Planning Commission has noted a similar scenario in the case of eastern Uttar Pradesh. It is useful to quote from the document. "Eastern region of Uttar Pradesh is flood prone. Poverty is acute in this region. Therefore, household food security is the primary concern of the farm households in this region. To meet the household food security, as high as 91 per cent of all agricultural land was allocated to food grain crops." Source: *Uttar Pradesh: State Development Report Volume II*, published by Planning Commission, Government of India, State Plan Division, p. 8 (accessed on 13 June 2022, from https://niti.gov.in/planningcommission.gov.in/docs/plans/stateplan/upsdr/vol-2/Chap_b1.pdf).

The role of non-economic factors in obstructing productive investment also requires a rethink. The rural elite's use of violence or threat of use of violence over the small and marginal segment of the peasantry, although not wholly absent today, has reduced significantly. In cases where such instances are found, they appear to be arising out of direct economic conflicts, mostly over wages with landless or nearly landless agricultural workers. In other cases, it is associated with explicit political conflict aimed at retaining or obtaining control over government apparatus and resources. In both these cases, the use/threat of violence is not aimed at capturing agrarian surplus to any significant scale—the primary reason being an absence of agrarian surplus of any considerable scale that can be captured. Therefore, the importance of direct political control through debt, as envisaged by Bhaduri's model, also seems to be considerably reduced. Perhaps the vast mass of the peasantry is so impoverished and economically vulnerable that it does not pose any serious challenge to the rural elite. The only potential threat comes from peasant mobilisations. The prospects of this, too, have gone down with the declining power of peasant organisations, also reflected in electoral dynamics where the direct issues of peasants no longer acquire a central place.

The agrarian stagnation of Bihar, as it exists today, is primarily not on account of the subjugation of the peasantry to the class of parasitic landlords and usurious moneylenders. It is more on account of the structure of landholding, where it is a sea of small-marginal cultivators engaged in subsistence farming without any surplus left for productive accumulation. Those who possess any surplus, small or big, are numerically very small. Further, they do not have any incentive to invest in productivity-raising efforts as their return from these is precarious. Therefore, to whatever extent generated, the agrarian surplus is usually diverted away from agricultural investment, as the latter cannot compete with other avenues like trade, animal farming, or even human capital formation.¹⁴⁵

The differentiation of peasantry, however, has progressed mainly in the form of growing impoverishment. Fragmentation of holdings under demographic pressure and increasing commercialisation has made the peasants increasingly depend on markets of different types for survival. This has not created a mass of "footloose" labour but an impoverished peasantry, also engaged in hiring out themselves as the need arises. Hiring out labour is not a taboo, but complete dependence on hiring out is a big threat to survival

¹⁴⁵ Almost everyone interviewed during the field survey preferred putting their money into children's education to expanding their scale of cultivation. Animal farming, certainly more rewarding than crop cultivation, tends to be limited by the size of family labour and high cash outlays on items of current expenditure.

because of the precariousness of wage employment. Fear of losing the family rice bowl, to borrow the phrase from Elisabeth Croll (1983), keeps their feet stuck in the field. This brings the macro context of the agrarian economy into a sharper focus. The non-farm sectors of the economy, not being able to attract and absorb the surplus labour in the agricultural sector, profoundly influence and get influenced by the latter.

Bihar's agrarian stagnation today, therefore, must be mainly explained in terms of an *absence* of a big push. With the decline of the old agrarian relations, the crux of the five-decade-old stagnation models, the present rural elite does not seem to be interested in thwarting productivity growth. The rural elites do exist and exercise power in many ways. But as the agrarian economy as a whole is unable to produce any sizeable surplus, they are not looking forward to appropriating it. Their main interest has moved, as argued earlier, to capturing and retaining control over government apparatus and resources, now pumped through the *Panchayati raj* institutions. Therefore, the internal weakness of the agrarian economy does not lie in the presence of feudal or semi-feudal landlords; but rather in a mass of impoverished peasantry engaged in subsistence farming *without* landlordism. Any understanding of the relationship between agricultural stagnation and agrarian structure must explore the structure of landholding and tenancy to fully grasp the evolving patterns of growth or stagnation. This exploration will be futile if guided by an urge to find the old-type agrarian relations. The agrarian relations have changed – landlordism today is not the imposing figure that it used to be five decades back. The vast mass of peasantry has continued and multiplied largely under demographic pressure. The tenancy is on the rise, but it remains a "marginal" phenomenon. This is the most important aspect of the agrarian structure today. Persistence of subsistence has to be located in this *newer* context.

7.2 Agrarian transformation: The policy framework

Given the preponderance of impoverished and vulnerable tiny landholders, the dynamic of the agrarian economy is largely determined by this vast mass of subsistence peasant families, surviving but without any scope of earning a profit that they would consider their way out of subsistence living. Breaking this impasse would either involve removing the vast mass of peasantry off the land with their land being transferred to those who are profit-oriented producers looking to increase their scale of production and profit; or changing them into profit-oriented producers, even if small in scale. The theoretical explanation presented in the

present work incorporates and investigates these scenarios. The latter scenario does not seem to be a viable option to choose for the subsistence peasants, given their land and resource position. They can either choose to remain subsistence peasants producing necessary food grain for survival or leave subsistence farming to get wage employment elsewhere. Given the precariousness of wage income-based subsistence, it appears fairly rational on their part to choose subsistence farming, which maximises their income by more efficient use of family labour (by minimising "wastage" of family labour, particularly of women and children).

It would be apt to pose the more significant question here. What explains better the pattern of relationship between subsistence farming and wage employment? Is it the insufficiency of income from subsistence farming that explains their search for wage employment? Or, is it insufficient wage employment that drives their hunger for subsistence farming? The existing literature is somewhat biased in favour of the first. The second possibility does not get adequate attention which is also very crucial. The proposition of the present study is not to establish the second of these as *the central dynamic* but to find a more unified story for the observed stagnation. The first of these two emphasises the limits of the agricultural sector to sustain "surplus" labour, pushing them out of the farm sector. The second acknowledges the limits of the non-farm sectors to absorb/employ the same surplus labour, hence pushing them back to the farm sector. It may be more appropriate to consider the first as the inevitable unfolding dynamic in the long run¹⁴⁶ and the second unfolding much before the full play of the "long run". This overall scenario visualises a situation where the limits of the non-farm sectors become operational much before the first has stopped ejecting the surplus labour out. In a more unified story, the surplus of labour is not merely a farm labour surplus; instead, the surplus labour is that of the economy as a whole.

The weakness of the non-farm sectors in generating secure employment becomes both a cause and a result of agrarian stagnation (the fundamental structural bind that Kalecki (1955) was referring to). Not only does the agrarian transformation gets stalled, trapping the farm sector in a subsistence economy, but it also halts the process of overall structural transformation of the economy attempted through sustained industrialisation. This scenario

¹⁴⁶ This does not mean that employment in the non-farm sector cannot be increased in the short and medium run. But if such increases are to attract the surplus labour from the farm sector, they must be accompanied by the growing confidence of the subsistence peasantry in these changes. Their decision to move out of subsistence farming crucially depends on their confidence in getting bankable employment elsewhere. This change in perception will likely take a long time. Till then, the necessity to increase their income from cultivation remains intact.

brings us back to the question of the agrarian transformation of Bihar with the macro context firmly embedded in a holistic understanding. As discussed in Chapter 5, any process of agrarian transformation, proceeding on the *undemocratic path* driving subsistence peasant families off their fields without any secure alternative employment, can be questioned on its economic as well as political merit. Therefore, the only desirable and feasible options are either pulling the surplus labour out of subsistence farming by providing secure and dignified employment elsewhere or by turning them into profit-oriented peasants producing a surplus.

Given the present context of the economy, it seems that focussing on any one of them exclusively may not work. Turning the entire mass of subsistence peasants into profit-oriented peasants may not be viable or even desirable. In the long run, a good number of them must move out to alternative employment. Therefore, creating a secure and dignified livelihood away from crop cultivation, in the long run, is necessary. But relying exclusively on the long-run goal of creating alternative employment, leaving the vast mass of impoverished peasantry waiting for that long run, is also problematic. Moreover, the persistence of subsistence farming adversely influences the economy from the demand side. Therefore, increasing their income in the short and medium term is also necessary. In the language of the diagrams presented in Chapter 5, this process of agrarian transformation involves shifts in demand curves for land of both types of peasant households. For subsistence peasant families, the rightward (inward) shift in their demand curve occurs via a reduction in "land hunger". For profit-oriented peasant families, the rightward (outward) shift is realised by a decrease in the number of land-hungry peasants and a consequent increase in the number of profit-oriented peasants. The findings of Chapter 4 become crucial to achieving this task of agrarian transformation as it contextualises the explanations offered in Chapter 5.

The present work has shown that even the conditions of simple economic reproduction of subsistence peasant families in Bihar cannot be met within the sphere of crop cultivation. Non-farm wage incomes and other sources of farm income, particularly the rearing and sale of cattle, are crucial in meeting the subsistence requirements. Given these conditions of reproduction, any effort to turn them into profit-oriented economic agents can not simply rely on policies that have been pursued so far. These policies have a strong technocratic bent that overlooks the structural peculiarities of the most numerous section of the peasantry. Tiny landholdings, a very high degree of parcellization, no surplus to invest in

bettering their cultivation practices, with little or no marketing support characterise their world of farming.

As argued earlier, agricultural production in Bihar has to move in a direction where the crop mix is more diversified, and yield levels of major crops are raised to match the levels of other states. This requires substantial improvement in agricultural infrastructure – timely and efficient irrigation, drainage, roads, storage facilities and electricity supply. Further, a timely supply of fertilisers coupled with the availability of the new and improved varieties of seeds (that are less water intensive for crops and areas that lack adequate and timely irrigation and more water resistant for crops and regions that are flood prone) will be necessary. None of these can be achieved solely through private means, given the resource position of the peasantry. The poverty of the subsistence peasant families is so deep that they are found to be incapable of spending even a tiny amount on inputs that may increase their yields. It is already visible that the positive cash balances arising out of cattle rearing and sale are not their savings but a source of meeting subsistence. Therefore, farm diversity of this type and scale will not help them either. Non-farm income is also seen to be sinking in the consumption bowl for most of these peasant families. This implies that the cash outlays that will be necessary to augment their yields substantially, or will be necessary to go for high-value cropping, would be unavailable to them as their private farm savings are no match for these required outlays.

Investment with borrowed money could be a way out. The data suggest that the sources of credit for the overwhelming majority are still informal. The uncertainty of getting credit and high interest rates prevailing in informal credit markets can be prohibitive enough for these subsistence peasants. The formal credit penetration is one of the lowest in Bihar. Field interviews have shown that there is a cost of getting credit from formal sources in the form of bribes, etc. The formal credit is out of reach for the unrecorded tenant cultivators for lack of collateral.

Providing the subsistence peasants with money through direct farm assistance or easy and subsidised credit and other inputs remains necessary. But this will not suffice. Merely increasing public expenditure in the way it has been done so far (mainly fertiliser and tube well subsidies) may be futile. It must be associated with institutional restructuring so as to make the return on public expenditure high in the form of improved farm incomes. The availability of credit and crop insurance must be made easy and cheap. It must also be

provided in a manner which is transparent enough to instil confidence among the subsistence peasants to go for it. The objective should be to make them aware of all risks, the risk-covering mechanisms, and secure in the economic and institutional mechanisms delivering the risk-covering services. The field survey by the researcher has demonstrated that none of the cultivating households availed the benefits of crop insurance, essentially because they lacked knowledge and confidence in these measures. Even the tiny sums necessary to pay the insurance premium were out of reach for most of them.

The credit disbursal has to be made more democratic than how it exists today. It must also be monitored carefully to avoid wasteful practices. But this process must be less bureaucratic and more democratic, involving the stakeholders. Such institutional innovations will set off a chain reaction where more involvement of stakeholders will make these institutions more robust, instilling even more confidence. It will substantially reduce the monitoring cost and make the peasants more trustful of this institutional functioning.

A similar approach has to be developed to better the irrigation condition. As proposed in the previous chapter, in the absence of landlords or "water lords", the formidable challenge from inside the agrarian structure to irrigation expansion comes from the overwhelming presence of marginal holdings and insecurity of tenure of tenant cultivators, coupled with highly parcellized operational holdings. This crucial input, except for subsidising the installation of tube wells, has been left to the outcomes of the water market, which may not be complete or perfect. Collapsed canal irrigation and heavy reliance on shallow tube well irrigation weigh heavily on the impoverished peasantry. This mode of irrigation, while escaping from the inefficiency of the large irrigation projects, has its own inefficiency. Despite the proliferation of shallow tube wells under the state subsidy programme, it remains short of providing timely and adequate irrigation. Parcellized landholdings add substantial costs to those availing water through shallow tube wells. Canal irrigation remains a significant source despite recording a substantial decline in the area irrigated. Other sources of irrigation which have declined greatly out of complete neglect, particularly the *ahar-payin* system, must also be revived. As it is almost free, one should not ignore the virtues of the canal or the *ahar-payin* irrigation, given the structure of landholdings in the state. However, there has to be democratic and wider participation of peasants in the maintenance and distribution of water from these sources. The old patterns of controlling or monopolising water have declined, but they may resurface again as the rural power structures, in collusion

with the state machinery, are found to be exercising some control over monetary resources. Water distribution must not fall prey to a potential predatory behaviour of rural elites looking to further their economic interests at the cost of a more efficient water distribution delivering higher yields.

Increasing public expenditure on irrigation expansion is necessary, but it must move beyond subsidising shallow tube wells. It must incorporate reviving and constructing water distribution channels. This will not only reduce the substantial cost of taking water from tube wells to fields through plastic pipes for the poor peasants, but it will also make water markets more efficient by increasing irrigated area per tube well. Tenancy reforms aimed at recording and securing tenancies and consolidation of holdings will remain important in this regard.

The suggested policies so far attempt to reduce the cost of *profitable* cultivation for subsistence peasants. With sharply rising input costs necessary to adopt better cultivation practices, the need to reduce the economic burden on the subsistence peasants will be there. But to turn them into profit-oriented cultivators require marketing support as well. The agrarian economy of Bihar lacks storage facilities and timely and adequate transportation services to store and transport agricultural commodities. It is also characterised by weak, imperfect and volatile agricultural output markets. Solving the problems of productive accumulation purely from the supply side will likely fail in the broader task of agrarian transformation. The vast majority of small and marginal cultivators are more likely to remain conservative in their response to these changes. As the initial surplus will be small given their small landholdings, they will not switch away from food grain production to other high-value crops, as the potential threat to food security weighs more heavily. The expected net return from *new* cultivation practices may not be sufficient to offset the cost of an insecure food supply.

Therefore, marketing support will be essential to increase the expected net return resulting from changing practices. The experience of dismantling the APMC Act in Bihar demonstrates that the claimed benefits of better and more rewarding market outcomes are nowhere to be seen. The subsistence peasants must see their efforts bearing fruit in the form of a minimum expected return. Better marketing infrastructure and institutional provisioning are needed to make the impoverished peasantry trust the *new framework of cultivation* and not just the new technique. The experience of dairy farmers' collectives from all over the country can be productively utilised to devise a fresh institutional setup.

Finally, in the long run, creating secure and dignified employment will remain necessary to complete the task of agrarian transformation. The ensuing migration of surplus labour will be present throughout this process till its completion. This process can be made more tolerable for the migrating labourers by securing the food supply for themselves and their families left behind. By reducing the threat to their food security, a universal food supply system independent of the location of the family members of these households can make their decision to migrate easier. Of course, they must eventually be provided with employment; hence, the non-farm sector must grow to absorb this labour force moving out of cultivation. In the absence of facilitating framework, migration of surplus labour is more likely to sustain subsistence farming than to overcome it.

The necessity of creating alternative employment for the vast mass of impoverished subsistence peasantry and reducing their "land hunger" cannot be overemphasised. The task of agrarian transformation cannot be achieved without it. Moreover, it must be borne in mind that the real wages should be rising in the long run to attract surplus labour. This is in contrast to the Lewisian perspective, where the subsistence in the traditional sector was fixed. In the present case, it is proposed that the traditional sector also undergoes a change, and the incomes of subsistence peasant families in the countryside are rising because of their gradual adoption of better cultivation practices or a more diversified income source. Therefore, the agrarian transformation is firmly rooted in the broader macroeconomic transformation – both become a part of a larger structural transformation, each needing and facilitating the other. Until their incomes rise enough to meet their basic needs, increasing the consumption of the impoverished peasantry either through subsidies or cash transfers will remain crucial in sustaining this process.

In the absence of the changes as suggested, Bihar's agrarian economy is likely to remain stuck in the vast mass of impoverished peasantry forced to practice subsistence farming. Worse, it will be accompanied by forced displacement of a section of the peasantry left without any secure livelihood.

7.3 The political economy of agrarian transformation

If we summarise the steps needed to come out of the stagnation/subsistence trap, they can be classified into the following broad categories – increasing public investment, creating a universal food supply system for the poor peasant families (migrating or otherwise), creating

alternative employment for surplus peasant population, and institutional innovation. As proposed in Chapter 3, the agrarian structure of Bihar and its relationship with agrarian accumulation has to be located in the broader matrix of technology, politics and markets. The role of the state in tilting the balance of forces cannot be underestimated. As outlined above, the agrarian economy of Bihar needs a big push. Will the state apply its power in this direction?

Of all the measures mentioned above, increasing public expenditure and creating a universal public food distribution system face the strongest opposition from the neoliberal ideas and institutions that have penetrated deep into the state apparatus. Creating alternative wage employment through state expenditure faces the same force of resistance. In this case, however, there may also be opposition from the capitalist class everywhere if the wages rise due to the government's expenditure. Opposition to expanding employment generation schemes in the rural areas testifies to this prospect. Institutional reforms, however, face direct and fierce opposition from the dominant landholders and other sections of the rural elite whose privileges might be lost if the institutional setup is made more democratic and transparent.

Tenancy reforms have been resisted in the past whenever attempted by the state. The state also gave it up immediately faced with this opposition. Creating cooperatives and making them function in a democratic and transparent manner to utilise the government support in a better manner is also likely to irk the existing rural elite. It is more likely that they will not allow these changes in collaboration with the state apparatus. Whether such institutions are to be created for credit disbursal or for marketing support, the rural elites are likely to sabotage the process to ensure their control over public resources. For political reasons also, they may also not like the improving status of subsistence peasants, challenging their corrupt or violent practices as the case may be.

The theoretical paradigm of the *Agrarian Question* helps understand the emerging dynamics in a better way. The multiple perspectives, as outlined in Chapter 3, throw interesting insights to understand the state of the *Question* better today. Locating the emerging agricultural technology and markets in the context of present-day's rural politics is very important. The contestations over free agricultural markets and support to cooperatives will play an important role in unfolding the agrarian scenario. To what extent the state succumbs to the pressure of neoliberal ideas and institutions and interests of the rural elite

will determine the distance it will go in achieving the agrarian transformation democratically in the state. In the absence of a powerful mobilisation of subsistence peasants and workers from below, putting sufficient pressure on the state, the present scenario is likely to persist.

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