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The 'Peasant' in History: Evolution of the Concept and Changes in the Post-colonial Economic

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Abstract

The industrial revolution put forth the issue of transformation of an agrarian society to an industrial society and this is how the famed "agrarian question" was perceived in the initial period. The peasant question that formed the core classical agrarian question has become a subject of intense debate in the wake of globalisation. The category called 'peasant' has been conceived and defined in many ways and yet there is confusion around the seemingly 'simple' question – what constitutes a peasant. The dominant definitional categorization of the peasant more of less remained the same across the spectrum, classifying them as petty producers, located in a cultural cocoon with subsistence production as the primary activity and engagements with markets being quite rare. The receding peasant-farmer differences and limitations of the old definitions become extremely significant in the context of capitalist development in agriculture. This paper tries to trace the evolution of the term 'peasant' in past few centuries through a brief survey of the classical works and major debates around it. Towards the end, the paper tries to argue how onward march of global capitalism has rendered a number of past definitions meaningless, and attempts to make a contribution in updating it.

As agrarian crises and ecological disasters become more and more severe, the attention of global scholars and policy makers is once again increasingly shifting towards one important category- the 'peasant'. But despite a history of intense debates around the term, covering various disciplines, continents, scholars and actors, there is still confusion or lack of clarity around the seemingly 'simple' question – what constitutes a peasant. The industrial revolution put forth the issue of transformation of an agrarian society to an industrial society and this is how the famed "agrarian question" was perceived in the initial period. During the initial period of the French revolution, the peasantry's role in the violent state of affairs due to the 'great fear' led people like Balzac to categorize it as the most regressive class, envious of the fortune of others, easy to

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manipulate and inherently wicked.[1] Later, because of its support to Napoleon, many termed the peasantry as a highly reactionary class whose only concern was to safeguard its little piece of land. Till the Russian revolution, peasants were not getting very sympathetic treatment from the Marxists but the question of revolution in China, and the role of peasantries in third world revolutions in the post war period changed this scenario.

Post war period is also the time when a number of anthropological studies on peasants came out. However, the dominant definitional categorization of the peasant more of less remained the same across the spectrum, classifying them as petty producers, located in a cultural cocoon with subsistence production as the primary activity and engagements with markets being quite rare. Towards the end, this paper argues why this understanding of 'peasant' needs to change.

Not a Class but a "Condition": Locating Peasantry in Early Writings of Marx and Engels

Marx's views on agriculture stemmed from his engagement with the impact of capitalism's development on agriculture, and the role of peasantries during various processes of social change. For Marx, the proletariat, not peasantry was the actor of change that would lead to destruction of capitalism, class-based society and private property. Hence his works are certainly not extremely complimentary towards the peasantry. The agrarian question to him referred to the transformation of pre-capitalistic societies and systems into capitalist ones. Being a pre-capitalist mode of production, peasantry and peasant agriculture according to him were bound to perish before the all-encompassing march of Capital, traits of which could be seen in the enclosure movement that ruined peasant agriculture in Britain and turned erstwhile peasants into proletarians.[2] While talking about the pitiable state of the French peasantry, Marx asserted that the reason for the same lay in the nature of peasant agriculture, e.g.-

"...their field of production, the small holding, permits no division of labor in its cultivation, no application of science, and therefore no multifariousness of development, no diversity of talent, no wealth of social relationships... A few score of these make up a village, and a few score of villages make up a Department... much as potatoes in a sack form a sack of potatoes"[3]

In his writings, Marx often criticized the inertia, egoism and attachment to traditions of the peasantry.[4] The French peasantry later became the main ally of Napoleon,

1 For more on this, see Honore de Balzac, *The Peasants* (Philadelphia: George Barrie and Son, 1899), *https://archive.org/stream/peasants00ivesgoog/n48/mode/2up* (Website accessed on 21 March 2015).

2 Karl Marx, *Capital*, Vol. 1, Part 8, *https://www.marxists.org/archive/marx/works/1867/capital.htm* (Website accessed on 15 March 2015).

3 Karl Marx, *Eighteenth Brumaire of Louis Bonaparte, VII*, *https://www.marxists.org/archive/marx/works/1852/18th-brumaire/ch07.htm* (Website accessed on 15 March 2015).

4 Graeme Duncan, *Marx and Mill: Two views of Social Conflict and Social Harmony* (Cambridge: Cambridge University Press, 1977), 128.

helping him in crushing the workers' uprising of Paris and consolidating power in his own hands. Marx saw this as a reactionary act of "a class harbouring conservative small property illusions" which helped Louis Bonaparte's accession to power in return of their property rights, while detaching "state from its old class roots and softened the edge of class collisions".[5] That is why he criticized the French peasants and the Napoleonic state as:

"…clumsily cunning, knavishly naïve, doltishly sublime, a calculated superstition, a pathetic burlesque, a cleverly stupid anachronism, a world-historic piece of buffoonery, and an undecipherable hieroglyphic for the understanding of the civilized — this symbol bore the unmistakable features of the class that represents barbarism within civilization"[6]

The above two statements are the most controversial and frequently quoted statements of Marx on peasantry, used by the critics (who try to portray him as an anti-peasant thinker)[7] to denounce the Marxist understanding of peasantry as demeaning.[8] However, scholars like Hal Draper rightly point out that they convey this sense for they are mostly quoted without clarifying their historical setting. The second one was not demeaning since Barbarism here means "standing outside the bounds of high civilisation", which in this case was bourgeoisie civilisation.[9] And barbarism was also used by Marx to signify colonial exploitation and ruin of civilisation as well, as a result of contention between classes.[10] Further, Draper stresses that Marx's approach in his writings about the French peasantry was more guided by an attempt to understand the "relation of the peasantry to the other classes of modern society" and the changes they were experiencing, rather than comparing peasants of today with those of yesterday or trying to explore or define the essence of the peasantry.[11]

The transformation of non-capitalist social relations to capitalist ones had not happened on expected lines in 19th century Europe and as European Marxist parties debated how to capture power, the issue of the persistence of peasant agriculture and peasant population made them worry. Due to its "property fanaticism" and reluctant attitude towards aligning with the proletariat in class action to overthrow the ruling classes, the

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5 Ibid.

6 Karl Marx, *The Class Struggles in France*, *https://www.marxists.org/archive/marx/works/1850/class-struggles-france/ch02.htm* (Website accessed on 15 March 2015).

7 David Mitrany, *Marx Against the Peasant: A Study in Social Dogmatism* (London: Weidenfeld and Nicolson, 1951).

8 Teodor Shanin even begins his *The Awkward Class* with Marx's quote about barbarism of the peasantry, to highlight Marx's 'anti-peasant' understanding, see Teodor Shanin, *The Awkward Class: Political Sociology of Peasantry in a Developing Society: Russia 1910-1925* (London: Oxford University Press, 1972).

9 Hal Draper, *Karl Marx's Theory of Revolution, Vol. 2, The Politics of Social Classes* (New Delhi: Aakar Books, 2011), 345.

10 John Bellamy Foster and Brett Clark, *Empire of Barbarism*, *www.monthlyreview.org/2004/12/01/empire-of-barbarism* (Website accessed on 15 March 2015).

11 Hal Draper, *Karl Marx's Theory of Revolution*, 2011, *op. cited*, 331.

peasantry was a hindrance in the path of European Marxist parties in their pursuit of political power. This political problem was the reason why Engels transformed the "agrarian question" into the "peasant question". The peasant question, in essence was – how to overcome the political problem of peasant apathy and mobilise them behind the socialist parties? In his *The Peasant Question in France and Germany*, Engels maintained that the leftist parties "must first go from the towns to the country" and "must become a power in the countryside", if they wanted to capture the state.[12]

However alike Marx, Engels maintained that the peasantry was not a unitary class in itself, but a combination of different classes, consisting "of quite different parts", or "subdivisions of the rural population".[13] Peasantry for both of them was not a class, but a condition, and the later Marxists also upheld this position. The Peasant Question in France and Germany was written in 1894, a time when the development of capitalism was already pushing pressures on the small holding peasant, "differentiation was proceeding apace" and "class relations were emerging far more clearly and sharply within the peasantry".[14] Hence, the peasant question for Engels meant the enquiry into class differences within the peasantry to find out which "subdivisions of the rural population (could) be won over by the Social-Democratic Party"[15] In this quest, Engels identified small peasants and big-middle peasants as two significant divisions, with small peasants being "owner or tenant".[16]

Engels suggested that socialist parties should win over the small peasants to their side, and opposed the "double opportunism" of these parties which tried to exploit the sense of property present in small peasants on the one hand (by making sham promises to them about protection of their petty private property despite knowing that it was bound to perish in front of capitalism's forward march and later changes), and attempting to bring in the middle-big peasants and "other capitalist exploiters of the national soil" into their fold on the other.[17] He stressed that in place of this strategy, the socialist parties much prepare the small peasants for a transition of their private properties to cooperative ones, without use of force for this purpose.[18] Thus, the peasant question was "not a work of theory", but "essentially a practical intervention".[19] Engels' engagement with the peasant question led him to initiate an exercise of differentiating classes within peasantry to determine the policy of socialist parties with respect to the peasantry, bringing it down, in essence, to the question of mobilisation. Lenin and Kautsky extended this exercise further, but with a different differentiation scheme.

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12 Fredrick Engels, *The Peasant Question in France and Germany,* 1894 (New Delhi: People's Publishing House, 2011), 458.

13 Ibid., 457-59.

14 T.J. Byres, 'Foreword', in Atiur Rahman, *Peasants and Classes: A Study of Differentiation in Bangladesh* (New Delhi: Oxford University Press, 1986), xii.

15 Fredrick Engels, 2011, *op. cited,* 459.

16 Ibid.

17 Ibid., 466.

18 Ibid., 470.

19 Jairus Banaji, 'Illusions about the Peasantry: Karl Kautsky and the Agrarian Question', in *Journal of Peasant Studies*, Vol. 17, Issue 2, London, 289.

'Whom shall we Ally with?' Peasantry in Later Marxist Writings, from Lenin to Mao

Lenin's *Development of Capitalism in Russia* (henceforth DCR) and Karl Kautsky's *Die Agrarfrage (The Agrarian Question)* both came in the same year- 1899. Kautsky's book dealt about development of capitalism in agriculture in the German context using data from Britain, France, Germany, and USA, while Lenin's book was concerned about the same in Russia. The second part of Kautsky's book "The Social Democratic Agrarian Policy", clearly indicates its purpose- to arrive at an agrarian policy for the socialist parties.[20]

One of Kautsky's finding is that with the development of capitalism in agriculture, a situation arises whereby rather than being dissolved due to the expansion of big farms, the small peasant farms becomes the source of cheap labour and other inputs for the large farms.[21] Along with this function, the family farms or small farms also engage in non-farm industrial activities, including wage labour, which allow them to survive.[22] This goes against the reading of Engels who believed that the small peasants "are doomed" in front of the big, capitalist farms. However, Bryceson says that Kautsky's understanding was not fundamentally different from other Marxist scholars as he also maintained that over a long period, peasant agriculture and population will eventually disappear through migration to urban areas and increase in non-farm rural livelihoods.[23]

Other than being an enquiry into the development of capitalist relations in Russian agriculture, Lenin's book was also motivated by the need to engage with the Narodniks, who considered that peasantry was essentially an archetypical whole, and class differentiation in it was never permanent, but a temporary phenomenon. The Narodniks had a legacy of scholarly engagements with the peasantry since the second half of nineteenth century and their works relied on rich statistics collected from the provincial government bodies in Russia called the *Zemstvo*; many of the Zemstvo statisticians were in fact Narodniks.[24] Based on the Zemstvo data, their studies refuted the claims

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20 See Karl Kautsky, *The Agrarian Question: A Survey of the Tendencies of Modern Agricultural Policy of the Social Democracy, https://www.marxists.org/deutsch/archiv/kautsky/1899/agrar/* (Website accessed on 15 March 2015).

21 Hamza Alavi, 'Peasantry and Capitalism: A Marxist Discourse', in Teodor Shanin (ed.), *Peasants and Peasant Societies: Selected Readings* (Oxford: Basil Blackwell, 1987), 192.

22 Jonathan Rigg, *More than the Soil: Rural Change in Southeat Asia* (Essex: Prentice Hall, 2000), 17.

23 Deborah Bryceson, 'Peasant Theories and Smallholder Policies: Past and Present', in Deborah Bryceson, Cristobal Kay and Jos E Mooij (eds.), *Disappearing Peasantries: Rural Labour in Africa, Aisa and Latina America* (London: ITDH Publishing, 2000), 11.

24 Utsa Patnaik (ed.), *The Agrarian Question in Marx and his Successors,* Vol. II (New Delhi: Left Word Books, 2011), 93.

of any significant development of capitalism in Russian agriculture, or its sustenance.[25]

After examination of the same Zemstvo data used by the Narodniks, Lenin showed that capitalism was already a dominant trend in Russian agriculture, and in terms of resources (carting-ploughing implements, land, draught animals etc.) there existed a huge gap between various sections of peasantry that resulted in class differentiation.[26] Alike any developing commodity economy, Russian peasantry was also experiencing pushes and pulls of forces like completion, land grab, concentration of resources in the hands of a minority, proletarianisation and rise of wage labour and property inequality etc., which were leading to "depeasantisation" i.e. a process which made old peasantries to disappear and brought in a new type of rural inhabitants in the countryside.[27] On the basis of these facts, Lenin differentiated the Russian peasantry into three strata, the middle peasants standing in the middle of its two extremes – "the peasant bourgeoisie" and "the rural proletariat".[28]

Lenin also talked about two trajectories of capitalist development in agriculture – "from above" and "from below"[29], with the former taking place in Prussia and the latter in the United States of America. The "from above" or Prussian path entails a process through which the Prussian feudal lords transformed themselves "into a class of capitalist farmers hiring wage labour", becoming a "class for itself" while also crushing the Prussian peasants.[30] Lenin said that this path retains semi-feudal features for long, and since transformation to capitalism through this was far slower than the requirement, it also crushed the possibilities of development of the peasant economy as the productive forces grew slower under this process.[31] Opposed to this was the "from below" or North American path which was a more preferable path as it ensured "free development of the small peasant farming", by removal of feudal vestiges and turned the whole agrarian system into a capitalist system.[32] Since, the "class for itself" action here was

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25 Nicholai Chernyshevsky was one of the most influential names of Russian Populism who asserted that capitalism had not commenced in Russia. V.P. Voronstov and N Danielson were two later Narodnik economists of the 1880s who agreed towards the penetration of capitalism in Russian agriculture but still maintained that Russian capitalism was unsustainable. In *DCR*, Lenin was primarily responding to these arguments of Voronstov and Danielson, whom he has referred to as Mr. VV and Mr. N respectively, in the course of the book. For more, see Gavin Kitching, *Development and Underdevelopment in Historical Perspective* (London: Methuen, 1982), 37-39; Atiur Rahman, *Peasants and Classes*, 1986, *op. cited*, 13-38.

26 V.I. Lenin, *Development of Capitalism in Russia,* in V.I. Lenin, *Selected Works*, Vol. III, 172-187, *www.marxists.org/archive/lenin/works/cw/pdf/lenin-cw-vol-03.pdf* (Website accessed on 15 March 2015).

27 Ibid., 173-89.

28 Ibid., 172-187.

29 V.I. Lenin, *The Development of Capitalism in Russia, op. cited*, 32-33.

30 Terence J. Byres, 'Paths of Capitalist Agrarian Transition in the Past and in the Contemporary World', in V.K. Ramachandran and Madhura Swaminathan (eds.), *Agrarian Studies: Essays on Agrarian Relations in Less-Developed Countries* (New Delhi: Tulika Books, 2002), 59.

31 Ibid., 59-60.

32 V.I. Lenin, *The Development of Capitalism in Russia, op. cited*, 33.

done by the peasantry, it ensured that the peasant economy prospered while the roadblocks in the path of productive forces were removed and a home market thrived due to these developments; due to this the Marxists consider the second path more progressive than the first.[33]

Other than countering the Narodnik ideas of an archetypical peasantry, Lenin's schema of class differentiation actually served another purpose – the task of determining what role various classes of peasantry were expected to play in the revolution. Since the task of the Bolshevik Party was to do revolution in a comparatively backward country with a significant peasant population, the Soviets concluded that the *Kulaks* or the rich peasants were the class enemies, while *Batraks-Bedankyaks* (landless seasonal agricultural workers and poor peasants respectively) were true allies and the *Seredenyaks* or mid-income peasants were unreliable allies.

What T.J. Byres calls the 'second round of the agrarian question' began in the aftermath of the Russian collectivisation exercise as the geographical locus and scope of the issue widened from Europe to Asia, Africa and Latin America, in the context of national liberation movements and peasant revolutions.[34] Most of these countries that were going through national liberation movements or revolutionary movements were predominantly agricultural and hence, the question of finding the most revolutionary section of the peasantry became significant. Mao Tse-Tung emerged as the most influential exponent of the "poor peasant thesis" in this time.

Two of his writings – 'Report of an Investigation of the Peasant Movement in Hunan', and 'How to Differentiate Classes in Rural Areas' focus on the situation of class differences in peasantry in the Chinese countryside of 1920s, and formulate a strategy for intensification of revolutionary action.[35] Under the heading 'Vanguards of the Revolution', Mao states that while rich peasants remain inactive in such struggles, middle peasants vacillate and that it is only the poor peasants who constitute the main force of revolutionary struggles as they are not afraid to lose anything.[36] Mao concluded that this "great mass of poor peasants" that constituted "altogether 70 per cent of the rural population" was the real "vanguard in the overthrow of the feudal forces" which performed the revolutionary task that was pending since a long time.[37] Mao called the Chinese revolution a peasant struggle, giving the primary actor position to poor peasants in the revolution, unlike the proletariat in the October revolution. It was this

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33 For a detailed explanation on Lenin's treatment of these two paths, see T.J. Byres, *Capitalism from Above and Capitalism from Below: An Essay in Comparative Political Economy* (London: Macmillan, 1996), 27-36.

34 T.J. Byres, 'Foreword', 1986, *op. cited,* xxviii-xxix.

35 See Mao Tse-Tung, 'Report of an Investigation of the Peasant Movement in Hunan', 23-62 and 'How to Differentiate Classes in Rural Areas', 137-40, in *Selected Works of Mao Tse-Tung,* Vol. 1 (Peking: Foreign Languages Press, 1965), *www.marx2mao.com/PDFs/MaoSW1.pdf* (Website accessed on 18 March 2015).

36 Mao Tse-Tung, 'Report of an Investigation of the Peasant Movement in Hunan', *op. cited,* 30-34.

37 Ibid., 32-33.

section of the peasantry that would "rush forward along the road to liberation", sweeping "all the imperialists, warlords, corrupt officials, local tyrants", and "every revolutionary party and every revolutionary comrade" was to be put to test in front of them, so as "to be accepted or rejected".[38] Mao's views of poor peasants were later opposed from within the Marxist tradition by Hamza Alawi and Eric Wolf, as we will see later. But his insistence on class differentiation within peasantry became an important concern for later scholars.

'Reactionaries' or a 'unique' category: Peasantry in neo-Narodnik writings and the Russian Collectivisation Debate

The Marxist ideas on differentiation of peasantry were severely challenged by the neo-Narodnik school, also called the 'organisation and production school', led by Russian economist A.V. Chayanov. Chayanov's principle emphasis was to show that peasant family farms were an economic form which was primarily different from "capitalist farming even in an environment clearly dominated by capitalism".[39] As the director of the Soviet Agricultural Academy, he initiated a formal debate on the question of the nature of the peasant family farm and peasant agriculture's place in an economy with the Marxists, which reached its peak in the 1926 and was cut short by Stalin's intervention in 1929 with the beginning of the collectivisation exercise.[40] Lost in the years of Stalinism, his *Peasant Farm Organisation* became available to Anglophone readers only in 1966, followed by the translation of *The Theory of Peasant Cooperative* in 1991. Despite this, his influence on peasant studies is unparalleled.

Chayanov insisted that the peasant family farms were based on the "nonwage family economic unit", which was a non-capitalist form with categories like wages and prices being outside of their purview.[41] The significance of this specific type of economic production for Chayanov was huge, as among the six types of economies that he cited, one type is the "family economy", with two sub-types of "natural" and "commodity" economy.[42] Maintaining that fulfilment of the family demand was the primary objective of peasant activities, he stressed that the degree of self-exploitation of labour, the

38 Mao Tse-Tung, Quoted in Utsa Patnaik (ed.), *The Agrarian Question in Marx and his Successors*, Vol. II, 2011, *op. cited*, 5.

39 Teodor Shanin, 'Chayanov's Message: Illuminations, Miscomprehensions, and the Contemporary "Development Theory', in Daniel Thorner, B. Kerblay and REF Smith (eds.), *A.V. Chayanov: The Theory of Peasant Economy* (Irwin: Homewood, 1966), 3.

40 Chayanov was later persecuted for his ideas that were contrary to the official Soviet line. His views that forcing peasant family farms to produce surplus won't yield desired results were criticised by Stalin as a defence of Kulaks. He was tried three times, sent to exile and later sentenced to death in late 1930s. His family came to know of his death only two years after he was killed. He was later rehabilitated in the 1980s by the efforts of a number of intellectuals and academicians, including Teodor Shanin. For more, see Daniel Thorner, B. Kerblay and REF Smith (eds.), *A.V. Chayanov: The Theory of Peasant Economy*, 1966, *op. cited*.

41 Ibid., 1-4.

42 The other types of economies were capitalist, slavery, communist, feudal and the serf economy of Tsarist Russia. See Ibid., xxii.

'drudgery', depended upon the demand satisfaction of the family farm – the more the family demand, the greater the drudgery.[43] Using farm size as the indicator of a family farm's wealth, he argued that family farm's size changed in accordance with the family's life cycle, going on increasing when the family grew and its members matured into workers, and coming down when the members aged or when the family disintegrated.[44] What was economic, class differentiation for the Marxists was just demographic differentiation for Chayanov.[45] While smaller farms grew into bigger farms with growth in the family members, the bigger farms disintegrated in smaller ones, keeping the number of affluent and not so affluent sections of peasantry proportional, when seen over a long period of time.

These ideas invited severe criticism from the Soviet economists, who under the leadership of L.N. Kristman tried to show the deepening of capitalist relations and class formations within the peasantry, arguing that a small section of peasants prospered at the cost of many.[46] Later, to justify appropriating the surplus from the peasant economy to fund Soviet state's industrialisation efforts, Evgenii Preobrazhensky argued for the need of a 'primitive socialist accumulation', to overcome its backwardness and ruins of the war, and achieve a significant improvement in its productive powers.[47]This meant moves to appropriate the property of *Kulaks* or forced collectivisation, which ultimately did take place on behest of Stalin; a Congress of Agrarian Marxists was urgently summoned to condemn the opponents of this policy, labelling them as traitors and the debate came to a forced end with it.[48]

However, in later years Chayanov's line of reasoning was picked up by a number of scholars, most prominently Teodor Shanin and Daniel Thorner. Thorner said that as a "widespread form of organisation of human society", the peasant economy holds extreme significance, and "it is essential to define peasant economy as a system of production", as "a distinctive group" while distinguishing it from other historical systems such as slavery, capitalism and socialism".[49] Talking about peasantry in the East and West Pakistan region, David Bertocci used the term "cyclical Kulakism" to argue that the position of rich peasants was never permanent in the agrarian system as the circulation of elites kept on happening as a result of the fluidity-flexibility of agrarian systems and rural strata.[50]

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43 Ibid., 6.

44 J M Millar, 'Reformulation of A V Chayanov's Theory of Peasant Economy', in *Economic Development and Cultural Change*, Vol. 18, No. 2, January 1970, 220.

45 See Henry Bernstein, V.I. Lenin and A.V. Chayanov, 'Looking Back, Looking Forward', *Journal of Peasant Studies*, Vol. 36, Issue 1, Routledge (January 2009), 51-81.

46 Terry Cox and Gary Littlejohn (eds.), *Kristman and the Agrarian Marxists* (New York: Frank Class and Company, 1984), 11-60.

47 Evhenii Preobrazhensky, *The New Economics* (London: OUP, 1965), 80-124.

48 Teodor Shanin, *The Awkward Class*, 1972, *op. cited*, 61.

49 Daniel Thorner, 'Peasant Economy as a Category in Economic History', in Teodor Shanin (ed.), *Peasants and Peasant Societies*, 1987, *op. cited*, 202-18.

50 Peter Bertocci, 'Social Organisation and Agricultural Development in Bangladesh', in R.D. Stevens, Hamza Alavi and Peter Bertocci (eds.), *Rural Development in Bangladesh and Pakistan* (Honolulu: University Press of Hawaii, 1976).

The collectivization drive of Soviets drew huge criticism, while the Narodnik insistence on uniqueness of peasant economy inspired various schools like the substantivists and moral economists that emerged in the later years.

'Nature' of Peasantry re-visited: Continuation of the debate in Formalists-Substantivists and Moral Economists

The formalist-substantivist divide is a result of the post war revival of the old, neo Narodnic-Soviet debate regarding the nature and traits of peasantry – whether peasantry was an a-historical, pristine 'type' of social existence that differed from others or not? Karl Polanyi asserted that the trade in pre-industrial societies was different from the same in industrial societies as rural producers functioned according to the logic of fulfilling subsistence needs rather than maximisation of benefits, a trait that was characteristic of the industrial societies.[51] In his article 'Economic theory and primitive society', George Dalton extended this argument, saying much of the contemporary economic theory was inapplicable to peasant societies of the past, as it differed from the present market economy "not in degree but in kind".[52] Together, they argued against the evolution of economic systems and societies, from simple to complex, ascribing an essentialist position to the peasant societies. The substantivist school thus revived the Chayanovian understanding of defining the peasantry.

To some extent, this also gets reflected in works of the subaltern school.[53] Ranajit Guha, in the very first volume of the subaltern studies argued that the domain of the subalterns was completely distinct from that of the elites, having its own logic, culture, patterns of mobilization and layers of domination.[54] Through a study of peasant insurgencies in the 19th century, Guha tried to show this domain of the subaltern and its concepts in action, attempting to prove the unique manner in which the peasant insurgencies derived meaning and methods from their own resources.[55] Partha Chatterjee extended this argument further in his studies on the peasant movements in pre-Independence Bengal, highlighting the community centric, non-individual line of peasant reasoning.[56] However, most of the theorisation of this school was limited to peasantry in colonial days.

51 See Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Time* (Boston: Beacon, 1957), *http://inctpped.ie.ufrj.br/spiderweb/pdf_4/Great_Transformation.pdf* (Website accessed on 18 March 2015).

52 George Dalton, 'Economic Theory and Primitive Society', *American Anthropologist*, Vol. 63, No. 1 (1961), 1-25, *https://www.jstor.org/stable/pdf/667335.pdf?_=1467122619617* (Website accessed on 18 March 2015).

53 Subaltern school has been dealt with very briefly here, for more, see Partha Chatterjee, 'A Brief History of Subaltern Studies', in Partha Chatterjee, *Empire and Nation* (New York: Columbia University Press, 2010), 289-301.

54 Ranajit Guha (ed.), *Subaltern Studies I, Writings on South Asian History and Society* (New Delhi: Oxford University Press, 1982), 31-33.

55 For a detailed treatment of the same, see Ranajit Guha, *Elementary Aspects of Peasant Insurgency in Colonial India Society* (New Delhi: Oxford University Press, 2005).

56 Partha Chatterjee, *The Nation and its Fragments: Colonial and Postcolonial Histories*, in *The Partha Chatterjee Omnibus Society* (New Delhi: Oxford University Press, 1999).

Robert Firth opposed this, insisting that peasants also employ rational choice in allocating scarce resources, and hence was not different from people in industrial societies.[57] Clubbed under the formalist school, Firth and likeminded economic anthropologists such as Michael Douglas and A.G. Dewey tried to break the "primitive-modern societies" divide, arguing that peasants also try to organise their resources with an intent to maximise their utility, but the absence of formal economic institutions like banks force them to do it in a slightly different manner. While the Moral Economy school took some inspiration from the substantivist school, arguing for the different nature of peasant societies, the formalist logic was picked up by Samuel Popkin, who tried to explain the behaviour of the peasantry using the rational decision-making model and tools of political economy.[58] Popkin insisted that the peasant is a rational actor, making choices for self-maximisation on the basis of a loss-benefit calculation influenced very little by the moral concerns.

In recreating the essentialist notion of a pristine, a-historical, homogenous peasantry, alike the substantivists, Moral Economy School also takes inspiration from the neo-Narodnics, though without acknowledging it. Works of historians like Eric Hobsbawm[59] and E P Thompson[60] are said to contain the traits of the moral economy but the most well-known proponent of this school is American anthropologist James Scott.[61] Based upon his fieldwork in Southeast Asian countries, Scott talks about a unique peasant culture and economy that runs on the logic of subsistence (called 'subsistence ethic' or 'safety first' principle), risk aversion, community and reciprocity, contrary to the industrial societies' notion of profit maximisation and individualism.[62] Scott argued that the traditional structures of peasant societies and patron-client ties between the landlords and peasants provided a cushion against distress through 'social insurance' from the traditional elite and 'distribution of risk' in peasant society, making actual starvation rare in Cochin-China and Lower Burma (now Myanmar)[63]. Subsistence, thus, was a 'moral claim' of the peasantry over those whole ruled over it[64], but the colonial

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57 See Raymond Firth, 'Themes in economic anthropology: a general comment' in Raymond Firth (ed.), *Themes in Economic Anthropology* (London:Tavistock Publications, 1967).

58 Samuel Popkin, 'The Rational Peasant: The Political Economy of Peasant Society', *Theory and Society*, Vol. 9, No. 3 (May 1980), 413. See also Samuel L. Popkin, *The Rational Peasant: The Political Economy of Rural Society in Vietnam* (Berkeley: University of California Press, 1979).

59 See Eric Hobsbawn, *Bandits* (London: Wiedenfeld and Nicolson, 1969).

60 Thompson is credited with the usage of the term 'moral economy', See E P Thompson, *The Making of the English Working Class* (New York: Vintage Books, 1963).

61 For the works that inspired Scott's idea of Moral Economy, see the first part of Marc Edelman, 'Bringing the Moral Economy Back in...to the Study of 21st Century Transnational Peasant Movements', *American Anthropologist*, New Series, Vol. 107, No. 3 (September 2005), 331-45.

62 James C. Scott, *The Moral Economy of the Peasant: Rebellion and Subsistence in Southeast Asia* (New Haven and London: Yale University Press, 1976), 13-55.

63 Ibid.,88.

64 Ibid., 32-34.

rule and economic policy decisions associated with it destroyed this traditional structure, forcing the peasants to rebel as last resort.

'Most revolutionary' or No Longer Meaningful: From 'Middle Peasant Thesis' to Negation of the term 'Peasant'

Contrary to above-mentioned celebratory accounts, the initial anthropologist engagements with the peasant were either belittling, or at best essentialising. This could be seen from the example of A.L. Kroeber's definition who said that peasants are those who constitute "part societies with part cultures, definitely rural, yet live in a relation to a market town" and though they are dissimilar to the tribal people as they lack the "isolation, political autonomy and self sufficiency of a tribal population", they still "maintain much of their old identity, integration and attachment to the soil."[65] Robert Redfield took inspiration from the 'part culture' orientation, and defined peasantry as a "little tradition", while maintaining that "peasant society and culture" have "something generic" about them, thus producing "some similarities all over the world" in this unique "arrangement of humanity".[66] Teodor Shanin, though not so patronising, also argued that the peasantry consisted of "small agricultural producers, who, with the help of simple equipment and the labour of their families, produce mainly for their own consumption" along with the purpose of meeting their "obligations to the holders of political and economic power".[67]

A revival of anthropological engagement with peasantry happened in the wake of post War period as developments in Asia, Africa and Latin America, which witnessed peasantry led revolutions and peasant uprisings against colonial rule, sparked the interests of both Marxists and the US-funded anthropologists. Marxist writer and ideologue of the Algerian uprising- Frantz Fanon said that "in the colonial countries the peasants alone are revolutionary, for they have nothing to lose and everything to gain".[68] Fanon stressed that "the underprivileged and the starving peasant" who lives "outside the class system is the first among the exploited to discover that only violence pays".[69] In his 1965 article 'Peasants and Revolution' which was a reply to Fanon's generalisation about peasantry's revolutionary potential, Hamza Alawi highlighted the need for differentiating between the nature and capabilities of various sections of the peasantry, coming up with his "middle peasant thesis".

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65 A.L. Kroeber, *Anthropology* (New York: Harcourt, Brace and Company, 1948), 284, *https://archive.org/stream/anthropologyrace00kroe#page/n3/mode/2up* (Website accessed on 18 March 2015).

66 Robert Redfield, *Peasant Society and Culture: An Anthropological Approach to Civilization* (Chicago: University of Chicago Press, 1969), 25.

67 Teodor Shanin, *The Awkward Class*, 1972, *op. cited*, 204.

68 Frantz Fanon, *The Wretched of the Earth* (New York: Grove Press, 2004), 23.

69 Ibid., The 2004 Grove Press edition of the book mentioned above does not use the words 'outside the class system', but the 1961 Penguin edition does use these precise words to describe the starving peasant.

Using role of various sections of the peasantry in movements and revolutionary struggles in Russia, China and India, Alawi argued that the middle peasants, who were independent small holders owning land that they cultivated themselves and belonged to a "different sector of the rural economy",[70] were "initially the most militant element of the peasantry".[71] Alawi maintained that though his argument reversed "the sequence that is suggested in Maoist texts" as the poor peasants were "the least militant class of the peasantry" to him, it was "in accord with the Maoist practise".[72] Eric Wolf supported this argument, by saying that "only a peasantry in possession of some tactical control over its own resources" could provide leadership and sustain "an on-going political leverage".[73] Since the poor peasant lacked any tactical power as he depended "on the landlord for the largest part of his livelihood", he and the landless labourer were "unlikely to pursue the course of rebellion" unless helped by an "external power" e.g. the Red army in case of China and the collapse of the Russian army in case of the October Revolution.[74] The rich peasants, being the local agent of powers, were unlikely to embark on a revolutionary course and hence only the "land owning middle peasantry" or the "peasantry located in a peripheral area outside the domain of landlord control" was able to "enter a sustained rebellion".[75]

Going further, in *Peasant Wars of the Twentieth Century*, Wolf defines the peasants as populations "existentially involved in cultivation" and making "autonomous decisions regarding the process of cultivation".[76] The category thus includes share croppers, tenants and owner cultivators, "as long as they are in a position to make the relevant decisions on how their crops are grown", but excludes fishermen or landless labourers.[77] Differentiating between the peasant and the farmer, Wolf says that "the major aim of the peasant is subsistence", often keeping "the market at arm's length" while the farmer "enters the market fully, subjects his land and labour to open competition" and "explores alternative uses for the factors of production in search for maximal returns".[78]

All these definitions indicate of a generic type of peasantry, engaged in petty production, and more or less alienated from the 'market'. Further, all such definitions belong to the pre neo-liberal world and hence need an adjustment with the changed times. Echoing these sentiments, in the very first volume of the *Journal of Peasant Studies* Sidney Mintz called for the "need for middle-range definitions of peasantries and of peasant societies" which could lead to the "widest-ranging level of definitional engagement, adequate to describe" various "real peasant societies" that exist on the ground.[79]

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70 Hamza Alavi, 'Peasants and Revolution', *The Socialist Register* (1965), 244.
71 Ibid., 275.
72 Ibid.
73 Eric R. Wolf, 'On Peasant Rebellions', *International Social Science Journal*, Vol. 21, No. 2 (1969), 286-294.
74 Ibid.
75 Ibid.
76 Eric R. Wolf, *Peasant Wars of the Twentieth Century* (London: Faber and Faber, 1971), xviii.
77 Ibid.
78 Ibid., xviii-xix.

Despite this, Mintz refused to acknowledge landless agricultural workers as peasants, keeping the definition narrow.

But while many call for broadening the definition of 'peasant', others argue for abandoning usage of the term altogether. Anthropologist Anthony Leeds considered that peasant was "a folk term adopted into social science" while lacked any precision and hence he was critical of those who used it.[80] Marxist political economist Henry Bernstein argues that usage of the term peasant shall be limited to explaining the "pre-capitalist societies, populated by mostly small-scale family farms" as capitalism has led to division of peasantry into "small-scale capitalist farmers, relatively successful petty commodity producers and wage labour".[81] However, a large number of scholars have abstained from making such claims while also recognising the "occupational multiplicity" and changes in the countryside.

Marc Edelman argues that "peasant is not just a role or a social structural position, but also a form of identity and self-ascription".[82] Thus, he highlights the significance of invocation of this term and the situation in which it was done, giving importance to the role of the grassroots agrarian movements. Transnational agrarian organisation Via Campesina defines peasants as "the people of the land", using common concerns like increased vulnerabilities due to globalisation, commodity markets and climate change as the factors that unite various groups of rural inhabitants – owner cultivators, share-croppers, landless labourers, rural artisans etc. together. Edelman points out that the activist definitions have now embraced the inter changeability of terms "farmer" and "peasant" as a general practise.[83] This trend towards broadening the definition is also reflected in the efforts of the international organisations and institutions as the definition of peasant forwarded by the Advisory Committee of the Human Rights Council (UNO) is similar to Via Campesina's definition.[84] Thus, while majority of definitions given by social scientists and anthropologists differentiate between the peasant and the farmer (sometimes also between both these and the agrarian labourer), recent practises in grassroots activist circles and international organisations use them interchangeably. Though interchangeable usage of both terms is something that has become necessary, the reasons for this lie in the sweeping changes that have happened in the world through forces of global capitalism. Let's try to understand this in the specific context of India.

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79 Sidney W. Mintz, 'A Note on the Definition of Peasantries', *Journal of Peasant Studies*, Vol. 1, No. 1 (October 1973), 92.

80 Anthony Leeds, 'Mythos and Pathos: Some Unpleasantries on Peasantries', in Rhoda Halperin and James Dow (eds.), *Peasant Livelihood: Studies in Economic Anthropology and Cultural Ecology* (New York: St. Martin's Press, 1977), 228.

81 Henry Bernstein, *Class Dynamics of Agrarian Change* (Halifax: Fernwood Publishing, 2010), 3-4.

82 Marc Edelman, 'Transnational Organising in Agrarian Central America: Histories, Challenges, Prospects', *Journal of Agrarian Change*, Vol. 8, No. 2/3 (April 2008), 251-252.

83 Marc Edelman, 'What is a Peasant? What are Peasantries? A Briefing Paper on Issues of Definition' (New York: Hunter, 2013), 10.

84 Ibid., 12.

The Peasant in post-colonial *economic*: lessons from India[85]

The 1960-70s saw an intense debate in India with Utsa Patnaik arguing that capitalism was emerging as the dominant trend in Indian agriculture, and opposed by a group of scholars including Ashok Rudra, A. Majid, B.D. Talib etc.[86] The debate ended in favour of Patnaik with majority agreeing that capitalist and semi-capitalist relations were indeed significantly emerging in the countryside at the cost of the feudal relations.[87]

The receding peasant-farmer differences and limitations of the old definitions become extremely significant in this context of capitalist development in agriculture, especially since the advent of Green Revolution peasant politics in India. Green Revolution in India produced a new category of peasants, who were adapt at making use of modern techniques and technology of agriculture, skilled in pressuring the state machinery in ensuring greater returns on produce and cheap input costs through united political action, and yet were culturally not very dissimilar to the notion of the old peasant. Nicknamed "bullock capitalists"[88], their unions heavily influenced the politics of the 1970s and 80s across India, be it the Bhartiya Kisan Union (BKU) of Uttar Pradesh, Haryana and Punjab, Shetkari Sanghatna of Maharashtra, Karnataka Rajya Ryot Sangha (KRRS) of Karnataka or Tamil Nadu Agriculturists' Association (TNAA) of Tamil Nadu. Keeping in mind these differences, Dipankar Gupta uses the term 'farmer' for owner-cultivators of post independent India, and 'peasant' for those of pre-independence period.[89] Making an attempt to explain the difference between them, he goes on to narrate what both terms denote. The notion of 'peasant', says Gupta carries political-economic backwardness, indifference to dynamism, rural idiocy with it[90], while the 'farmer' is "conceived as a modern agriculturist who often hires labour, employs machines and other green revolution techniques, and who interacts with the market and with political institutions more intensely and knowledgeably than the peasant is understood to do".[91] However, despite being farmers in this sense, the BKU mass base still retains a 'peasant outlook' in many ways and hence, Gupta coins a new term, the

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85 Due to limitations of space, only a few scholars who extensively wrote about Indian peasantry could be engaged here.

86 Other contributors to the debate included Paresh Chattopadhyay, Hamza Alavi, Andre Gundar Frank, Ranjit Sau, Jairus Banaji, Pradhan H Prasad, Gail Omvedt and M.M. Mukhopadhyay. See Utsa Patnaik (ed.) *Agrarian Relations and Accumulation: The 'Mode of Production' Debate in India*, (Bombay, Oxford University Press, 1990)

87 Pranab Bardhan, 'On Class Relations in Indian Agriculture', *Economic and Political Weekly* (12 May 1979), 857-60.

88 Lloyd and Susanne Rudolph, *In Pursuit of Laxmi: The Political Economy of the Indian State* (Chicago: Chicago University Press, 1987).

89 There are some exceptions as sometimes he uses the 'peasant' for post-independence owner-cultivators as well. But this usage is limited to small or marginal owner-cultivators who are clubbed as 'poor peasants'. However, for categories like agricultural labourers and tenants Gupta uses the appropriate terms in both phases.

90 Dipankar Gupta, 1997, *op. cited*, 23

91 Ibid., 25.

'peasant-farmer' to signify this new age owner-cultivator, the *Kisan*.[92] While the 'farmer' part takes care of the economic roles aspect of the *Kisan*, the 'peasant' part "connotes the culture and ambience in which the farmer lives".[93]

It is understandable to keep usage of the term 'peasant' to denote the cultural-social universe where the current day agriculturalists live. But Gupta does not explain why he considers the needs to use the word 'farmer' to denote the 'economic roles' aspect of the owner cultivator. Perhaps we could trace the reasons for the same in the traditional-anthropological definitions of the 'peasant' mentioned in previous sections.

The Chayanovian definition of the peasant as someone who engages in agricultural production on the family farm with family labour (in most of the cases) and produces mainly for sustenance, influenced a number of definitions of peasants that came up later, though with some differences. Hence, when the later Marxists differentiated peasantry on the basis of outside labour hired, or when Hamza Alawi put forth the 'middle peasant thesis' which was substantiated by the works of Frantz Fannon and Eric Wolf, or when the neo-Narodniks like Shanin and later the moral economists explained peasant rebellions in the third world, all of them had the previously defined notion of 'the peasant'. Eric Wolf's description of peasant is quite representative of this whole universe of scholars; he insisted, as mentioned previously, that the peasant is someone who is engaged in subsistence production and his engagements with the market are next to none. That's why when someone like Gupta has to deal with peasants of the Green Revolution period, who are not just surplus producers but are deeply embedded in the market for supply of modern inputs and sale of their product, he feels the need to qualify the concept by adding 'farmer' to it to signify the 'economic roles' which in essence highlights a changed relationship with the market.

It is in this context that bringing in Kalyan Sanyal's understanding of capitalist development becomes important. While expressing his understanding of the "post-colonial *economic*", Sanyal differentiates between what he calls the "need economy" and the general capitalist economy, with the need economy being that realm of "non-capital" that is "annihilated by primitive accumulation but resuscitated by development interventions".[94] This space of the "non-capital" is ruled by the logic of subsistence or fulfilment of needs and comprises small scale or petty owner-producer enterprise.[95] These could be a small roadside eatery in Kolkata or a furniture workshop operating from shanties in Durban. Sanyal asserts that these enterprises got popularised in the development theory discourse as comprising the "informal sector" since the 1970s.[96]

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92 Non land-owning categories such as tenants, agrarian labourers have been excluded as one who does not own land was not considered a farmer by Charan Singh and both BKU and Gupta maintain that understanding.

93 Dipankar Gupta, 1997, *op. cited*, 26

94 See Kalyan Sanyal, *Rethinking Capitalist Development: Primitive Accumulation, Governmentality and Post-Colonial Capitalism* (New Delhi: Routledge, 2014), 68-69.

95 Ibid., 68-70.

96 Ibid., 193-96.

Later, Sanyal goes on to differentiate his understanding of the need economy with that of the transition-development theorists. The latter, according to him view the need economy as guided by subsistence, non-surplus production meant for satisfaction of own needs, and thus the whole difference between it and the general capitalist production for them is that of "natural economy" and not commodity economy.[97] Sanyal asserts that both capital and non-capital comprising the post-colonial *economic* reside within the "commodity space" and hence the need economy or the natural economy is also engaged in surplus production and commodity production.[98] However, after production, the commodities are then sold in the market to "acquire money that will enable the producers to have access through the market to a bundle of goods and services" for satisfaction of their needs.[99] This he describes by the "Marxian commodity-money-commodity (C~M~C) circuit".[100] Thus, in place of immediately consuming the use-value produced, or in place of its direct exchange with required use-values through barter like system, the need economy produces commodities that are sold in the market to acquire money, which then is used to buy the required consumption basket. Sanyal's insistence is on the point that the monetisation of all transactions (and commodities) and the mediation of market in all such transactions has become the characteristic feature of global economy of our times, and even the need economy i.e. natural economy or the informal sector is not free of it.

Looking at the term 'peasant-farmer' in light of the above understanding reveals that the term has been rendered obsolete in light of the new developments in global economy. For what is the need of attaching 'farmer' with 'peasant' to denote 'economic roles' and increased interaction with the market when all forms of production (even those in the need economy) have already been subsumed within the market? If the 'peasant' is as integrated with the market as the 'peasant-farmer', what is the need of the second category? And if we subtract the later addition suggested by Gupta, what we have is the contemporary 'peasant' who is in no way less integrated in the market and monetary transactions than the 'peasant-farmer' or the farmer.

Even Utsa Patnaik- one of the biggest proponents of class differentiation in India, has also said lately that the principal contradiction in agriculture is shifting to that between "all the peasant classes in rural areas" on one hand and "imperialism with its local landed collaborators" on the other.[101] Certainly, internal divisions within peasants are expected to blur when the whole peasant community and agriculture goes through crisis as is the case currently in India. In light of this discussion, the insistence of Ploeg to not contrast 'peasant farming' with 'entrepreneurial" farming, but to see them in continuum makes more sense.[102]

97 Ibid., 68-70.
98 Ibid.
99 Ibid., 69.
100 Ibid.
101 Utsa Patnaik, *The Republic of Hunger and Other Essays* (Gurgaon, Three Essays Collective, 2007), p. 226
102 Jan Douwe van der Ploeg, *The New Peasantries: Struggles for Autonomy and Sustainability in an Era of Empire and Globalisation* (London: Earthscan, 2008).

From Agriculture to Non-Farm: Agrarian Change among the Scheduled Castes of Central Assam

Sarmistha Das*

Abstract

This paper examines how agrarian change and production relations have been shaped by myriad factors like caste, landholding, and social position and livelihood choices. While land is central to agricultural production, the nature of its access as manifested through landownership and land tenure defined by the agrarian relations of a society vary. Apart from the primitive or simple societies, agrarian social relations are invariably hierarchical in nature underscoring differential access of people to land. The paper aims to understand the complex nature of such hierarchical relationships as well as the nature of their transformation with the unfolding of changes in the agrarian practices and other forms of livelihood in contemporary Assam vis-à-vis India. Located in a multi-caste village of central Assam, the article moves around the issues of land and livelihood, new alternatives to supplement the traditional production process, the inter caste relationship and the nature of landholding. The article is an attempt to understand the process of transition- from being engaged in agriculture (what they were) to their disinterest in the production process and the factors which contribute to expedite this process.

Introduction

In recent times, the changing agrarian relations coupled with emerging livelihood practices among the rural populace have brought about significant transformation in the traditional Indian rural society. While some of these changes are the result of the positive state intervention in the form of land reforms, pro-poor schemes, technological inputs in agriculture, etc., some other changes in the rural society are the consequences of state's indifference as well as lopsided approach to development. Such initiatives, while on the one hand, helped people counter some of the challenges of agrarian backwardness, on the other, gave birth to a series of socio-economic problems arising out of ambiguities in the legislations, slow bureaucratic procedures, ignorance and insufficient resistance by the people (Mohanty, 2012).

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New studies on land ownership and reform from across the world present an interesting picture of the changing agrarian economy vis-à-vis state. Boon (2014) in his discussion on the relationship of state and land in the African context argues that struggle over land and confrontation of state and citizens in the everyday affairs of African political system has become an apparent reality today. Lund (2008) talks of the issues of land and labour in the West African region. The issues of land and property determine the political agenda at the local level. Borras et. al. (2007) on another account brings in the discourse from Philippines and refers to the World Bank experiments in market led agrarian reforms and its anti-poor outcome. Murray (2007) while referring to Indonesia brings into focus the constraints that fail to improve the conditions of lives, livelihoods and landscapes of the people and narrates how everyday issues of corruption, violence remain the biggest challenge.

In the Indian context it is evident that the measures initiated by the Indian state such as land reforms and agricultural modernization along with green revolution could not remove social inequalities. Introduction of improved means of technology in agriculture by the state gave birth to a new mode of production within the Indian economy (Rudra 1975; Thorner 1982; Patnaik 1976, Banaji 1976; Alavi 1981, Bhaduri 1973; Chandra 1974). Further, such change accentuated regional inequalities as green revolution and its advanced technologies were introduced only in select pockets of the country (Jodhka, 2004, Dhanagare 1991; Brass 1994). Thus, green revolution created binaries across the country; the beneficiaries (farmers) not only dominated the rural areas but also had a substantial influence in the state and regional politics and over time this class started moving out into different non-agricultural activities (Karnath 1991). Some had migrated to urban areas (Upadhya 1988) and some entered agricultural trade (Harris-White 1996). The pauperised peasantry on the other hand became landless and agricultural wage labourers and many also migrated to urban areas in search of livelihood. These emerging processes changed many traditional relationships within the village and social structure gradually became redundant. Aggarwal (1971), Breman (1974) observe 'depatronisation' as a process being experienced in many areas which were affected by the green revolution.

The process of rural outmigration peaked since the 1990s after structural adjustments in the Indian economy. A visible outcome was the real estate boom and many youths migrated to work in these nonfarm sectors. Parthasarathyet. al. (1998) argue that rural unemployed go out searching for jobs and are willing to do whatever comes their way. This process of rural outmigration became a pan Indian phenomenon. Chakravarti's (2018) ethnographic account of the lives of the Dalit agricultural labourers in Bihar reflected through their stories of life brings out the crisis in accessing the basic necessities such as health care, education for the marginalized. Though the village under study remained unaffected by green revolution, yet rural outmigration remained a major phenomenon there too, though the pattern was different. The youths moved out of the traditional agrarian economy and started looking for alternatives beyond agriculture. While some joined non-farm employment many migrated for joining the informal sector.

Focus of the paper

The paper is based on ethnographic account and analysis of the lives of people in Dakhinpat *Satra*, a revenue village, under the Nagaon Sadar revenue circle, of Nagaon district in Assam (which is located in the northeast of India). The village is 12 kms, south west of Nagaon town[1] and falls under Dakhinpat Gaon Panchayat and Pakhimoriya mouza.

The village is home to a number of castes and there are three wide-ranging residential segregations based on caste. They are divided into *Satra* (neo-vaishnavite monastery) *chuk* (corner), Besimari and Dakhinpat. While each segregation is a unit in itself, they are also mutually dependent on each other in terms of their everyday socio-economic activities which primarily revolved around agriculture. *Satra chuk* are at the centre of the village and is surrounded by Dakhinpat on one side and Besimari on the other. In terms of caste composition of the households, *satra* chuk is the most diverse with castes like Brahmins, Kalitas (a middle caste groups in Assam) Koch (a detribalised Hindu group) and *kaibartas* (a scheduled caste group). The Dakhinpat and Besimari area of the village, however, are home to the *kaibartas* and *hiras* (two scheduled caste groups in Assam).

The *satra*, traditionally was the fountainhead of religious, economic and political authority of the village. The local narratives claim that the village was donated by a tribal king in a process of detribalizing himself and sanskritizing into the Hindu fold. Hence, all land including the water bodies in the village were under the control of the *satra*. All major decisions on access to land, production process, share of the produce, and control over produce etc.share to the *satra* was taken by the *satra*dhikar (abbot). The economy in the village revolved around the cultivation season in winter and summer. The winter crops cultivated included mustard and pulses like the local variety of *kechari (*lentil*)*. During the summer, *bau* and *lahi* two different varieties of paddy were grown in the village. Apart from paddy the village also has rich sugarcane and mustard plantations.

The farming and agricultural life had been fairly good in the village earlier. Livelihood in the village spun around agriculture, the labour required was supplemented by the members from various castes, except the Brahmins, from the village. But as the traditional authority of the *satra* declined, the land reforms left the traditional power house to mere embellishments of traditional authority. Land was redistributed among the people. This was also followed by the fissures in the traditional religious supremacy of the *satra*. Towards the late 1970s there were religious assertions by lower castes in the village and they were supported by their fellow caste members from neighbouring villages. Today traditional arrangements have changed and new patterns of agriculture and its alternatives have evolved with time. This paper deals with issues like land fragmentation, changes in agrarian relationship and loss of traditional sources of livelihood.

[1] According to the Statistical Handbook of Assam 2011, Nagaon district is divided into three subdivisions, 17 towns, 1412 villages and 239 Gaon Panchayats.

Approach and method of study

Evidently, negotiating with issues as mentioned in the previous section called for a certain amount of methodological flexibility and therefore informal discussions and conversations with the villagers helped in understanding and collating the necessary information and data for the study. However it was challenging to work as a non-participant observer especially in the pockets dominated by the marginalised caste group mostly the *kaibartas*. When I decided to stay in another *kaibarta village* located some 4 km away from my study village, the villagers from my study area started cooperating with me and came forward for discussions. They would huddle around me and discuss their problems ranging from the infrequent visit of doctors at the primary health care centre, to difficulties faced by them in procuring the job cards for various schemes under Mahatma Gandhi National Rural Employment Guarantee Act. The villagers took me to be either a representative from some Non-Profit-Organisation (NGO) or as representative of the government and hence expected some kind of financial help from me. However, with time such perceptions about me gradually changed and they understood my purpose of visit. As I started to spend more time with the people in the village it became apparent that I was neither a benefactor nor a threat to them. My task that seemed daunting became enjoyable.

Local Agrarian Economy and Caste

Agriculture was the backbone of the traditional village economy. The process of agricultural production involved all the villagers but based on their castes affiliations the individuals worked at various capacities. Besides agriculture, fishing was a supplementary source of livelihood, but such activities were confined to the scheduled castes only. Traditionally all the villagers irrespective of their caste affiliations were engaged in the agricultural fields of the *satra* (*Khatopathar)* at different capacities; the system though open yet production relations were stratified. While the *kaibartas* and the *hiras* were engaged in activities like ploughing, the brahmins, kochand the kalitas were placed in activities that were perceived higher in status compared to ploughing. The brahmins and the kalitas did not directly work on the agricultural fields; they were the officials appointed by the *satradhikar* (abbot) to oversee the agricultural work. The *satradhikar* did not reside in the village, in his absence the production relations were under the supervision of the members of the *satra parichalana samity* (*satra* management committee). This committee comprised of the members of the upper caste who were influential not only in their own village but also in the larger local social setting. The brahmins numerically dominated the committee and were engaged in most of the decision making because of their traditional influence in the *satra*. The *satra* was a part of the brahmo sanghati (one of the four different *sanghati* of *satra*: *purusa*, *kala*, *nika* and *brahma*. The distinction lies in the ideology and the philosophical orientation of the *satra*s which emerged in the sixteenth century. The *brahma sanghati*is headed by a Brahmin preceptor, together with Vedic rites and *naamkirtan* lays emphasis on God. (Nath 2011:39). Presence of the brahmin preceptor gave an added advantage to the brahmins in the village who traditionally exerted their influence. Thus, for the sharecropper appeasing the *satra* and its officials was crucial as his good relations with

them marked a way for his good share in *kahtopathar* and for which he may at times had to put an extra effort to keep them contented. There are instances when a cropper from *kaibarta or a hirash* community would go and work in brahmin houses as *kamla* (daily labourer) without any economic remuneration (free labour service). In a certain sense, for the sharecropper the *satra* as an institution was the lifeline, dominating their major socio-economic relations.

The elderly men from the village narrated that such relations of production were hereditary. The *adhihars* (sharecroppers) would inherit their titles. While they could not transfer the land, they could pass on the right to cultivate in a piece of the *satra* land to the members of the next generation.

The *satra* occupied the centre stage and owned the village land (it had a total of **651** bighas of land under its control till the land reforms). The traditional edifice started losing its power with the implementation of land reforms since India's independence especially since 1973 (which were subsequently repealed and implemented again). Thus, the upper castes men by being members of the *satra* parichalana samity exercised control over the *satra* land and the rest of the villagers. The land reforms brought alteration in the total acreage of land in the village. This was welcomed by most of the villagers who were contented with the reforms. However, in terms of the total land holding, the *satra* till date remains the biggest landholding institution in the village.

Agricultural engagement of the villagers today varies. Based on their contribution in agriculture and ownership of land four categories can be found in the village. These categories are not exclusive and can be inclined with the categories of Thorner (1973). The categories regionally vary except the category of Mazdur who more or less has a lot of similarity with the kamla.

i. *Landowner:* This category has maximum land in the village. On an average, they own more than 15*bighas* of cultivable land. Some of them lease out and some lease in land. This category is found across all the castes. While the primary source of income revolves around agriculture, some are engaged in government jobs, some in small businesses like grocery store, tea stalls, hardware shop pharmacy, etc. in the village. This category can also be called as the small farmers.

ii. *Adhiar*(share cropper): This is a category which is mostly found amongst the middle and marginalised castes in the village. On an average, they own more than 10 *bighas* of land. Often the produce they generate from land is not enough for them to sustain for a year. Hence, they also engage in other forms of income generation besides engaging in agriculture.

iii. *Haluwa*(plough-man): This is a category which owns less land 5 *bighas* of cultivable land. They work as wage labourers and the only supplementary skill was with the *hal (*plough). But with an increase in the mechanised methods of agriculture especially the use of tractors, they have started losing their traditional occupation.

iv. *Kamla*(daily wage labourers): They are landless and the only source of income for them is by working as agricultural labour. Occasionally they also work under MGNREGA, but this is not a regular source of income as the functioning of the schemes is irregular.

Apart from the *landowners*, other categories include members from lower and marginal castes. The households of the upper caste officials of the *satra*, which belong to the brahmin and kalitas enjoyed usufruct rights over *satra* land provided to them by the *satra* (by virtue of being members of the *satra* parichalana samity). With the enforcement of Ceiling Act the *satra* had to surrender its land above the ceiling limits, but the land under the possession of the upper caste households mentioned was not brought under the purview of the Act. The land under their possession was treated as family land and not as *satra* land even though such lands belonged to *sattra.* However, land owned by these households was not large in sizes and it varied 10 to 15 bighas of land[2]. The ceiling surplus land of the *satra*, however, was distributed among the villagers. Though this provided many marginal and landless peasants, especially kaibartas and hiras with some land, this was much less than what the upper castes secured after the redistribution of land. As narrated by a kaibarta villager, he could get 12 bighas of land as his uncle was close to the revenue officials. However, leaving out the land under the possession of the upper caste, the *satra* and the wetland areas (which were declared as commons), only 250 bighas of land was left for redistribution among more than 200 other families of the village.

Besides agriculture, traditionally the commons (mostly wetlands) in the village were an important source of supplementary income. Conventionally the commons were accessed by all the castes with a certain edge administered by the *satra* and its parichalana samity. However, over the years there has been a decline in an individual's access to such commons as most of the water bodies have dried up. The river which contributed significantly as a supplementary source of income went under private lease. The villagers now seek permission from the lessee to engage in fishing.

A young boy from the village in his early twenties narrates:

> *Agriculture is no longer an appealing area of livelihood for two reasons: it is not as productive as it used to be and it is time taking. Moreover with disappearance of the wetlands and the river Kolong which was the life line for the villagers going under amahaldar (lease holder) people's access to the alternate sources of livelihood has become limited.*

Thus, from being a common asset, the river today has not only become a private space but in the process, has also weakened the supplementary source of income for the villagers.

[2] Only in a single case, I found one brahmin landowner with 30 bighas of land.

Lack of irrigation has been often cited as a major setback to agriculture. During the late 20th century Kolong (the only river) which covered the length of the village had been blocked at Hatimura in Kaliabor (a place which is at 54 km from village). During one monsoon, the river created debacle in the downstream areas of Nagaon town, following which the civic authorities had blocked the river at its mouth. This had a severe effect on the downstream villages in the district. Further this has stopped the constant flow of water from Brahmaputra to the river Kolong. Not only did it brush off the inflow of water but also affected the aquatic life in these villages. Villagers (from Dakhinpat) rue that the village which was once known for its fertile river beds is today under extreme agricultural poverty. The river no longer continues the same flow and can today be considered almost a dead river; this has further added to the livelihood miseries of the youths in the village. The blockade of the river Kolong at its mouth not only stopped the normal flow of the water in the river but the flood water that replenished the wetlands periodically and also deposited fertile silt in the agricultural fields in its flood plain had been cut off. Today, the wetlands have become a pale shadow of their past self. Villagers, who once had flourishing fishing activity, today hardly have anything worthwhile to offer. There are evidences that reflect the crisis faced by the scheduled castes and the plight of their livelihood with the death of the river (Bora:2004). Landlessness is also an important factor contributing to disinterest amongst the scheduled caste villagers. Thus, shifts in livelihood practices and the transition from agriculture to non-farm activities have become fashionable in the village[3].

Land Distribution and Fragmentation

A look at the caste wise land distribution in the village reveals that out of the total 610 bighas of land in the village, the SCs have maximum land under their possession. Table I below represents caste wise distribution of land among the villagers. However, the data on fragmentation of land (in figure I, II and III) portray a contrary picture.

Table 1: Caste wise distribution of land in 2013[4]

Caste	Land holding (in Bighas)
Scheduled Castes (Hirasand Kaibartas)	442.89
Others (Brahmins, Kalitas)	103.79
OBC (Koch, Sut)	63.62
Total	610.30

[3] Since the late 1980s, there was a massive effort to step up irrigation for boosting agriculture in the state by the then government under the aegis of the regional political party (Assam Gana Parishad AGP). Shallow pumps were installed in the paddy fields for better irrigation. But the programme was unsuccessful and the village still bears the relics of the program in the form of unused irrigation pumps. The villagers lament that the pumps and pipes that were erected in few fields had been stolen.

[4] Table source: Land Documents, Revenue Records of the villagers at the Maujadars office at Pakhimoriya

Figure 1: Fragmentation of land among OBC

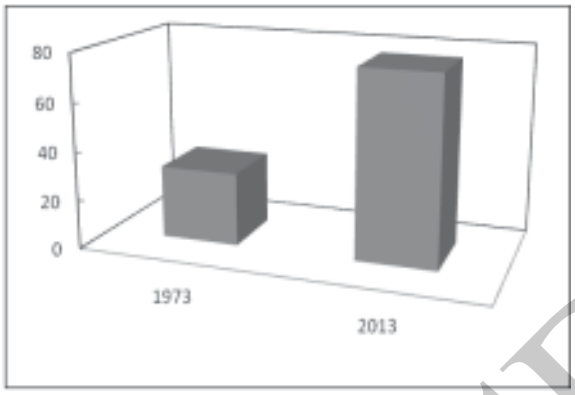


Figure 2: Fragmentation of land among SC

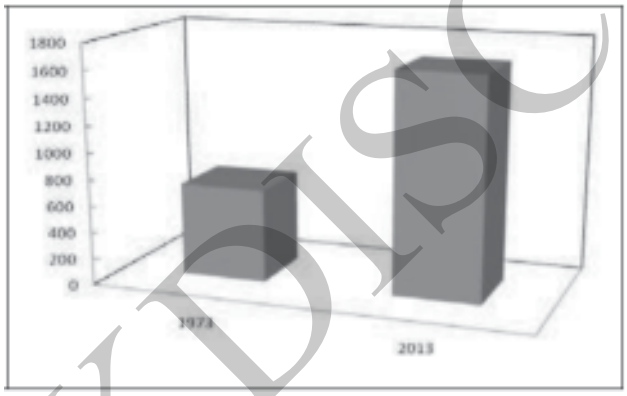
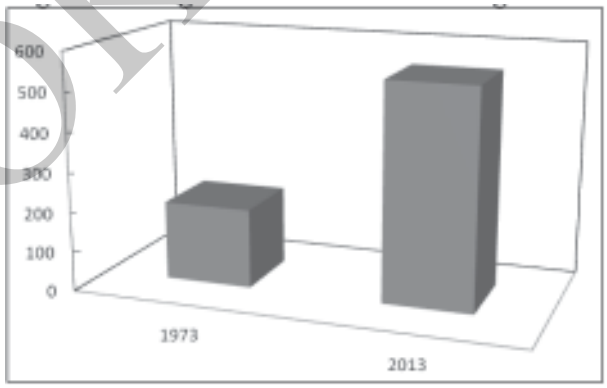


Figure 3: Fragmentation of land among Others



To understand the story of land fragmentation in the village, 1973 has been taken base year (as land reforms were initiated that year in the village). The data on land holding indicates that the SCs have the maximum land. However, the data on land fragmentation

indicate a different picture. The figures I, II and III indicate that the SCs have had maximum land fragmentation in between 1973 to 2013. There has been an increase of 200% in the total fragmentation of land. Compared to the SCs the Others and OBCs (numerically less) have only 50% land fragmentation records. Hence, despite having access to land the SCs in the village continue to be the marginal landholders.

The gaonbura(village headman) narrates:

> *Although every caste in the village has undergone land fragmentation, but when it comes to continuing the agricultural practices most groups stay together. It is only among the SCs that there is a split in agricultural land which means a divide in their production activities as well. As a result, agricultural activities become unproductive for them. Adding to this unproductive agricultural cycle, the disappearance of the erstwhile commons has further multiplied the crisis by limiting their livelihood choices. Such instances act as pre-cursor hastening the inclination towards non-farm activities.*

While fragmentation of land in general has affected the entire village, it was much adverse in case of the scheduled castes. Since the members of other castes have found permanent employment outside the village because of their education, there is much less pressure on their land stemming the process of land fragmentation. The scheduled castes, however, because of their limited life choices and low educational attainment, have hardly found any sustainable permanent employment outside the village. As a result, there is increasing pressure on their agricultural land leading to its fragmentation. This has compelled the poor scheduled caste villagers to look for unskilled and semiskilled livelihood opportunities in distant places as opportunities in the vicinities of the village are either limited or non exitent. This is testified by the fact that today the incidences of landlessness among the Scheduled Castes in village are quite high, and there are as many as 40 landless families among them.

Although, the *satra* lost most of its land after the enactment of the land ceiling act, it continued to be the biggest institutional landholder in the village with 50 bighas of agricultural land. The landless (mentioned above) families besides depending on the better off scheduled caste villagers' agricultural land, also heavily depend on the *satra* land (*khatopathar*) as sharecroppers and also as *kamlas.* It needs to be mentioned that today only in the *satra* land sharecropping is exclusively practiced. The other landowners in the village practice both sharecropping and a new system of contractual arrangement (*chukti)* with those who lease in land this new practice is much more favourable to the landholders than the landless peasants. In *chukti,* irrespective of the produce, a peasant should give a fixed amount to the landowner. This system puts pressure on a peasant because even in case of a crop failure, he is bound and obliged to pay the landowner in terms of produced or in cash as agreed and fixed by the contract. This practice takes away whatever human considerations that existed in the erstwhile sharecropping (*adhi)* system where a sharecropping peasant had to give half of whatever was produced. It is no wonder therefore that the scheduled caste landless and the marginal peasants still prefer to work in *khatopathar.*

Emerging Livelihood Practices

There has been an ongoing change in the production relations in the village. Changes in landholding patterns, fragmentation of land across caste groups, landlessness, and loss of commons are usually the primary reasons. With these emerging changes there is a need for the people to look for an alternative. Apart from the move towards nonfarm activities like poultry and piggery (which are far and few in the village) there is also a surge in outmigration from the village. The failure of the state to bring about the desired change and the pauperization of the poor rural masses had been subjects of great debates and discussions in the India in the 1970s and 1980s. But such discussions are far and few since the early 1990s when the Indian state changed its socialist path of development and to neo-liberal process of development. Studies (Shiva 199; 2004) indicate, with the inception of the neo-liberal economy in India since 1991, the plight of the peasantry has worsened over the years. There has been an escalation in the incidents of landlessness amongst the peasants, suicides, mono cropping and monopolies by the capitalist giants. Further there are also instances of growing indebtedness amongst the small and marginal farmers, development-induced regional disparities in the wake of integration with the global economy. This adds to the burning agrarian crisis and increases the number of farmer's suicides (Despande and Aurora, 2010). In the context of our village under study, though there is a crisis looming in the agrarian economy of the village, the villagers have been coping with the challenges of cycles of continuous agricultural failure and indifference in agricultural activities. Yet there has been no cases of farmers suicide reported in the village essentially because of the social organisation of the villages in Assam are different from other Indian villages. The traditional patron client relationship is usually not present in the villages. As discussed the land ceiling act had taken most of the land from the *satra*, but it continues to be the biggest institutional landholder with maximum land and people under its protection and control.

In the village under study, while on one hand, there is large acreage of agricultural land which lies fallow, on the other, there are many young men in the village who are jobless and seeks alternative livelihood outside agriculture. The poor villagers lamented that production of rice (the principal agricultural crop) has become unproductive because of uncertainty in rainfall, lack of irrigation, dwindling agricultural subsidies on paddy saplings, fertilizers, etc. Moreover, since every family below the poverty line (BPL) gets 35 kg of subsidised rice (Rs. 3/- per kg) under the Public Distribution System (PDS) of the state, the basic requirement of staples is ensured. This security of food grain is also another reason for people moving out of agriculture in the village.

Out-migration

Young unemployed men from the BPL(Below Poverty Line) migrate out of village to the various urban centres like Noida (in the National Capital Region of Delhi), Silvia (capital of Dadra and Nagar Haveli), and Surat and Gandhi Nagar (in Gujarat) in search of employment. The lure of better opportunities in cities also has its own demonstration effect and there is a negative attitude among the youths towards agriculture. The end result is a crisis of agricultural labour in the village.

As narrated by the Gaonbura:

> *There is a crisis of labour in the village. Agricultural works like ploughing the fields, threshing the paddy, etc. were traditionally carried out by the family labour. Today, such family labour is not found as most of the youths have moved out of the village. The educated youths have become teachers, clerks, etc. in other areas of the state while the 'under matriculates have become labourer outside the state.*

He further adds that the government is also responsible for creating this crisis in agriculture. According to him, the schemes like MGNREGA, AAY, IAY, etc. have had a negative effect on agriculture. However, one needs to critically evaluate whether such schemes have affected the rural agrarian economy in the village. It needs to be mentioned that social security benefits of the government ushering change in rural landscape and subsequently changing the agrarian economy across villages is not limited to the village under study but is a general phenomenon across villages in India.

This issue of out migration from agriculture has been studied in depth by many scholars. A section of scholars argue that this outmigration is an outcome of the process of change that has occurred in the traditional agrarian sector (Arjan De Haan, 2002). The latter is breaking up under the onslaught of new forces of production and paving the way for a new production relation in the country side. The scholars uphold the view that migration is a welcome and a necessary process of change. There are scholars who contradict such claims are critical of this process of rural outmigration. They argue that the process has been hastened not by the availability of some better and sustainable opportunities outside agriculture, but because of an extremely sluggish agricultural sector without the necessary government support including irrigational facility, subsidised power, minimum support price, etc. turning agriculture into an unproductive sector. This has induced growth of alternative opportunities of employment in the informal economy. However, the challenge for this informal sector of the Indian economy lies in the fact that it is impossible to demarcate it as a separate category and any such attempt would lead to inconsistency in the larger framework (Breman:1976).

Though migration is not a new social phenomenon and mostly has a pattern, many people migrate because of the remittance economy which grows with migration. The desire for better life and income attracts the people to move out and explore new avenues. However, the factors that trigger such outmigration of the villagers make for an interesting study. An important thing to be noted here is that the spread of the stories of opportunities associated with the large scale rural outmigration from Assam to other Indian states in recent years has acted as the immediate trigger for such outmigration from the village. Because of this outmigration, a crisis for agricultural labour has unfolded in the village.

Migration can also be a strategy of different groups for creating remittance income (De Haan 2002). The youths perceive the process of moving out of the village as a strategy to cope with uncertainty in livelihood opportunities however whether migration has

been a gainful bargain remains a question. It has been observed that often remittances sent by migrants are not sufficient for the families back home and experiences of people from rural Bangladesh reveals how people in households where there is outmigration cope with their indigenous ways of meeting the household requirements (Katy1995).

Interaction with the youths[5]of the study village revealed that income generated from agriculture is not enough to sustain their families for the year. Apart from the landless and marginal farmers who are compelled to depend on the rice distributed under the PDS, the other villagers prefer to consume rice from their own agricultural field. Among those raising their own paddy, a section of the households produce more than what is required for their domestic consumption, while for the rest of the households, it is barely enough to last for the whole year. Those who produce surplus do not find a market which can fetch a fair price for their produce and therefore, are compelled to sell their produce at a cheaper price to the middleman (mostly the Bihari traders from outside). On the other hand, those who do not produce more than their consumption requirement find it extremely tough to run their families as they do not have any other alternative source of income outside agriculture. Both groups of farmers are seasonally unemployed but, lack of locally available alternative sources of income compels them to remain out of work during the lean agricultural season.

The locally available alternative sources of livelihood in the district like the brick kilns, stone crushing units, etc. are sites of seasonal migrants from Bihar, poor immigrant Muslim community from within the state but they do not attract the local villagers. There is perceived sense of shame among the villagers to seek work in these places. At the same time, the expectation of better work and income also continue to elude the seasonally unemployed cultivators in the village. Therefore, the only alternative as revealed by the villagers is to move out of the village for durable employment from where they can earn income that would exceed their income from agriculture. Across village households, it was observed that unless there is one member of the household with a permanent job, youths have moved out from the village in search of livelihood. Also it was found that families which have a steady income from other sources including services continue with their engagement in agriculture in the village.

Studies from Punjab and Uttar Pradesh indicate that with rural outmigration from these states, there has been a transformation in the traditional village economy. Adi-dharmis and the Jats in Jalandhar are now engaged in various non-traditional works such as running telephone booths, grocery stores, eateries, etc. Many of them also stitch footballs for various multinational companies (Abbi and Singh, 1997). It is evident that the most pronounced trend in the Indian villages today is the move from the shackles of caste and agriculture (Gupta 2005). Further the traditional notion of unchanging and idyllic village has changed across India as people have started moving out of the traditional occupations breaking the stereotypes associated with their traditional

[5] The information was gathered from the Focus Group Discussion (FGD) conducted amongst the youths in the village.

occupations. At the same time, employment in non-farm sector is largely determined by the socio-economic position of the household and recent trend across Indian villages shows that caste based occupational arrangements have withered (Gupta 2005).

Although the villagers from Dakhinpat *Satra* did not have many options with respect to the traditional occupations, yet there was a relationship of dependence which revolved around the authority of land. As discussed earlier, all land traditionally belonged to the *Satra* and therefore the villagers had to surrender themselves to the absolute authority of the *Satra*. Hemendra, a young Kaibarta boy, from Dakhinpat in his 30s while narrating the nature of outmigration from the village identified some critical factors which according to him were responsible for people moving out of the village. Decline in agricultural productivity was the primary reason behind the outmigration of the villagers, and he argued that outmigration has not only helped them earn an income, but also has helped them move out of the traditional stereotyped occupations in the village. He further adds that increasing aspiration for upward mobility among the scheduled caste youths has also contributed to the process of their outmigration. Thus aspiration for better life and social position is a also emerging as a prime factor for rural outmigration among the youths.

Echoing similar views Tikendra, another Kaibarta boy from Dakhinpat, in his early 20s, who himself has been a migrant also holds that the fragmentation of land among the Scheduled Caste families was the main reason for migration among the Scheduled Caste youths. The income varies with the type and place of occupation and a majority of the youths who had migrated from the village have an income earning varying between Rs.3000/- to Rs.6500/-. As revealed by him, often this income is insufficient to meet the monthly expenses at the new city. Tikendra had left the village in early 2013 but returned in March of 2015.

He maintains that as the income generated from agriculture is less, the youths are compelled to look beyond agriculture and in the absence of other alternative avenues for supplementary income in the area there is a growing tendency to move out of the village. Interestingly, Tikendra discloses that the fascination among the youths about certain places, specially the developed urban centres of the country such as Delhi, Ahmedabad, Hyderabad etc. and the perception about the economic opportunities in them also triggers the tendency to migrate to these places. Be that as it may, it is clear from the accounts of Hemendra and Tikendra that youths move out of the village in search of better livelihood.

Social divisions and alternative livelihood

A section of youths (scheduled caste) from the village have taken up non-agricultural activities like poultry, fishery and piggery in partnership. The village has three poultry farms, two piggeries and a fishery. These businesses were started with the financial assistance taken from State Institute of Rural Development (SIRD), National Bank for Agriculture and Rural Development (NABARD), besides occasional loans from the village households who were economically and financially better off.

The initial financial assistance as start-up fund from SIRD and NABARD are subsidised and the subsequent financial requirements are met from borrowings sanctioned by a nationalized bank either on the recommendation of a guarantor or in lieu of mortgage of property. The two piggery farms that were started in the village in early 2013 with financial assistance and loan, burden of repayment of loan availed from the SIRD forced closure of one of the piggeries. The piggery farm that continues also has been facing challenges. The poultry farms have had successful run. It is interesting to note that that traditionally the villagers neither reared chicken nor pig and neither the villagers consumed chicken or pork. It was only under the state government's self employment programme that youths in the village started the poultry and piggery farms. Although a section of the elderly in the village does not prefer the activities as they would pollute the clean and pure environment of the village nevertheless, there is no resistance as self employment would bind the village youths within the village and put a hold on outmigration. Thus economic activities which otherwise had been unacceptable within the social norms in the village, tend to change in the wake of changing nature of social crisis (outmigration) induced by economic crisis faced by the village.

However these new farming activities do not find any enthusiasm among the upper castes households from the village[6]. On the contrary, these households have been engaging in speculative land market that has been steadily growing in the periphery of Nagaon town and investing their resources in for acquiring new lands. Engaging in such farm practices has never been part of the socio-economic life of the higher caste households and such activities had been carried by people from lower castes. The stereotyping of activities by castes and absence of mutual trust across caste hierarchy still continues in the village. Social exclusion thus creates barrier in creating gainful livelihood opportunity within the village economy itself.

There is no doubt that agriculture is un- remunerative today, yet it still holds the prospects for a sustainable source of income. Despite the crisis, many villagers continue with agriculture as the main or only source of livelihood. The withdrawal from agriculture is not always a result of non sustainability, but also a result of a wave of information dissemination about the prospects of other opportunities in cities and towns which may accentuate the outmigration given the ongoing crisis in agriculture. The rural economy with high share on agricultural farming has failed to diversify over the years into other non- farm activities have contributed in a significant way in the

[6] These households stay close to the vicinity of the sattra. Also there is a general unwillingness on their part of to take up these activities even though the households have the required land. Often problem of supervision is cited as a reason if farms are located at a distance within the village. They also stressed that for such farms they would have to depend on the scheduled castes from the village who might not be honest. When asked about why they do not invest in fisheries (which is not restricted in the vicinity of the *sattra*), they mentioned, that water bodies in the village which were previously connected to the river are not available as they have dried up and the village as a whole has become somewhat water deficient. So, for them, fisheryis not a profitable venture.

current crisis facing the agrarian sector today. The villagers especially the youths today remain discontented with fragmentation of land and falling income from agriculture, absence of alternative livelihood avenues in the village. Therefore, a moving out beyond the village seemed more rewarding.

Conclusion

The study of Dakhinpat *Satra* brings out a nuanced change taking place across villages in the state. Factors like caste, landholding which determine social position and livelihood choices have undergone transformation. The socio-economic life of the village reflects the crisis- from bounteous agriculture the fields today have turned non remunerative. Various state supports and institutional reforms (land reforms, irrigation) could not lead to desired optimal changes and social and economic transformation. Despite redistributing the ceiling surplus land of the *satra* among the landless villagers it only led to marginal change in the economic relations of the scheduled castes but over the years have not contributed in improve their agricultural production and the *satra* continued its dominance with its total land.

While agrarian change had its impact on the entire village economy, the socially marginalized scheduled castes were its worst victims. Two processes were concurrent in scheduled caste household-on one hand, agriculture became unproductive and on the other, increases in land fragmentation pushed them out of agriculture. To mitigate the crisis, these households either took up non-farm activities like poultry and piggery or migrated out of village. As opportunities for nonfarm activities remain limited given the investment cost and other operational aspects within the village, youths have migrated to other places where work opportunities are available.

As an outcome of the decline in agriculture as a source of income in the village there has been a growth in outmigration of the youth in rural areas of Assam. Since the last one and half decade, the state has witnessed an unprecedentedly large-scale outmigration from its rural areas to other states of India on account of the breaking down of its rural economy. One cannot testify whether such outmigration has been a boon for the state economy as remittance income continues to be low. Outmigration cannot be a long run solution to the problems of the crisis emerging in rural areas. This calls for a revival of the rural economy. In a socially and ethnically diverse society such as Assam, an attempt at the revival of the rural economy needs a holistic multi-pronged approach taking into account the specific character and needs of the local economies and the communities and instead of the stereotyped ‘one size fits all’ policy.

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Participation by Tribal farmers from North East Region in Global Value Chain: A Case Study of Ginger in KarbiAnglong[1]

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Abstract

In the light of growing integration of agriculture of North East with the global economy, the present paper examines a case study of ginger growers from Karbi Anglong to argue that resource poor smallholders are unlikely to benefit by participating in the global value chain. The paper further argues that if a region lacks in appropriate infrastructure and developments, merely pushing farmers to participate in global value chain can do more harm than good. The evidence collected from the data shows that institutional innovations such as much acclaimed Gin-Fed model has failed to take off. The paper further argues that any effort to link the region with the global economy must not overlook institutional specificities such as community based ownership of resources. The paper concludes with an observation that there is more to look within and resolve many tricky issues before we open up for gainful participation in the global value chain under the new liberalized trade regime.

1. Introduction

Even in 21st century, an overwhelming majority of developing countries continue to be marked by persistently high share of population dependent on agriculture for livelihood. Among such population, most are smallholders, who, along with agricultural labour, account for majority of the rural poor in most developing countries. In such context, any policy that affects smallholders has significant implication for mass poverty in rural areas of the developing countries (Lipton, 2006). Invariably, the question of what these smallholders grow in their field, how they grow and who and how they sell become intricately linked with the development interventions of government, International Funding Agency and NGOs. Increasingly, preferred policy option used by these agents of development initiatives focus on making smallholders part of the global agri-food chain as a strategy to reduce rural poverty.

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In this context, North Eastern Region of India presents itself as an interesting case study. Marked by poor infrastructure and lack of industrial development, the region is characterized by over reliance of its population on its agriculture for livelihood. The share of population in the region that is dependent on agriculture for livelihood stands at 70%, which is much higher than the national average of less than 50% of its population. Overwhelmingly dominated by smallholders, much of the agriculture in the region, particularly its mountainous part, is carried out in subsistence mode, with very little surplus generated for commercial transaction. Despite that, the region is being promoted as a 'potential hub' in the global value chain as a supplier of horticultural and cash crops. In fact, donor agencies, NGOs and the government, both at the centre and state level, all have been actively collaborating to insert the region in the global agri-food chain. A detailed account of different bodies presently active in promoting the region as hub for agricultural exports has been noted in a number of recent literature (Ray et al 2017, Das, 2016). Both NE vision 2020 document, drafted by DONER Ministry, and National Agricultural Policy envisioned for the region creation of faster agricultural development, promotion of value addition through acceleration of demand driven agribusiness to cater to the domestic and export market of agricultural produce. Many of these initiatives are likely to be pursued with renewed vigour even as the government at the centre has made a transition in the policy regime towards the region from 'Look East' to 'Act East'. The grand narrative behind pursuing such policies is that linking resource poor smallholders with large corporate buyers from international market will resolve many of the marketing problems that smallholder face in a setting marked by poor infrastructure in mountainous region. It is expected that smallholders in the region would benefit from competitive prices in international market. In this back drop, the present paper critically evaluates a case study of ginger from Karbi Hills region. The paper is organized as follows: the first section focuses on introduction, followed by a case study of ginger grower, where we discuss about production, marketing and institutional innovation in ginger value chain. The last section concludes with policy suggestions.

The insights from the literature on Global Value Chain indicates that mere participation in the global agri-food supply chain does not ensure that values generated in the value chain would accrue to all its participants (Nathan 2018, Joonkoo et al, 2012, Fold, 2001). The question of who gets what share of values generated in the supply chain is linked with the concept of rent. Drawing on insights from Ricardo's theory of rent, Kaplinsky (2005) defined rent in GVC as something that accrues to only someone 'who possess some scarce resource, capability, knowledge which others do not possess" (Kaplinsky 2005, p.62). Typically, it is the powerful actors who can create entry barrier and appropriate rent generated in the supply chain. Most of the powerful actors placed in the global value chain are located in the Global North and metropolitan cities of Global South.

A related literature suggests that participation in global value chain has differentiated effect on different geographies as global production network cuts through national and regional boundaries, inserting its supply chain (Hess and Yeung, 2005, Coe et al.,

2004). Such differentiated effect on geographies depend on the institutional arrangement of the local economies, specifically the roles performed by various state and non state actors in capturing the values generated within the local economy. In Global Value Chain, local and non local actors are differentiated by their territorial embededdness. With increasing devolution of power from nation state to local and regional institutions, such configuration of institutions in turn shape how and with what effects these regions are inserted into global production network.

2. Case Study of Karbi Anglong

In the light of the above discussion, the present paper focuses on the case of Karbi Hill Region of Assam, which finds frequent mention as producer of world's best quality ginger (The Indian Express, 2007)[2]. Overwhelmingly dominated by tribal people, the district of Karbi Anglong in Assam was identified by National Agricultural Innovation project (NAIP) as one of the 250 most backward districts in India. In most sense, the region is a microcosm of any hill region in North East. Different ethnic communities such as Karbi, Kuki, Dimasa, Garo, Nepali and Harijan live in close proximity with each other. In a typical village in the region, authority centres on *gaonburah* or village head, who is custodian of village land and other community resources. Village head man is decided based on hereditary, subject to specification that the heir is familiar with traditional customs and rituals. All the households in the village approach the *gaonburah* for allotment of land for cultivation on which they have only user rights. Such arrangements are not surprising given that social organization in the tribal village revolves around shifting cultivation, with community based ownership of resources being the dominant norm.

While tribal farmers in the region has been growing ginger for long, more recently, its cultivation and trading has been promoted by development agencies and district administration as a pathway out of poverty for farmer households living a largely subsistence livelihood. A number of players are active in the ginger economy of the region. Marwari traders and their agents are ubiquitous in the region, sourcing from farmers for long. Gin-Fed, a farmer co-operative set up by the district administration, is a relatively more recent player. In mid 2000, GI Registry of India has accorded Geographical Indication (GI) rights to the ginger grown in the region. Given high premium for organic produce in the international market, the district administration has also been keen to promote the crop grown in the region as organic crop. Within short time, the district has emerged as one of the important hub of ginger production in the country, with reported production increasing from 17,312 metric tons in 2007 to 32,033 metric tons in 2012[3]. While there is no reliable data on how much of the ginger produced in the region is exported, Gin-fed alone has also reported export of more than 50 metric tons of dry ginger to Europe in 2015. There is some literature such as Das 2016 which noted differences in prices received by different agents of supply chain

[2] http://archive.indianexpress.com/news/with-ginfed-karbi-anglong-farmers-strike-gold-in-ginger/249297/

[3] https://www.ruralmarketing.in/industry/agriculture/landless-ginger-farmers-of-assam

of ginger in the Karbi Hill region, but an in depth study of likely implication for ginger growers of such large scale expansion of ginger cultivation in the region is conspicuously absent. The present paper aims to document a critical evaluation of welfare implication for resource poor farmers from expansion of commercial crops in the present institutional setting.

The present paper draws upon divergent database, comprising of primary survey, key informant interviews and case studies, all collected from key ginger producing region in Karbi hills. The paper further relies on secondary sources to add to the insights gathered from the primary data. Primary data was collected from household survey in Karbi Hill region during the months of February and March 2018. The detailed household survey was preceded by pilot survey and key informant interview in January 2018 to identify villages inhabited by different ethnic communities that might be considered as key ginger producing belt. Apart from local key informants, officials of Gin-Fed were also consulted to shortlist villages for taking upper primary survey at the village and household level. The villages shortlisted for the survey are Julian, Gangjan, Katlen, Phaifengjal, Nailalung, Dilangi, Lang Soliet and Khuti Colony. The survey covered a total of 290 ginger growing farmer households.

3. Profile of Ginger growers

The economic profiles of the sample households confirm the subsistence nature of livelihoods which is typical of those living in the mountainous area in North East region. While one fourth of the households do not have any ration cards, most others that have cards report having only BPL cards, which are specified for those living below poverty line. Most farmer households are also poorly educated, with 40% of the household heads of the respondent families with educational attainment below primary. Approximately 40 % of the households do not have mobile phone, those that have them can hardly access its services because of extremely poor network. Needless to mention, almost all households (97%) live in *kachha* house.

The lack of industrial development in the region has left little employment opportunity outside farm, with most households sustaining their livelihood as shifting cultivators. More than 85% of the sample households take up petty jobs outside their farms to support their fragile livelihoods, which mainly include driving, construction works and wage labour. Such jobs account for one fourth of the total jobs reported by the sample households. In Gangjan village, a cohort of 25 to 30 youths regularly travel to Kerala during lean season every year as migrant labour to support the livelihood of their families. Case studies documented during our field visits to other locations in the region indicate that such trends are at incipient stage but are slowly becoming more common than earlier. Making the matter worse is the delivery of public services, which is almost nonexistent in most places. For example, fair price shops that operate under public distribution system are conspicuous by its absence in many of the selected villages. In Singhasan region, none of the sample households that we interviewed report having ration cards. Even in other regions, households having cards hardly manage to access subsidized food grains available under the PDS program. Despite

slowly diversifying their livelihoods away from agriculture towards other petty jobs, the limited cash income they earn havefailed to keep pace with the rise in prices of essential goods they consume.

Lack of development in the region is further compounded by type of decentralized governance arranged within the provision of Sixth Schedule in the Constitution of India, which was ostensibly introduced to safeguard the culture and identity of tribal people in the North East region. Ironically, several clauses within the schedule undermined the very purpose, with adverse implication for the development of the region. For example, the Autonomous District Council (ADC) was created with substantial autonomous power, but it does not have much say regarding developmental activities of very basic nature such as rural electrification or functioning of public distribution system (Ingti, 2014). Moreover, ADC has no control over the substantial amount of finance meant for Sixth Schedule area, which is still handled by the state government. Most crucial aspect is the undermining of traditional village institution as ADC usurped whatever limited power that is passed down from the state, without delegating the same to the village level institutions. The ADC on the contrary o appoints a *sarkari gaonburah*, who has jurisdiction over several villages, often undermining the authority of *traditional gaonburah*. Such pattern of decentralization means that most developmental problems remain unattended, with severe implication for the quality of livelihood of its natives.

4. Production of ginger

The cultivation of ginger in the region has a long history that dates back to 1950s. The agro-climatic condition of the region is favourable for growing specific variety of ginger that is in high demand in national and international market. Among major varieties of ginger grown in the region, two prominent ones include Nadia, which is high in fibre content and Aizol that has less or no fibre content. The latter is demanded because of low fibre content.

The production season starts with sowing in April and ends in the month of January. Typically, farmers accompanied by their family members, go upland in hordes during peak season as they work in each other's field during sowing and harvesting season, often settling wage payment in kind. Method of cultivation is organic by default as farmers use part of the harvest from the previous year as seeds for the present season. The cultivation does not use any chemical or fertilizer. A typical family grows ginger in a plot of 2.50 bighas of land. Mostly concentrated in Singhasan belt in the region, Kukis grow ginger in relatively larger plot, measuring 3.63 bighas of land.

5. Marketing of ginger

The production of ginger is only part of the story as farmers are merely responding to its growing demand for the crop by the outsiders. Though the Sixth Schedule, as noted already,has provisions that give special protection to the tribal living in the region, it is the agents from the outside such as traders who control the local economy. The physical infrastructure connecting most tribal villages with urban centres such as

Manja and Diphu are abysmal if not completely missing. In the absence of appropriate road infrastructure, it takes more than 3 hours to reach some of the tribal villages, located some 20 km away from the urban centre. Traders selling essential goods in both weekly market and elsewhere are mostly non tribal. Our observation during the course of field survey indicate that prices charged by the traders are much higher than those available in the nearest urban centres. Despite higher prices, the buyers still purchase their essential requirement from these traders from outside as the travel cost required to purchase them from the nearby urban centre is prohibitively expensive. Similar price differential of basic essentials in the interior of hill region has also been documented in Dima Hasao District (Barbora, 2002).

As discussed earlier, lack of employment opportunities and absence of basic facilities in the region mean that the allure of cash is always very strong among the locals. Growing popularity of ginger as cash crop is not very surprising in such setting. Given high demand for the crop in national and international market, such setting perfectly suits traders operating from outside the region. These traders have gradually made their headway in the region, and they advance cash and other basic entitlements required by farmers well in advance with support from the local youths acting as their agents. Over 35% of the sample households report taking loans and cash advances from the traders within past one year. The average value of such loan taken from the traders varies from Rs 5000 to Rs 6000. Another 15% of the sample household also received loan in kind or food ration in advance. Such interlocking arrangements suit traders perfectly. They can not only procure ginger from the farmers at very low prices, but can also earn additional income as interest payment. The farmers are charged at 3% monthly rate of interest, which amounts to 36% annual interest income, more than twice the interest rate charged from the formal banking system. Over the years, Karbi Hill region has witnessed steady expansion of ginger cultivation. n such circumstances, it is, however, not very clear as to how much farmers benefit by selling their ginger harvest to the traders. Such informal contract works to the disadvantage of the farmers who lose their freedom to sell to buyers of their choice. Worse, they also end up losing a sizeable chunk of their proceeds from crop sale at the end of the harvest in the form of payment to settle loans and interest.

6. Ginger farm as sites for ethnic clashes

Karbi Hill region has, for long, been witness to ethnic violence among different ethnic communities, living in close proximity with each other. With growing ginger cultivation in Karbi Hills, ginger fields have become sites for manifestation of already simmering ethnic tension between different communities. The ethnic clashes that broke out between Karbi and Kuki communities in early 2000 in Singhasan region were symptomatic of such growing ethnic tension between the communities. Two militant groups United People Democratic Solidarity (UPDS) and Kuki Revolutionary Army (KRA) representing the cause of Karbi and Kuki communities respectively were frequently engaged in ethnic clashes that claimed the lives of more than 50 people within a period of two months in early 2000s (Talukdar, 2008). The two militants groups were also engaged in extortion on truck loads of ginger, which varies from Rs. 5000 to Rs. 20000 per

truck. As Oinam (2003) has noted elsewhere, the nature of such conflict between different communities has changed over the years. Earlier, the conflict was about relationship between dominance or subservience, with migration and settlement not being much of an issue. A closer scrutiny of increasing number of clashes in the Karbi Region suggests that at the heart of such intensified clashes is perhaps land question. As agriculture in the Karbi hill has moved beyond subsistence agriculture, possession of cultivable land became increasingly important among the communities. It might be possible that one tribe sees the other expanding its territories for commercial cultivation of ginger as threat to their dominance in the region.

7. Emergence of Gin-Fed as institutional innovation

In a setting marked by a series of ethnic clashes among different ethnic communities, the district administration set up a collective body known as Ginger Grower Co-operative Federation (Gin-Fed) in 2007. Funded with an initial endowment of Rs 2 core from Rashtriya Shrama Vikas Yojana (RSVY), the set up of Gin-Fed comprises of 15 procurement centres in key production zones, each centre managed by a local NGO and an assistant from Gin-Fed to offer procurement facilities to the farmers living in inaccessible areas. An initiative that was much hailed when announced, Gin-Fed introduced for the first time a credit linked smart card called Gin-card that would give its member farmers credit of Rs 5000 per bigha with a cap on maximum of Rs 10,000 for two bighas. The access to loan was facilitated by an MoU signed by Gin-Fed with State Bank of India (SBI) and Longpi Dehangi Rural Bank (LDRB), the latter a regional bank head quartered in Diphu that operates in Karbi Hill area. As the community based land ownership is not recognized in the formal banking system, Gin-Fed countersigned the *dak* issued by *gaonburah* (village head) to certify the holder as genuine farmers to facilitate their access to formal banking system. The apparent rationale behind the introduction of Gin card is to reduce the dependence of the farmers on informal sources of credit such as traders. Of the 3000 member farmers who were registered with the co-operative in the first year (2007), credit was disbursed to half of them through Gin card. According to its CEO, Gin-Fed has tie up with a number of national firms with presence in the export market that include, among others, Kishan Network, Sheel Biotech and Sreshta Natural Products.

The rationale behind the formation of Gin-Fed was many folds: *First*, to bring different ethnic communities under one umbrella organization which would help diffuse tension that exist among different communities. *Second*, organizing farmers into a collective body would be linked with large corporate buyers in the national and international market. Such aggregation of smallholders would reduce transaction costs incurred by both farmers and buyers alike. It was further expected that such collective body would give the farmers a platform to deal with traders and buyers on better terms and conditions. *Third*, set up processing and drying facilities within the premises of Gin-Fed so that ginger growers could move up the ladder of the value chain instead of remaining just the supplier of raw materials, competing at the bottom. *Finally*, Gin-Fed further planned to engage in organic certification for ginger produced by its members so that they could claim higher prices, given the premium that exists for organically

certified produce in the international market. In the growing market for organically certified produce, rent is mostly appropriated by certifying bodies and buyers who are placed at the top of the value chain (Courtois et al, 2011). The design laid out by Gin-Fed for organic certification runs as follows: Assisted with 95% subsidy from NABARD, Gin-Fed would apply for three types of certification C1 for local/ regional market, C2 for national market and C3 for international market.

The state government also got GI (Geographical Indication) tag assigned to ginger produced in the region so that ginger produce in the region could get higher prices in the international market. International funding organization such as IFAD (International Funding for Agricultural Development) also joined hands with the state government as it helped Gin-Fed set up collection centre. The involvement of multiple bodies like district administration, NGOs, Banks and International Organization in the ginger supply chain provided a big push to the ginger cultivation in the region, with its production increasing from 17,312 metric tons in 2007 to 32,000 metric tons in 2012. In the first year after its formation .i.e. 2007, Gin-Fed achieved significant coverage in the media. In the beginning of the season, Gin-Fed set for its member farmers prices of Rs 8 per kg, which was much higher than Rs 2 to Rs 3 per kg that farmers received from the traders until then. The case studies documented during the course of the survey indicated that its emergence also benefitted other farmers who were not members of Gin-Fed as the traders, fearing competition, started offering them higher prices than before.

8. Failure of Gin-Fed

A decade later since its inception, Gin-Fed appeared to be a mere shadow of its former self as revealed from survey of households. The various credit instruments like Gin-card, the credit linked smart card, led to high default rate among the members in the very first year, leading to the withdrawal of the credit program. The failure of the program, more than anything, displays lack of understanding on the part of the district administration of the institutional setting in which Gin-Fed was inserted. The composition of the Management Committee of Gin-Fed is hardly representative of the farming community. Only 5 out of the 20 members of Gin-Fed are farmers, the rest comprises of 9 bank managers, district level officers from different departments and 5 managers/ presidents working as representatives of non-governmental organization. Shifting cultivation practiced by farmers does not require credit for farming activities. In fact, farmer's need for cash stem from lack of employment opportunities outside agriculture, which is further accentuated by dysfunctional public delivery system. Instead of solving these basic problems, the district administration pushing credit through Gin-card program signifies its top down approach with an attitude of 'we know what works for you'.

Gin-Fed operates more like a government department. The district agriculture department funds the administrative cost of Gin-Fed, which include, among others, the salaries of contractual employees who look after day to day affairs of the co-operative. In such set up, Gin-Fed has very little incentive to engage directly with the farmers. List of 7011 farmers that figured in the register maintained by Gin-Fed represents only 'ghost

farmers' who have hardly visited Gin-Fed or has any association with the organization. Only 2% of the sample households reported being member of Gin-Fed, but even fewer among them reported being registered with the co-operative. Half of the sample households have not heard about Gin-Fed. Those familiar with Gin-Fed reported that it does not operate in their area. Many even reported that they had no desire to be part of Gin-Fed. Very few sample farmers reported attending any meeting organized by Gin-Fed. Needless to mention, majority of the officials do not have much knowledge about problems and challenges facing tribal farmers in the region nor do they have any stake on how the organization is run.

Much publicized program on organic certification remains only on paper despite plans by the government at the centre to make the region 'organic capital of the country'. Ginger is produced in the region using shifting cultivation that makes the produce grown in it organic by default. In the light of mass publication of food scares associated with consumption of food produced using heavy use of chemicals and pesticide, there is high demand for produce certified as organic (Reynolds, 2004). Gin-Fed's plan to introduce organic certification is precisely to counter such trend so that rent is protected on behalf of the farmers. However, in the absence of any organic certification, there is hardly any entry barrier for rent to accrue to the member farmers, especially when ginger produced from the neighbouring hill states such as Arunachal Pradesh and other north eastern states with similar attributes are also flooding the market. Similarly, Gin-Fed's plan for processing and value addition of ginger produce did not make much headway. Drying and processing facilities that was installed in the 1st year is used less than its full capacity. Moreover, farmers have little stake in any value that is added by the co-operative as the co-operative management takes complete control over the produce before being put into processing.

Even with its reported procurement of 600 tones of ginger produce, Gin-Fed, after a decade of its formation, still remains a peripheral player in the region. Worse, much of the procurement by Gin-Fed is done through traders, the very agent it is supposed to compete against. Farmers continue to get exploited in the hands of traders. The average prices received by the farmers are Rs 11 per kg that compares poorly with Rs 70 to Rs 80 per kg at the retail market in Guwahati. Thus in a setting, marked by poor infrastructure and very limited income earning opportunities beyond subsistence agriculture, farmer households finds themselves in a very weak bargaining power vis a vis traders, who appropriate much of the values created in the region. Prices that farmers received for their ginger harvest compare with retail prices in urban market such as Guwahati in the ratio of 8:1 to 10:1. It is not uncommon to see ginger prices soaring to Rs 200 per kg even in nearby Assam, with middlemen and syndicate appropriating much of the benefits (The Telegraph, 2014).

9. Conclusion

Our case studies of ginger growers in Karbi Hill Region highlight the perils of participation in the global value chain if the institutions are not aligned with the needs of the local people. The top down approach of the district administration also failed

to address the local needs and aspirations. Though designed with an objective to safeguard tribal culture and identity, provisions in the Sixth Schedule have failed to reflect on the aspirations of the local people. The failure of local governance indicates that most of the developmental activities such as basic infrastructure and public delivery services are ignored, which reduces the bargaining power of the ginger growers as participants in the global value chain. It is the middlemen and traders who take advantage of the situation as they tie the growers to sell the produce at a price fixed much before harvesting season begins. Institutional innovation such as Gin-Fed failed because of lack of local participation in the institutions of local governance. In such context, ginger growers are more likely to remain the supplier of raw materials, with very little spillover effects on the local economy.

Provisions in the Sixth schedule have also failed to address the ethnic relation on the ground. In particular, land question remains unresolved in the changing context. While land used for subsistence cultivation was compatible with the existing traditional village institutions, expansion of commercial cultivation has the effect of flaring up already fragile ethnic ties in the region. How such ethnic issues would be resolved in the changing context will go a long way in determining the outcome of participation in the global value chain. As we brace up for a new trade regime under Act East policies, there is more to look within and resolve many tricky issues before we open up for gainful participation in the global value chain.

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Analysis of Growth and Instability in Area, Production, Yield and Price of Rice in India

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Abstract

Agricultural growth with stability has been a matter of concern in India. This paper analyses 41 years data (1970-71 to 2011-12) on area, production and yield under paddy to understand the question of instability in rice production in India. The analysis shows that at all India level compound annual growth rate of area, production and yield of rice were positive but it had been declining gradually over the periods. In the recent decade (2000-01 to 2011-12) there is increase in instability at all India level in area, production and yield of rice. The possible reasons for increase in instability were low percentage of irrigated area to total cropped area, decline in use of seeds and manure and other inputs necessary for agriculture. In the post reform period (1990-91 to 2016-17) the instability has increased in case of wholesale price of paddy across various states while instability has declined in case of farm harvest price of paddy.

1. Introduction

Growth with stability is considered important for development of agriculture. There is considerable literature on growth and instability of yield and production of crops both from theoretical and empirical perspectives. An analysis of instability in crop output, apart from growth, is important for understanding the nature of food security and income stability. The variations in crop output not only affect prices and bring about sharp fluctuation in them but also result in wide variations in disposable income of the farmers. The magnitude of fluctuations depends on the nature of crop production technology, its sensitivity to weather, economic environment, availability of material inputs and many other factors. The estimates of Dev and Pandey (2012) showed that there is a continuous decline in trend growth rate in the value of output of all cereals. The growth rate in value of the output of cereals in India declined from 2.76 per cent in 1980s to 2.02 per cent in 1990s and it further declined to 1.25 per cent during 2000s. In the case of paddy the trend growth rate in the value of output declined from 3.31 per cent during 1980s to 1.80 per cent in 1990s and it declined further to 1.13 per cent

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(Dev and Pandey 2012). This shows that situation of farmers in India has been worsening as value of output had declined. The need for maintaining stability of income of the farmers and is also important from food security perspective.

A number of studies on growth and instability in agricultural production, in general and food grain production in particular observed that substantial gain in area, production and productivity of wheat has been achieved in all the states during post green revolution period. Rice cultivation also recorded an increase in area, production and productivity, particularly in states which adopted rice cultivation during post-green-revolution period. Hazell (1982) assigned much importance to the growth for increasing instability, but Ray (1983), Dev (1987) and Rao (1988) identified rainfall, irrigation and agro-physical situations as important factors influencing instability in food grain production during post green revolution period. The application of new technology (Seed-fertilizer) has also been found responsible for variability in food grain production during post green revolution period (Mehra, 1981, Mehra 1981; Hazell 1982; Ray 1983; Parthasarthy 1984; Mitra 1990 and Wasim 1999).

Despite improvement in technology, increase in input subsidies, and improvement in access to these services, farm prices and farm income across states have diverse variation. These year to year fluctuations in prices and farmers income affect farmer's decision for investment in agriculture. While the need for increasing agricultural production is obvious, the increase in instability in agricultural production has several adverse affect-it raises the risk involved in farm production and affects farmers' income and decisions to adopt high paying technologies it affects price stability and increases vulnerability of low income households. Instability in agricultural and food production is also important for food management and macroeconomic stability (Chand and Raju, 2009).

A number of studies have tried to look into the factors leading to instability. Paltasingh and Goyari (2013) calculated instability in subsistence agriculture of Odisha by taking 41 years data from 1970 to 2010 and dividing the period into pre- reform and post reform period. They observed that there is no positive relation between growth and instability and found that weather variability was the only important factor responsible for higher instability. As irrigation coverage is low in Odisha and cultivation continues to be rain fed, variation in weather variability was one of the primary determinants of instability in agricultural production. In areas of green revolution too, even though there had been increase in productivity and production of all the crops, instability in agricultural production did not decline (Sihmar: 2014). Instability affects both production and productivity per hectare. There are studies which emphasize that instability is a consequence of growth which means growth and instability are positively related.

2. Data Source and methodology

2.1 Focus of the paper

While instability in agricultural sector has been widely studied, this paper makes an

attempt to look into the question of instability in rice production in India. Paddy rice make up more than 10 percent of the total output value of India's agriculture. Globally, China is the largest producer of paddy, and India ranks second. Around 60 per cent of people in India consume rice and it is cultivated by the farmers in more than 16 states. The paper tries to understand the growth rates of area, production and yield of paddy and to measure the instability in area, production and yield of paddy across states. The paper also analyzes the instability in farm harvest prices and wholesale prices of paddy across states. The time period used under the study is 1970-71 to 2011-12 divided into four quarters-. Period I covers 1970-71 to 1979-1980; period II starts from 1980-81 to 1989-90; period III covers 1990-91 to 1999-00 and period IV starts from 2000-01 to 2011-12. The time period has been chosen to understand the post green revolution period impact on rice production, and the post reform period in India.

2.2 Data and Methodology

Data on important variables like area, production and yield of rice for the period 1970-71 to 2011-12 and cost of cultivation data were compiled from Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi. Other relevant data used in this analysis were compiled from secondary sources such as Agricultural Statistics at a Glance, Land Use Statistics, Agriculture Prices in India, State wise value of Output of Agriculture and allied activities by Ministry of Statistics and Program Implementation (MOSPI), and Agmark Portal maintained by Directorate of Marketing and Inspection (Ministry of Agriculture).

The compound annual growth rate of area, production and yield of paddy has been calculated using semi log model. For calculating instability index the methodology used by Chand and Raju (2008) has been used. The instability index is given by:

Instability Index = Standard deviation of the natural logarithm (X_{t+1}/X_t)

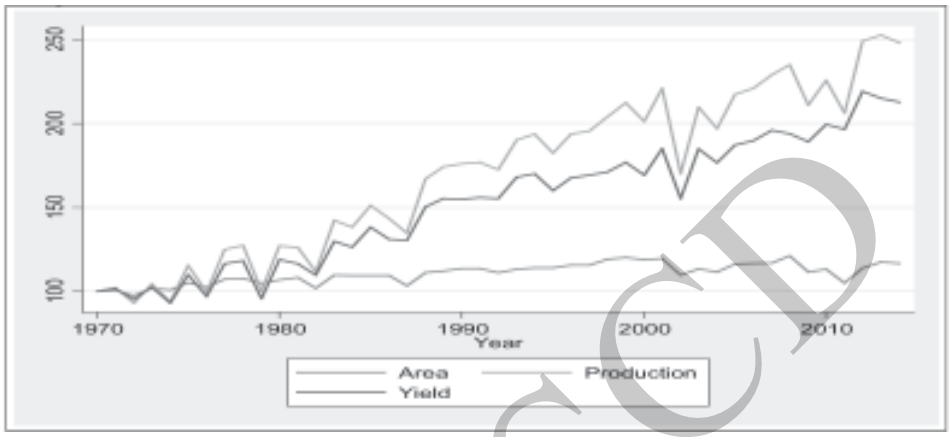
Here X_t refers to Area (A), Production (P), Yield (Y) and Farm Harvest Price (FHP) in the year "t"; and X_{t+1} denote the same for subsequent year. This index is unit free and robust and measures deviations from underlying trend (log linear in this case). When there are no deviations from the trend, the ratio of X_{t+1} and X_t remains the same and their standard deviation is zero. The findings are discussed in the subsequent sections of the paper.

3. Trends in Production and Yield

India has close to 199 million hectares of gross cropped area, and more than 21 per cent, i.e., 42.9 million hectares, is under paddy. Close to 60 percent of the area under rice in 2011–12 was under irrigation. The area, production and yield of rice in India have increased over the years. Taking 1970-71 as the base year, the figure shows that till the 1990s there was continuous fluctuation in all three key variables namely area, production and yield of rice. There has not been much increase in area under rice but there has been significant increase in production which reflects India's self sufficiency in rice production and the potential to export rice to other counties. Even though the

yield of rice increased over the period but it was lower compared to two major rice producing countries in Asia viz. Thailand and China.

Figure 1: Variation in All India Area, Production & Yield of Rice from 1970-71 to 2011-12



Source: Computed from Government of India various issues

Table 1: Share in State Wise Value of Output of Paddy at 2004-05 Prices (Per Cent)

States	TE 1992-1993	TE 2002-2003	TE 2010-2011	TE 2013-2014
Andhra Pradesh	13.97	13.56	14.3	6.57
Assam	4.35	4.77	4.49	3.76
Bihar	6.42	6.04	4.05	5.88
Gujarat	1.69	1.38	1.56	1.52
Haryana	4.66	5.33	4.98	4.94
Himachal Pradesh	0.16	0.16	0.16	0.17
Jammu $ Kashmir	0.95	0.67	0.73	0.74
Karnataka	2.82	2.85	4.6	3.65
Kerala	1.67	1.03	0.64	0.53
Madhya Pradesh	7.7	1.61	1.74	2.71
Maharashtra	3.31	2.79	2.7	3.47
Manipur	0.49	0.54	0.53	0.37
Odisha	7.1	5.51	6.54	6.45
Punjab	9.13	10.62	11.4	10.79
Rajasthan	0.26	0.21	0.42	0.32
Tamil Nadu	7.58	6.18	5.17	5.08
Tripura	0.95	1.03	0.95	0.62
Uttar Pradesh	13.48	14.08	12.59	13.77
West Bengal	14.2	15.82	13.82	13.13

Source: Author's Calculation
Note: Value for TE 2013-14 are in 2011-12 Prices

The share of state wise value of output of paddy during different time periods show that there were large variation across states. Uttar Pradesh, West Bengal and Punjab

were the top three rice producing states during T.E. 2013-14 at 2011-12 prices. Andhra Pradesh had a higher share before Telangana was formed. During T.E. 2010-11 Andhra Pradesh, West Bengal, Uttar Pradesh and Punjab became the major producers at 2004-05 prices. Punjab is the only state where there has been a continuous increase in the percentage share in the state wise value of output of paddy from 1992-93 to 2010-11. Changes in cropping pattern across the states that had started in the eighties in response to more, skewed domestic demand, have accelerated in the post-reform period with opening up of trade in agricultural products and thrust towards agro-exports. The area under rice production declined markedly in favour of export crops.

4. Growth Rate for Rice at All India level

Table 2: Compound Annual Growth Rate in Area, Production and Yield of Rice (Per Cent)

Period	Area	Production	Yield
1970-71 to 1979-80	0.88***	1.9	1.01
1980-81 to 1989-90	0.41	3.62***	3.19***
1990-91 to 1999-00	0.67***	2.02***	1.34***
2000-01 to 2011-12	-0.003	1.82	1.82***

Source : Author's Calculation

*Note: *** means significant at 1per cent level, ** means significant at 5per cent level and * means significant at 10 per cent level.*

The main rice growing season in the country is kharif, in which the crop is sown during the Indian monsoon season, June-July, and harvested in November–December. About 84 percent of the annual crop of the country is grown in this season. Four states, West Bengal, Uttar Pradesh, Andhra Pradesh, and Punjab, are the biggest producers in paddy in the country. The all India compound annual growth rate (CAGR) of area, production and yield of rice from 1970-71 to 2011-12 shows that there has been a steady decline for area under cultivation largely because of changes in cropping pattern. The CAGR of production was 3.62 per cent per annum during 1980-81 to 1989-90. The CAGR of yield was 3.19 per cent during 1980-81 to 1989-90 which declined to 1.82 per cent during 2011-12. This implies that growth rate over the period under study though positive but was declining gradually.

5. Growth rate of area, production and yield of rice: State wise variation

State wise estimation on rice production, shows large variation in the growth rates of area under rice (Table: 3). During 1970s, Punjab, Rajasthan and Haryana were the top three states with high CAGR in area under rice cultivation propelled mainly by HYV. During the decade of 80s, all India CAGR of rice decreased from 0.89 per cent in 70s to 0.41 per cent in 80s. During 1990s, there had been marginal improvement in all India CAGR of area of rice from 0.41 per cent to 0.67 per cent. However at state level there are mixed results as in some states there has been a decrease in CAGR of rice

while in many other states there is increase in CAGR of rice. Haryana recorded substantial increase in area under rice production during 1990-91 to 1999-2000 when the CAGR of area of rice increased from 2.40 per cent in 1980-81 —1989-90 to 6.10 per cent in period in 1990-91—1999-2000. However in case of Punjab there is continuous decline in CAGR of area of paddy. During 2000-01 to 2011-12, there has been a decline in CAGR of area of rice in many states except Andhra Pradesh, Gujarat and Manipur. Consequently, there had been a decrease during the same decade for the All-India level. Although the CAGR of area under rice cultivation has been positive, but there has been a declining trend over the years.

Table 3: State Wise Compound Annual Growth Rate in Area of Rice from 1970-71 to 2011-12

States	Period I 1970-71 to 1979-80	Period II 1980-81 to 1989-90	Period III 1990-91 to 1999-2000	Period IV 2000-01 to 2011-12
Andhra Pradesh	1.91*	0.54	0.55	2
Assam	1.49***	0.51	0.1	-0.25
Bihar	0.51	0.25	0.11	-0.79
Gujarat	0.26	0.41	0.5	2.37**
Haryana	6.64***	2.40*	6.10***	2.29***
Himachal Pradesh	-1.08*	-1.45**	-0.23	-0.66***
Jammu and Kashmir	2.54***	-0.03	-0.46	0.68***
Karnataka	-0.09	0.38	1.72***	1.37
Kerala	-1.07**	-4.13***	-5.58***	-4.48***
Madhya Pradesh	0.88***	0.36**	0.74***	-0.40**
Maharashtra	1.69***	-0.09	-0.69***	0.03
Manipur	1.94*	-0.67	0.35	2.68***
Odisha	-0.91**	0.41	0.16	-0.56**
Punjab	12.46***	5.39***	2.48***	1.02***
Rajasthan	5.87***	-3.15	4.07***	1.07
Tamil Nadu	0.23	-2.02*	1.06	0.39
Tripura	0.29	-1.42***	-0.78	0.52
Uttar Pradesh	1.53**	0.03	0.95**	0.06
West Bengal	-0.05	1.12**	0.55**	-0.73
All India	0.89	0.41	0.67***	0.003

Source: Author's Calculation

*Notes: *** means significant at 1 per cent level, ** means significant at 5 per cent level and * means significant at 10 per cent level.*

Rice is a water-intensive crop and states of Punjab and Haryana, has contributed to over-exploitation of ground water in these states. Thus policy makers and economists alike today feel the need to undertake a "second green revolution," wherein the rice production base is shifted away from the states of Punjab and Haryana (which face threats due to plummeting groundwater tables) to the more water-abundant eastern states of Bihar, Uttar Pradesh, and Odisha (Saini and Gualti:2017). Further with the opening up of the economy, expectations of export opportunities and higher prices at international markets led many farmers to switch from traditional rice growing to cash

crops and high value agricultural products like oil seeds, ground nut and cotton. The states in eastern India except for Tripura had a negative growth in area under rice cultivation which indicates that farmers were shifting away from rice cultivation.

Table 4: State Wise Compound Annual Growth Rate in Production of Rice from 1970-71 to 2011-12

States	Period I 1970-71 to 1979-80	Period II 1980-81 to 1989-90	Period III 1990-91 to 1999-2000	Period IV 2000-01 to 2011-12
Andhra Pradesh	4.2**	2.5	1.7	3.0*
Assam	0.6	1.1	1.1*	1.4
Bihar	0.3	4.1	3.1	0.3
Gujarat	4.2	-0.2	3.7***	9.0***
Haryana	11.3***	2.2	4.4***	9.0***
Himachal Pradesh	-0.9	-1.8	1.6***	0.5
Jammu $ Kashmir	3.5**	-0.7	-1.8	2.4***
Karnataka	1.4	0.2	3.6***	2.6
Kerala	-0.5	-2.9***	-7.1	-2.5***
Madhya Pradesh	-3.1	2	-0.1	4.9**
Maharashtra	6.9*	-0.7	1.4**	1.9
Manipur	6.4**	0.3	2.8	2.6*
Odisha	-1.4	4	-1.3	2.8
Punjab	18.5***	6.7***	2.5***	2.8***
Rajasthan	5	-1.9	6.0**	7.6**
Tamil Nadu	0.5	3.9**	-0.1	1.7
Tripura	4.3*	2.2**	-0.2	2.6***
Uttar Pradesh	1.6	5.7***	3.2***	1
West Bengal	0.8	6.8***	2.5***	0.2
All India	1.9	3.6***	2.0***	1.82**

Source: Author's Calculation
*Notes: *** means significant at 1 per cent level, ** means significant at 5 per cent level and * means significant at 10 per cent level.*

There has also been large variation in the growth rates of production of rice across states (Table: 4). During the 70's under the impact of green revolution, states like Punjab, Haryana, Maharashtra, Andhra Pradesh, Manipur, Rajasthan, recorded high growth rates in production of rice. Punjab and Haryana the two largest beneficiaries of green revolution had the highest growth rates. At the same time states like Himachal Pradesh, Kerala, Madhya Pradesh and Odisha where impetus of green revolution remained absent recorded negative growth rate during the period. As state support to agriculture increased during the 1970s and 1980s some improvement in growth rate during the decade of 80s was observed in states such as Assam, Madhya Pradesh, Odisha, Tamil Nadu, Uttar Pradesh and West Bengal. In West Bengal CAGR of production of rice increased from 0.8 per cent in 70's to 6.8 per cent in 80s. The all India CAGR of production of rice also increased from 1.9 per cent during 70s to 3.6 per cent during the 80s.

During 1990s the all India level of CAGR of production of rice declined over the previous decade. In major rice producing states there was steep decline in CAGR of production of rice e.g. in Andhra Pradesh growth rate declined from 2.5 per cent during 80s to 1.7 per cent in 1990s, in case of Punjab growth rate declined from 6.7 per cent in 80s to 2.5 per cent during 1990s; in case of Uttar Pradesh growth rate declined from 5.7 per cent in 1980s to 3.2 per cent in 1990s and in case of West Bengal growth rate declined from 6.8 per cent in 1980s to 2.5 per cent in 1990s. During the last decade, at all India level there was further decline in CAGR of production of rice to 1.82 per cent. However at state level there was some improvement in states except Uttar Pradesh, Bihar and West Bengal.

Table 5: State Wise Compound Annual Growth Rate in Yield of Rice from 1970-71 to 2011-12

States	Period (I) 1970-71 to 1979-1980	Period (II) 1980-81 to 1989-1990	Period (III) 1990-91 to 1999-2000	Period (IV) 2000-01 to 2011-12
Andhra Pradesh	2.2**	2.0**	1.1*	1.0*
Assam	-0.9	0.6	1.0***	1.7**
Bihar	-0.2	3.9*	2.9	1.1
Gujarat	3.9	-0.6	2	0.7
Haryana	4.4*	-0.1	-1.6	1.2*
Himachal Pradesh	0.1	-0.4	1.9***	1.2
Jammu $ Kashmir	1	-0.7	- 1.3	1.7**
Karnataka	1.5	-0.1	1.9***	1.2
Kerala	0.6	1.2*	10.2**	-7.1***
Madhya Pradesh	-3.9	1.7	-0.8	5.3**
Maharashtra	5.2	-0.6	2.1***	1.9
Manipur	4.4*	1	2.4	-0.1
Odisha	-0.5	3.6	-1.4	3.4*
Punjab	5.4*	1.3	5.6	1.0**
Rajasthan	-0.8	1.3	-5.4	6.5***
Tamil Nadu	0.2	6.0***	-1.2	1.3
Tripura	4.0*	5.1	0.5	2.0***
Uttar Pradesh	0.1	5.6***	2.2***	0.9
West Bengal	0.8	5.6***	1.9***	0.9***
All India	1	3.2***	1.3***	1.82***

Source: Author's Calculation

*Notes: *** means significant at 1 per cent level, ** means significant at 5 per cent level and * means significant at 10 per cent level.*

The growth rate in yield of rice during 1970-71 to 2011-12 across various states shows large variation (Table: 5). During the decade of 70's the CAGR in yield of rice was positive and high in most of the states like Punjab, Maharashtra, Haryana, Manipur, Tripura and Gujarat which recorded a marginal increase during 1980s. During 90's there was decline in all India CAGR in yield of rice and in some major rice producing states like Andhra Pradesh, Uttar Pradesh, Haryana, Odisha and West Bengal. The CAGR in yield of rice during the last decade was found to be positive in all the states except Kerala and Manipur. But in some important states such as Punjab, Uttar Pradesh and West Bengal there was decline in CAGR in yield of rice. Even though Uttar Pradesh has the highest area under rice production in the country, its yield rate is same with West Bengal.

6. Instability Index for rice cultivation: All India scenario

Table 6: Instability in Area, Production and Yield of Rice in Different Periods at All India level.

Variables	Period I 1970-71 to 1979-80	Period II 1980-81 to 1989-90	Period III 1990-91 to 1999-00	Period IV 2000-01 to 2011-12
Area	3.1	4.8	1.4	5
Production	16.2	12.6	4.7	12.2
Yield	13.3	8.5	3.8	8.2

Source: Author's Calculation

The instability index in area, production and yield of rice at all India level (Table: 6) shows that instability in area under rice cultivation increased from 3.1 in 70's to 4.8 during 80's, with a decline in the 90's and finally again an increase in 2000. The instability index for area under rice cultivation has been the highest during 2000 which shows that there is large scale fluctuation in area under rice cultivation. During the last decade the instability index for rice production increased which also highlights the distress in India's major cereal production. A similar situation is observed in respect of instability index for yield in rice production largely due to fluctuation in area under cultivation

7. Instability Index for Rice Cultivation: Variations across States

The instability index for area under rice cultivation (Table: 7) shows large variation. States which had high instability index for area under rice cultivation were Andhra Pradesh, Gujarat, Karnataka, Rajasthan and Tamil Nadu, Haryana and Rajasthan. Instability index for area under rice cultivation increased for Uttar Pradesh only during the last decade. However, in states like Haryana, Maharashtra, Odisha, Punjab and Tripura the instability index for area under rice cultivation declined during the last decade compared when compared to the dcade of 70's.

Table 7: State Wise Instability in Area of Rice from 1970-71 to 2011-12

States	Period (I) 1970-71 to 1979-80	Period (II) 1980-81 to 1989-90	Period (III) 1990-91 to 1999-00	Period (IV) 2000-01 to 2011-12
Andhra Pradesh	10.5	12.9	10.9	19.1
Assam	3.9	4	3.5	5
Bihar	7	7.7	5.2	13.6
Gujarat	12.6	22.1	7.3	8.1
Haryana	7.9	14.9	6.2	6.6
Himachal Pradesh	6.3	7.1	2.8	1.5
Jammu	3.5	2.2	3.6	4.2
Karnataka	11	8.8	4.5	11
Kerala	2	3.4	3.9	4.9
Madhya Pradesh	1.4	1.6	1.3	2.8
Maharashtra	4.2	5.9	1.5	2.2
Manipur	7.3	4.6	5.8	9
Odisha	5	4.5	2.3	3
Punjab	7.6	4.9	4.3	2.5
Rajasthan	9.9	25.4	9.5	20.2
Tamil Nadu	12	14.6	8.2	14.6
Tripura	6.2	5.9	7.1	4.1
Uttar Pradesh	5.3	7.4	2.7	9.6
West Bengal	5.4	5	2.5	6.6
All India	3.1	4.8	1.4	5

Source: Author's Calculation

The instability index for production of rice during the period 1970-71 to 2011-12 varied widely across states in India (Table: 8). Instability index for production of rice was higher in most of the states as compared to instability index for area under paddy cultivation during the period under study. Most of the states had high instability index of production compared to all India level. States such as Gujarat, Rajasthan, Maharashtra, Madhya Pradesh and Uttar Pradesh had high instability index during 70's. During 1980's there was a decline at all India level for instability index for production compared to the earlier decade. States where instability index was found to be higher were Rajasthan, Gujarat, Odisha, Bihar and Himachal Pradesh. Overall there was a decrease in instability index for rice production across the states in India in 1980s with few exceptions like Assam, Bihar, Kerala, Odisha, Rajasthan and West Bengal where there was worsening of the situation. During 1990s, there was an improvement at the all India level when the instability index declined from 12.6 in 1980s to 4.7 during 1990s. During the last decade, instability index for rice production increased from 4.7 in previous decade to 12.2 at all India level. Also, there was an increase in the instability index for most of the states particularly Rajasthan, Bihar, Gujarat, Madhya Pradesh and Odisha.

Table 8: State Wise Instability in Production of Rice from 1970-71 to 2011-12

States	Period (I) 1970-71 to 1979-80	Period (II) 1980-81 to 1989-90	Period (III) 1990-91 to 1999-2000	Period (IV) 2000-01 to 2011-12
Andhra Pradesh	18.9	18.7	16.4	22.5
Assam	10	13.1	6.2	11.1
Bihar	19.4	27.3	43.5	42.9
Gujarat	81.6	53.7	11.6	41.3
Haryana	26.4	18.5	12.7	7.6
Himachal Pradesh	25.2	24.6	6.3	20.4
Jammu and Kashmir	19.8	16.8	19.1	7.9
Karnataka	24.2	16.6	6.6	27.5
Kerala	5.4	5.8	70.8	11.4
Madhya Pradesh	38.7	22.1	14.9	39.7
Maharashtra	40.5	23.3	7	25.8
Manipur	18.2	17.5	22.8	19
Odisha	28.4	30.9	22.1	37
Punjab	13.2	12.4	6.9	4.4
Rajasthan	50.6	73.4	26.8	44.4
Tamil Nadu	24.5	22.2	60.1	28.3
Tripura	29.4	9.5	33.2	7.6
Uttar Pradesh	32.7	15.6	7.8	19.1
West Bengal	13.2	20.2	5.3	8.3
All India	16.2	12.6	4.7	12.2

Source: Author's Calculation

The instability index in yield of rice (Table: 9) from 1970-71 to 2011-12 shows that during the decade of 70s, the index was higher in states such as Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Tripura, Odisha and Haryana. However, during 1980's, there was an improvement in the situation when the index value was found to decrease from 13.3 to 8.5. This was also reflected for most of the state level estimates. During 1990s, there was further decline in instability index at all India level from 8.5 in 1980s to 3.8 in 1990s. Despite an overall improvement observed in most of the states, few states like Bihar, Haryana, Jammu and Kashmir, Kerala, Manipur, Rajasthan and Tamil Nadu showed an increase in the instability index value. The instability index increased during the decade of 2000 showing the high vulnerability of rice production and the concomitant distressed situation for farmers.

Table 9: State Wise Instability in Yield of Rice from 1970-71 to 2011-12

States	Period I 1970-71 to 1979-80	Period II 1980-81 to 1989-90	Period III 1990-91 to 1999-00	Period IV 2000-01 to 2011-12
Andhra Pradesh	11.9	10	7.1	8
Assam	7.4	9.8	3.4	6.5
Bihar	15.9	21.2	41.5	36.7
Gujarat	69.8	35.9	17.9	8.3
Haryana	23.1	8.9	15.6	8.8
Himachal Pradesh	20.9	21.6	5.6	21.5
Jammu	19.9	16.6	17.6	6.2
Karnataka	14.9	8.4	3.9	20.1
Kerala	4.9	3	43.4	25.1
Madhya Pradesh	38	21.5	15.2	38.1
Maharashtra	37.3	20	7.3	25
Manipur	12.8	15.8	19.9	11.6
Odisha	25	26.7	20.8	34.4
Punjab	11.9	10.2	60.7	3.4
Rajasthan	44.4	50.3	73.1	30.9
Tamil Nadu	13.6	11.4	60.6	18.5
Tripura	27.1	41.9	36.1	5.3
Uttar Pradesh	29.2	9.8	7.6	11.2
West Bengal	11.4	16.7	6.4	3.4
All India	13.3	8.5	3.8	8.9

Source: Author's Calculation

It was found that in some major rice producing states such as Andhra Pradesh, Haryana, Punjab, Uttar Pradesh and West Bengal the value of instability index was lower compared to other states during the decade of 2000.

8. Cropped Area and Input use in Rice Cultivation across states in India

The percentage of gross cropped area across states shows that while in some states there has been an increase in percentage of gross cropped area, in others there was decline in gross cropped area under rice (Table:10). In states such as Bihar, Kerala, Madhya Pradesh, Manipur and West Bengal there has been decline in percentage of gross cropped area of rice from TE 1992-93 to TE 2011-12 while states such as Andhra Pradesh, Haryana, Odisha, Punjab, Tamil Nadu and Tripura shows an increase in percentage of gross cropped area under rice. In Tripura, Assam and Manipur the percentage of gross cropped area is high during 2011-12 largely due to national Food Security Mission programme.

Table 10: State Wise Percentage of Gross Cropped Area of Rice (in Thousand Hectares)

States	TE1992-93	TE 2004-05	TE 2011-12
Andhra Pradesh	29.58	24.38	30.09
Assam	65.52	63.01	61.15
Bihar	50.04	41.08	42.33
Gujarat	5.31	4.09	6.38
Haryana	11.56	15.65	19.05
Himachal Pradesh	8.51	8.61	8.19
Jammu and Kashmir	25.51	22.73	22.74
Karnataka	10.28	9.88	11.69
Kerala	18.03	9.95	8.21
Madhya Pradesh	21.77	8.65	7.14
Maharashtra	7.44	6.83	6.68
Manipur	80.54	71.66	63.95
Odisha	46.47	52.55	79.2
Punjab	27.3	32.92	35.71
Rajasthan	0.7	0.51	0.58
Tamil Nadu	29.78	29.19	32.85
Tripura	57.11	80.42	78.6
Uttar Pradesh	21.6	21.93	21.81
West Bengal	66.59	61.04	57.76
All India	-	22.59	22.12

Source: Land Use Statistics (Ministry of Agriculture, Government of India)

Rice is water intensive and requires adequate irrigation facilities. Punjab, Haryana, Uttar Pradesh and West Bengal are the states with highest percentage of irrigated area to total cropped area. In Andhra Pradesh the share of irrigated area to total cropped area of rice has increased over the years. Percentage of irrigated area to total cropped area in states such as Bihar and Tamil Nadu also increased over the years largely supported by government programmes. In case of Bihar it increased from 57.94 per cent in 2003-04 to 68.94 per cent in 2012-13 and in Tamil Nadu it increased from 46.62 per cent in 2003-04 to 58.20 per cent in 2012-13. In case of Maharashtra share of irrigated area to total cropped area was just 18.48 per cent in 2012-13 which was much below the national average of 47.62 per cent. In north eastern states the percentage of irrigated area to total cropped area was very low and there was a decline in states such as Manipur, Mizoram, Nagaland and Tripura. At all India level proportion of irrigated area to total cropped area increased from 41.15 per cent in 2003-04 to 47.62 per cent in 2012-13. At state level except north eastern states there was increase in percentage of irrigated area to total cropped area (Table: 11).

Table 11: State Wise Percentage of Irrigated Area to Total Cropped Area of Rice

States	2003 -04	2004 -05	2005 -06	2006 -07	2007 -08	2008 -09	2009 -10	2010 -11	2011 -12	2012 -13
Andhra Pradesh	38.66	39.83	44.88	47.38	46.32	48.74	45.89	49.29	49.31	45.92
Assam	4.38	4.39	3.59	3.77	3.7	7.29	5.49	4.09	3.91	3.82
Bihar	57.94	56.72	58.47	60.19	60.85	61.16	60.76	61.83	67.45	68.49
Chattisgarh	20.66	22.96	23.94	25.92	26.48	27.05	26.74	28.29	29.09	30.31
Goa	23.74	23.73	22.23	21.9	23.19	21.99	23.47	22.75	24.99	22.37
Gujarat	36	38.02	41.45	44.71	45.95	45.57	44.37	45.82	48.18	46.93
Haryana	83.64	84.58	83.74	85.4	85.99	85.25	87.31	85.22	87.53	88.96
Himachal Pradesh	18.84	19.21	19.67	19.78	20.19	20.29	19.76	20.56	20.59	20.62
Jammu and Kashmir	40.46	41.11	41.62	40.73	40.85	41.45	41.91	42.02	41.34	41.95
Jharkhand	10.28	9.93	9.37	8.71	9.39	9.69	11.07	12	11.33	14.16
Karnataka	23.6	25.98	27.88	28.96	29.39	31.87	31.82	32.76	34.3	34.11
Kerala	14.38	15.2	15.41	16.8	16.49	17	17.06	17.65	20.49	17.67
Madhya Pradesh	29.19	30.65	29.98	32.53	32.17	32.5	33.45	33.66	36.54	38.76
Maharashtra	18.42	17.84	17.93	18.77	19.26	19.27	19.25	19.4	18.92	18.48
Manipur	18.39	22.73	22.72	22.72	21.7	21.9	22.3	20.98	18.83	15.7
Meghalaya	30.26	27.93	24.93	29.23	25.75	21.5	21.94	21.98	23.59	36.75
Mizoram	18.36	19.23	19.28	12.47	9.99	11.79	8.43	10.05	13.52	12.62
Nagaland	28.06	27.48	27.44	26.2	29.11	20.46	17.57	20.24	19.4	18.92
Odisha	29.16	30.86	33.56	35.77	36.7	35.03	29.29	28.35	28.95	29.51
Punjab	97.66	97.12	97.61	97.52	97.71	97.63	97.95	97.99	98.31	98.39
Rajasthan	29.51	33.68	36.03	36.96	36.42	34.74	33.61	32	36.33	39.47
Sikkim	9.41	9.24	15.12	15.12	14.64	15.4	13.66	13.22	13.7	13.55
Tamil Nadu	46.62	52.42	56.3	56.64	55.92	58.26	58.12	58.19	59.75	58.2
Tripura	38.18	38.22	36.03	36.22	36.47	36.64	36.62	35.02	34.9	34.88
Uttarakhand	44.76	44.5	45.32	45.79	46.7	47.75	48.58	48.02	49.02	49.26
Uttar Pradesh	72.86	74.2	74.96	75.62	75.6	77	76.08	76.62	76.72	78.2
West Bengal	55.76	56.06	57.7	57.93	58.14	57.66	57.97	58.81	58.13	63.08
All India	41.15	42.43	43.73	45.09	45.11	45.51	45.02	44.99	46.89	47.62

Source: Computed from Government of India various issues

Over the years, rice production India has witnessed a continuous decline in using seeds (Kg) and manure (quintals) in most of the states and an increase in fertilizer (Kg nutrients) use. However there is large variation in input use across states. There is also large variation in fertilizer use across states e.g. in Assam, Himachal Pradesh and Jharkhand the use of fertilizer was below 50 Kg nutrients during 2013-14; the use of manure was below 20 Kg in most of the states during 2013-14. Although India's average input application is not high, the imbalance in application of inputs like fertilizers is very high. There is sizeable intensification (rice and wheat in Punjab) while in others there is none (Table: 12).

Table 12: State Wise Input Use in Paddy Cultivation in India (Per Hectare)

State/Year	Seeds (Kg)			Fertilizer (Kg Nutrients)			Manure (Qtls.)		
	2000 -01	2005 -06	2013 -14	2000 -01	2005 -06	2013 -14	2000 -01	2005 -06	2013 -14
Andhra Pradesh	86.1	77.2	73.9	189.46	201.35	239.24	35.58	16.69	15.77
Assam	64.81	65.05	58.02	12.03	9.78	16.66	4.5	3.77	5.17
Bihar	63.22	53.47	46.31	75.36	84.84	98.92	1.29	1.22	0
Chhatisgarh	-	103.6	84.46	-	85.39	122.5	-	7.78	8.46
Gujarat	-	14.94	10.55	-	143.4	153.6	-	19.22	16.83
Haryana	0	0	0	197.7	229.4	207.8	3.07	3.62	0.07
Himachal Pradesh	-	98.4	91.6	-	43.0	19.7	-	25.7	6.0
Jharkhand	-	55.29	50.84	-	39.51	50	-	0.95	6.07
Karnataka	88.8	74.8	65.5	222.1	263.6	260.6	20.37	13.53	12.3
Kerala	0	0	0	106.5	127.2	176.2	28.33	17.76	10.16
Madhya Pradesh	98.4	91.95	66.84	50.71	50.2	105.6	20.24	17.04	7.54
Maharashtra	-	88.45	57.64		117.6	143.4	-	22.86	10.19
Odisha	104.9	91.86	89.13	81.18	83.88	78.59	25.2	25.41	21.13
Punjab	0	0	0	171.3	191.6	209.1	19.62	35.26	24.08
Tamil Nadu	-	0	0	220.2	224.2	240.1	32.76	30.24	37.15
Uttar Pradesh	0	0	0	110.0	129.6	156.8	9.46	8.42	0.91
Uttarakhand	-	0	0	-	79.35	115.6	-	67.03	10.86
West Bengal	71.59	71.27	63.36	95.81	94.03	132.3	30.91	23.36	25.1

Source: Computed from Government of India (Cost of Cultivation Data various issues)

9. Instability index for whole sale prices for rice

Owing to the differences in consumption pattern of rice, holding size and production per farm, the quantity of production sold or marketed by the farmers varies from one state to the other. The marketed surplus (MS)-output ratio varies from 29 percent to 99 percent for paddy/rice in India (Acharya et.al: 2012). In other words total production does not enter the market and a portion is retained by the cultivator for his self-consumption and also for making various payments towards cost of cultivation in kind.

Despite large number of rural markets, post-harvest distress sales, absence of grading and packaging at the farm level and inter-locking credit and commodity markets continue to be common place. A study on paddy sales by the Karnataka State Agriculture Prices Commission in 2002 found that only 29% of the sample farmers sold their produce through the regulated markets. The vast majority (71%) did not because of distance, no knowledge of regulated market, payment delays, no provision for paddy sale, harassment by coolies, good price at the local market, small quantity, and advance taken (Chatterjee and Kapur:2016).

Since agriculture is a state subject, the regulation on wholesale agriculture markets is governed by various states' specific Acts which empower the states to notify the commodities and designate the markets for regulated trades. Together with this, the minimum support price (MSP) is provided for procurement to cover the cost of production

by the farmers. The MSP linked to procurement had served the country well in the past three decades. However, in recent years it has started encountering problems mainly because of surpluses of several agricultural commodities and excessive built up of stocks with FCI. Even deficit states like Bihar, Assam, Eastern U.P. have started generating surpluses of certain cereals (GoI:2010). Consequently there are large variations in wholesale price of paddy across states (Table:13). During 1990s instability in wholesale prices was higher in states such as Haryana, Punjab, Tripura, Madhya Pradesh, and Kerala. Instability in wholesale prices increased during 2000s as compared to 1990s in most of the states except Assam, Bihar and Haryana. During 2000s in states such as Punjab, Andhra Pradesh, Haryana, Madhya Pradesh, Kerala, Gujarat, Himachal Pradesh and Tripura instability in wholesale prices was considerably high.

Table 13: Instability in Wholesale Prices of Paddy from 1990-91 to 2016-17

States	1990-91 to 1999-00	2000-01 to 2016-17
Andhra Pradesh	7.9	33.4
Assam	13.7	10.3
Bihar	9.3	8.6
Gujarat	19	25
Haryana	42.1	31.8
Himachal Pradesh	13.2	24.8
Karnataka	13	19
Kerala	20.6	28.1
Madhya Pradesh	21.2	31.2
Maharashtra	8.1	22.1
Manipur	5.1	22.8
Odisha	6.8	14.2
Punjab	24	46.6
Tamil Nadu	9.3	22.8
Tripura	21.4	24.8
Uttar Pradesh	6.9	16.9
West Bengal	7.5	19.2

Source: Author's Calculation (Directorate of Marketing and Inspection)

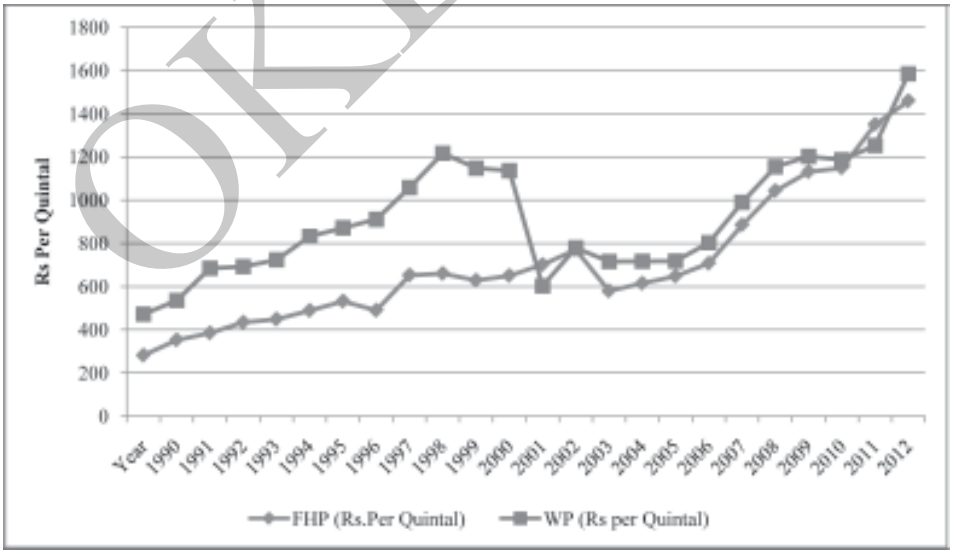
Also there are large fluctuations in farm harvest prices of paddy at state level (Table:14). The state with high instability in farm harvest prices during 1990s were Haryana, Tripura, Rajasthan, Madhya Pradesh and West Bengal. The instability index for farm harvest prices during 2000s increased by large margins during the last decade in most of the states as compared to 1990s. Karnataka, Haryana, Punjab, Rajasthan and Madhya Pradesh continued to be highly unstable in respect of farm harvest prices.

Table 14: State wise Instability in Farm Harvest Prices of Paddy from 1990-91 to 2011-12

States	1990-91 to 1999-00	2000-01 to 2011-12
Andhra Pradesh	7.6	11.3
Assam	12.3	5.2
Bihar	9.6	7.4
Gujarat	17.8	7.7
Haryana	51.9	39.7
Himachal Pradesh	14.5	9.1
Jammu and Kashmir	13.3	3.9
Karnataka	8.9	50.6
Kerala	10.3	10.7
Madhya Pradesh	19.9	18.4
Maharashtra	10.7	10.9
Manipur	11.2	14.2
Odisha	11	9.9
Punjab	14.6	27.5
Rajasthan	21.4	24.5
Tamil Nadu	11.4	11.7
Tripura	21.6	11.3
Uttar Pradesh	11.4	10.6
West Bengal	18.4	14.6

Source: Author's Calculation (Farm Harvest Price taken from Agriculture Prices in India)

Figure 2: Farm Harvest Price and Wholesale Prices of Paddy at All India Level (Current Price)



Source: Computed from Government of India various Issues

Figure 2 shows the Farm Harvest Prices and Wholesale Prices of paddy at all India level from 1990 to 2012. In most of the years wholesale prices were higher than the farm harvest price which shows that farmers were not able to get remunerative prices for paddy and they were selling at distress. From early 1990s to 2000 the gap between whole prices and farm harvest prices increased which also reflects the uncertainty for Indian farmers to recover their basic cost of cultivation.

During the 1970s and 1980s, MSP for rice moved downward in real terms. MSP policy yet afforded adequate producer incentives because of steady yield gains. Beginning in the early 1990s, however, devaluation of the rupee pushed up the costs of traded inputs and led to an upward trend in MSP for rice. Devaluation of the rupee in the early 1990s helped increase the cost of inputs traded. Linking MSPs on production costs disconnected from market conditions as India transitioned from deficits to surpluses. During the late 1990s, the MSP for rice in India was higher than the domestic and world market conditions. This trend benefited the relatively small share of producers in surplus areas who received the MSPs, but higher market prices had adverse impacts. Since 2001, following the accumulation of large surplus stocks, there have been relatively small nominal annual increases in MSPs for wheat and rice. As a consequence, there has been slower growth in rice output, including both area and yield, slowed growth in government procurement of rice in price support operations.

Table 15: Ratio of Farm Harvest Prices to Wholesale Prices of Paddy in Different Years

State	1990 -91	1991 -92	1992 -93	1993 -94	1994 -95	1995 -96	1996 -97	1997 -98	1998 -99	1999 -00
Andhra Pradesh	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5
Assam	0.7	0.9	0.6	0.6	0.7	0.7	0.6	0.6	0.7	0.6
Bihar	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5
Gujarat	0.6	0.9	0.7	0.6	0.6	0.7	0.7	0.8	0.7	0.5
Haryana	1.4	1.6	1.8	2.6	1.5	0.7	1	1.2	3	0.9
Himachal Pradesh	0.6	0.7	0.6	0.8	0.7	0.6	0.6	0.6	0.6	0.6
Karnataka	0.5	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.4
Kerala	0.7	0.8	0.8	0.6	1	0.8	0.9	0.8	0.7	0.6
Madhya Pradesh	0.5	0.6	0.4	0.5	0.4	0.4	0.7	0.5	0.6	0.5
Maharashtra	0.6	0.8	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.5
Manipur	0.5	0.6	-	-	0.5	0.5	0.5	0.4	0.6	0.6
Odisha	-	-	-	-	-	-	-	-	0.5	0.5
Punjab	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1
Tamil Nadu	0.6	0.5	0.6	0.7	0.6	0.5	0.5	0.5	0.5	0.4
Tripura	1.3	1.1	1	1.1	1.1	1	1.1	0.9	0.5	0.9
Uttar Pradesh	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.5
West Bengal	0.6	0.6	0.5	0.6	0.5	0.6	0.6	0.5	0.7	0.5

States	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Andhra Pradesh	0.5	0.5	-	0.9	0.4	0.9	0.9	1.1	1.2	1.2	1	1	1.2	1.1
Assam	0.5	0.5	-	0.9	1.1	0.9	-	0.9	0.9	0.9	0.9	1	1	0.8
Bihar	0.4	0.5	-	0.8	0.9	0.8	0.9	0.9	0.9	-	-	-	0.8	0.8
Gujarat	0.5	0.5	1.2	1.1	1	0.9	1	1.1	1	1	1	1	1.1	1
Haryana	0.9	1.5	1.6	0.8	0.9	0.9	-	-	-	-	1.2	0.8	1.5	1.3
Himachal Pradesh	0.7	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Karnataka	0.4	0.5	1	2.6	0.7	0.7	0.8	0.9	0.9	0.8	0.9	0.9	1	0.7
Kerala	0.5	0.5	-	0.4	0.5	-	0.9	0.6	1.1	1.1	1	1	1.1	0.9
Madhya Pradesh	0.6	0.5	1.5	1.2	0.9	0.9	0.9	1.1	0.9	1.1	0.9	1.1	1.2	0.9
Maharashtra	0.6	0.6	0.9	0.7	0.9	-	-	-	0.8	0.8	0.9	1.3	1	0.8
Manipur	0.4	0.4	0.9	0.7	0.9	0.8	0.7	0.8	-	-	0.7	0.6	0.7	0.9
Odisha	0.4	0.5	0.8	0.8	0.9	0.9	0.8	1.1	1	1	1	1	1	1
Punjab	0.2	0.3	1.6	1.4	-	1.3	1.3	0.7	0.8	1.1	0.7	0.7	0.8	0.5
Tamil Nadu	0.4	0.4	0.9	0.8	0.8	0.7	0.8	1	1	0.9	0.9	1	1.1	1
Tripura	-	1.1	-	1.4	-	0.7	0.7	1	-	-	0.8	1	1.3	1.1
Uttar Pradesh	0.5	0.5	0.9	0.9	0.9	1	1	0.9	1	1.1	0.8	1	1	0.8
West Bengal	0.5	0.5	0.8	0.9	0.9	0.9	0.9	0.7	0.9	1.1	0.9	0.9	1.1	1.1

Source: Computed from Government of India various Issues

Table 15 shows the ratio of farm harvest Prices to wholesale prices of paddy across states[1]. During 1990s in all the states except Haryana and Tripura the ratio of farm harvest Prices to wholesale prices was less than one. In case of Punjab the value of this ratio is 0.1 and 0.2 during 1990s which explains the reasons for distressed sale of rice by farmers in Punjab during 1990s. A similar situation arose in Andhra Pradesh, Uttar Pradesh,West Bengal where there was distress sale by the farmers in these states during 1990s.

During 2000s the ratio of farm harvest price to wholesale price has improved. However, in states like Assam, Bihar, Karnataka and Manipur though there has been an improvement in the ratio but paddy cultivation is still not profitable as the ratio continues to be less than one (0.7 and 0.9). Before liberalization, even low yields fetched relatively higher prices, but with opening up of the economy and linking to international markets have made prices depend on global demand and supply rather than local and low yield is made worse by low price. This combination of low yield and low price adds further to distress of cultivators (Menon:2006)

[1] When the value of this ratio is less than one implies there is distress sale by the farmers as farm harvest prices are the prices received by the farmer at the village site and when this ratio attains the value greater than 1one it means the cultivation of paddy is profitable to the farmers.

10. Conclusion

Over the years the compound annual growth rate of area, production and yield of rice in India though continues to be positive had been declining gradually. The rate of decline was faster in the post reforms period. The instability index in respect of production and yield at all India level decreased during the decade of 80s and 90s but increased during the last decade. As growth rate declined in area under production of rice, total production of rice and yield of paddy cultivation during the last decade, instability index for all the three indicators increased at the same time. The increase in instability in wholesale prices of paddy across various states from 1990-91 to 2016-17 shows the distressed situation of paddy farmers. The ratio of farm harvest price to wholesale price has improved in many states after 2005 in many states. The instability in area, production and yield of rice can be reduced through adequate institutional support and input supply to the farmers including marginal and small farmers.

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Heterogeneity in Diffusion of Better Farm Practices across Different Types of Farmers in the Brahmaputra Plain of Assam

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Abstract

The non-farm employment in the rural areas of the state has grown from 35 per cent in 1999-2000 to 40 per cent in 2011-12. It is against this backdrop; this study examines the extent of diversification of farmers in terms of their income sources and the nature of utilization of farm land by farmers of different types. The present paper throws light on the extent of diversification of farm households towards activities other than cultivation in the Brahmaputra Plain of Assam and compares the extent of diffusion of better farm practices between pure farmers and mixed income farmers. Based on field study data collected from nine villages in the Brahmaputra plain, it has been found that pure farmers have more mechanized farming practices than the mixed income farmers in terms of adoption and use of irrigation machinery while there is no such significant difference between them in case of ploughing mechanization.

1. Introduction

In India cultivation is the principal source of income for 63.5 per cent of farm households (Some Characteristics of Agricultural Households in India 2013). Since cultivation is the only source of income for a segment of farmers while for the rest it is one among the sources of their income, we cannot expect that farming as a source of livelihood is equally important for all types of farmers. On an average, income from non-farm business, livestock and wage/salary accounts around 52 per cent of monthly income of agricultural households (Key Indicators of Situation of Agricultural Households in India 2014). Generally, cultivation is more important for pure farmers than the mixed income farmers. This is because pure farmers depend exclusively on cultivation for their livelihood while the mixed income farmers derive their income from multiple sources. Moreover, owing to the engagement in activities other than cultivation time spent in cultivation is also likely to be less by the mixed farmers compared to the pure farmers. Taking in to account all these propositions, it can be expected that the adoption of better farm practices such as multiple and diversified cropping, application

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of fertiliser, the extent of farm mechanization etc. are more extensively used by pure farmers compared to the mixed income farmers. However, in so far as income is concerned, due to the multiple sources of income generation, mixed income farmers are likely to be financially better off than the pure farmers. The NSSO data on Consumption Survey for the year 2011-12 showed that one fifth of rural households with self employment in agriculture as their principal occupation had income less than the poverty line (Chand 2017). Past strategies in agricultural development focused on raising productivity through improved farm practices and ensuring food security of the country. The question of raising farmer's income did not find any mention in these strategies. Farmer's income remained low compared to non-farm income; during early 1980s, farm income was 34 percent of the income of non-agriculture worker which worsened further after 1993-94 and reached one-fourth of income of non-agricultural workers (Chand 2017). The National Sample Survey Office (NSSO) survey on employment and unemployment showed the number of cultivators declined at the rate of 1.80 per cent per year during 2004-05 to 2011-12 (Saxena *et al.* 2017). The NSSO 2014 Survey on situation of agricultural households showed that 60 per cent income of agricultural households is derived from farm sources while remaining 40 per cent is derived from off farm and non-farm sources (Key Indicators of Situation of Agricultural Households in India 2014). The data shows that for income across size classes, small farmers derive maximum share from non-farm sources but as one moves up in the size class category, the share of income derived from crop cultivation improves significantly and the share of non-farm activities, i.e. wages and salaries, and non-farm business activities declines (Birthal *et al.* 2017).

Assam is one among the agriculture based states of India[1] and over the years the state has experienced a declining trend of proportion of people engaged in agriculture. In terms of usual activity status (principal status and subsidiary status), workers engaged in agriculture sector was 63.6 per cent as per 66th round of NSS (Government of India 2009-10) and it declined to 56.1 per cent as per 68th round of NSS (Government of India 2011-12). The decrease in proportion of people engaged in agriculture in Assam can be attributed to factors like small and decreasing farm size, frequent flood and un-remunerative nature of agriculture to a great extent. The average size per holding in the state has decreased from 1.47 hectares in 1970-71 to 1.10 hectares in 2010-11(Report on Agricultural Census, 2010-11, Government of Assam). There has been large scale marginalisation of land; proportion of marginal size land in the state has increased from 21 per cent in 2000-01 to 26 per cent of the total land in 2010-11 (Economic Survey, Assam 2015-16). The state has in the recent decades experienced improvement in the level of educational attainment, emergence and expansion of non-

[1] In Assam, as per Land Utilisation Statistics for the year 2011-12 (provisional), around 36 percent of the total reported area of the state was net sown area (Economic Survey, Assam 2015-16) and the state comprises 3.8 per cent of agricultural households of India (Some Characteristics of Agricultural Households in India 2013). Moreover, agriculture sector provides employment and support to more than 50 per cent of the total workforce of Assam and a total of 20.28 percent of the GSDP at constant (2011-12) prices of the state was contributed by agriculture and allied sector in 2014-15 (Q) (Economic Survey, Assam 2015-16).

farm sector particularly unorganised sector. The non-farm employment in the rural areas of the state has grown from 35 per cent in 1999-2000 to 40 per cent in 2011-12 (Saha 2016). It is against this backdrop; this study examines the extent of diversification of farmers in terms of their income sources and the nature of utilisation of farm land by farmers of different types. The present paper would try to throw light on the extent of diversification of farm households towards activities other than cultivation in the Brahmaputra Plain[2] of Assam and compare the extent of diffusion of better farm practices between pure farmers and mixed income farmers.

The paper has been divided into four sections. Section 1 is introductory section. Section 2 comprises the data sources, explanation of data collection procedure and analytical framework of the study. The extent of diversification of farmers in terms of their income sources and the discussion on diffusion of better farm practices by different types of farmers have been incorporated in section 3. Final section comprises the broad conclusion of the study and policy implications thereof.

2. Methodology

2.1 Data Source and Sampling Procedure

The study is based primarily on field survey. The survey data were collected through multi-stage sampling procedure. Three districts one each from three different regions of the Brahmaputra Valley of Assam, were selected at the first stage. The selected districts were namely Lakhimpur, Kamrup and Morigaon. These districts also represent three different agro-climatic zones viz. north bank plain zone, lower Brahmaputra valley zone and central Brahmaputra valley zone respectively among the four agro-climatic zones of the Brahmaputra Valley. At the next stage, from each selected district, three villages were chosen at random. Lechai Gaon, No. 2 Kowadanga and Bhoroluwa Gaon were the three villages chosen from Lakhimpur. The villages selected from Morigaon were Chenimari, Bihubori and Hariapar. The three villages selected from Kamrup were Doloi Gaon, Pub-Sitara and Karara Garbhitar. Finally, a total of 232 farm households (around 12 percent of the total farm households in surveyed villages) were selected at random and surveyed during November, 2013 to January, 2014 to get the required information.

2.2 Analytical Approach

To understand the difference between pure farming households and mixed households, the households had been divided with respect to their primary occupation. Thus, if cultivation is the primary occupation of all the working family members of a farm household, the household is treated as pure farmer. In case of households where besides farming, there are other income activities, the households have been considered as mixed income farmers. The extent of diversification towards activities other than cultivation among farm households has been examined by looking into their distribution by income source.

[2] Brahmaputra Valley constitutes around two third of the geographical area of Assam.

The study on adoption and use of better farm practices has been divided in to two groups. First, whether the degree of mechanisation of ploughing and irrigation activities between pure farmers and mixed income farmers are same or not has been examined. Farm mechanisation has been analysed with respect to ploughing and irrigation activities as these are the two key farming activities. Using Fisher's *t*-test the degree of mechanisation between the two groups of farmers has been compared.

In the final stage, efficient utilisation of cultivable land by the two types of farmers has been examined in terms of three indices of land utilisation, viz., cropping intensity, diversification of cropping and fertiliser consumption. The values of these indices have been calculated for both types of farmers. Subsequently, using regression analysis presence of any significant difference between the two types of farmers with respect to all the three indices have been examined. As there are three indices, three equations have been formulated to capture the effects. The three dependent variables have been defined as:

Cropping Intensity (CI): It is the ratio of gross cropped area to the net sown area of the farm expressed in percentage.

Crop Diversification (CD)*:* Herfindahl Index (H) has been used to measure crop diversification as follows-

CD = 1-H

$=1 - \sum_{i=1}^{n} s_i^2$, where s_i is the share of the *i*-th crop in the gross cropped area.

Fertiliser Consumption (FC): It is the application of NPK (in kg) per hectare of gross cropped area.

Since the three indices are expected to vary with types of farming practices, the variable types of farmers (TYP) constitute our independent variable which is a binary variable that takes 1 for pure farmers, 0 otherwise (mixed income farmers).

In examining the impact of types of farmers on CI, CD and FC with the help of regression analyses, the effect of some other factors need to be controlled. For example, tenancy is likely to affect CI, CD and FC adversely since a part of the total production from cultivation has to be shared by the tenant with landlord in lieu of sharing the cost. Studies have shown adverse effects of tenancy particularly share cropping on CI and CD in case of Assam (Goswami 2012). Irrigation is another common factor which has important bearing on CI, CD and FC. With adequate irrigation facility, a farmer is likely to cultivate more intensively by adopting dry season cultivation which results more crop diversification and application of fertiliser. There are evidences of the impact of irrigation on cropping intensity (Dhawan and Datta 1992; Karunakaran and Palanisami 1998) and on crop diversification (Goswami 2012). Farm size is another determinant of CI (Agarwal 1984), CD (Mandal and Bezbaruah 2013) and FC (Quasem and Hossain 1979; Ahmad *et al*, 2001; Goswami, 2012). However, impact of farm size is not very

clear on all these three indices. Small farmers may use land more intensively; apply more fertiliser and diversify more to enhance their agricultural output. At the same time, given the relatively better financial condition of large farmers, this may also happen that large farmers realise higher cropping intensity and apply more fertiliser than the small farmers. We may also anticipate higher crop diversification by large farmers if there is absence of economies of scale and they are risk averse. Besides these factors, the extent of use of ploughing machinery may enhance cropping intensity and crop diversification by reducing both the physical labour involved in ploughing operation and the time of ploughing. The extent of HYV seeds adoption may also raise the intensity of cropping as it gets matured in shorter period of time than the traditional verities of seeds. Access to finance can enhance purchase and use of FC and in increasing CI and CD by facilitating the use of different farm inputs. Similarly, access to extension services may help in improving CI, CD and FC by creating and increasing awareness among farmers. Moreover, there may be some impacts of locational characteristics such as soil quality, agricultural infrastructure, access to markets for both inputs and outputs etc. on CI, CD and FC. The construction of variables is presented in Table 1.

Table 1: Variables and expected impact

Variable	Notation	Definition	Expected impact		
			CI	CD	FC
		Independent variable			
Types of farmers	TYP	1 for pure farmers, 0 otherwise (mixed income farmers)	+	+	+
		Control variables			
Tenancy	TEN	proportion of lease in area to the total operational holdings	-	-	-
Farm size	FS	Size of operational holding in hectare	+/-	+/-	+/-
Extent of ploughing mechanisation	EPM	Ratio of gross mechanically ploughed area to gross cropped area	+	+	
NA					
Extent of irrigation	ERR	Ratio of gross irrigated area to gross cropped area	+	+	+
Access to finance	ATF	1 for borrowers, 0 otherwise	+	+	+
Access to extension services	ATE	1 if consulted with extension workers, 0 otherwise	+	+	+/-
Area under HYV	HYV	percentage of area under boro paddy to the total paddy acreage	+	NA	NA
Location dummy	L_1&L_2	L_1=1 for Morigaon, 0 otherwise and L_2=1 for Kamrup, 0 otherwise assuming Lakhimpur as reference location	+/-	+/-	+/-

Specification of functional form and regression equation

The functional relation for each of the three indices is defined as:

$CI=F(TYP,TEN,FS,EPM,ERR,ATF,ATE,HYV,L_1,L_2)$……(i)

$CD=F(TYP, TEN,FS,EPM,ERR,ATF,ATE,L_1,L_2)$……(ii)

$FC=F(TYP, TEN,FS,ERR,ATF,ATE,L_1,L_2)$……(iii)

The minimum value that cropping intensity can take is 100 and we have a cluster of observations at that value. The value of crop diversification, another dependent variable, ranges from 0 to 1 and in our data set we have a cluster of observations at CD=0. The minimum value of fertiliser consumption is 0 without any restriction on the upper limit and we have a cluster of observations at FC=0. Under such cases left censored TOBIT formulation is better than the simple linear regression (Goswami 2012; Kumar *et al* 2012; Pandey 2016). Hence, left censored TOBIT regressions corresponding to (i), (ii) and (iii) respectively are specified as-

$CI_i^*=\beta_0+\beta_1TYP_i+\beta_2TEN_i+\beta_3FS_i+\beta_4EPM_i+\beta_5ERR_i+\beta_6ATF_i+B_8ATE_i+\beta_8HYV_i+\beta_9L_{1i}+\beta_{10}L_{2i}+U_i$……(iv)

Where $CI_i=100$ for $CI_i^*< 100$, $CI_i=CI_i^*$ for $CI_i^* \geq 100$ and U_i is the usual disturbance.

$CD_i^*=\beta_0+\beta_1TYP_i+\beta_2TEN_i+\beta_3FS_i+\beta_4EPM_i+\beta_5ERR_i+\beta_6ATF_i+B_7ATE_i+\beta_8L_{1i}+\beta_9L_{2i}+U_i$……(v)

Where CDi=0 for $CD_i^*< 0$, $CD_i=CD_i^*$ for CD_i^* $0 \leq CD_i^* \leq 1$ and U_i is the usual disturbance.

$FC_i^*=\beta_0+\beta_1TYP_i+\beta_2TEN_i+\beta_3FS_i+\beta_4ERR_i+\beta_5ATF_i+B_6ATE_i+\beta_7L_{1i}+\beta_8L_{2i}+U_i$……(vi)

Where $FC_i=0$ for $FC_i^*< 0$, $FC_i=FC_i^*$ for $FC_i^* \geq 0$ and U_i is the usual disturbance.

3. Results and Discussion

3.1 Diversification of Farm Households by Income Sources

The overall sample distribution comprises of 57.8 per cent mixed income farmers and 42.2 per cent belong to pure farmers category (Table 2). Cultivation is one of the sources of income for 84.1 per cent sample farmers while it is only source of income for only 42 percent of sample households. Activities under the 'other' category appeared as the second preferred primary sources of income among the sample farmers. Trade is the primary source of income for 23.7 per cent farmers followed by service (17.7 per cent) and 'other agricultural activity' (6.9 per cent) respectively. There are also some service holders for whom cultivation still continue to be a source of income. Across size classes by operational holdings, small size farmers turn out to be mostly pure farmers while large farmers are mostly mixed income farmers. Among the various sources of income for the sample households, excluding cultivation, the income from trade, service and 'other' are taken up relatively more by large farmers and 'other agricultural activity' is preferred and adopted more by small farmers. Diversification of income sources among farm households of lower size class of holding may reflect

unaccomodativness of agriculture sector; but multiple sources of income in farm households of higher size class of holdings may be for different reasons.

Table 2: Distribution of Farm Households by Income Source

Size class	Pure	Mixed income farmers						Total
(in hectare)	farmers	*Cultivation*	*Trade*	*Service*	*Other agricultural activity*[3]	*Other*	Overall*	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
							(3+4+5+6+7)	*(2+8)*
<1	41	*40*	*16*	*22*	*10*	*34*	60	101
	(40.59)	*(39.60)*	*(15.84)*	*(21.78)*	*(9.90)*	*(33.66)*	(59.41)	(100.00)
1 to 2	39	*40*	*28*	*11*	*6*	*23*	53	92
	(42.39)	*(43.48)*	*(30.43)*	*(11.96)*	*(6.52)*	*(25.00)*	(57.61)	(100.00)
2 to 3	13	*09*	*6*	*4*	*0*	*2*	11	24
	(54.17)	*(37.50)*	*(25.00)*	*(16.67)*	*(0.00)*	*(08.33)*	(45.83)	(100.00)
3 to 4	02	*03*	*1*	*2*	*0*	*3*	04	06
	(33.33)	*(50.00)*	*(16.67)*	*(33.33)*	*(0.00)*	*(50.00)*	(66.67)	(100.00)
4 to 5	02	*03*	*2*	*2*	*0*	*1*	04	06
	(33.33)	*(50.00)*	*(33.33)*	*(33.33)*	*(0.00)*	*(16.67)*	(66.67)	(100.00)
5 e”	01	*02*	*2*	*0*	*0*	*0*	02	03
	(33.33)	*(66.67)*	*(66.67)*	*(00.00)*	*(0.00)*	*(00.00)*	(66.67)	(100.00)
All	98	*97*	*55*	*41*	*16*	*63*	134	232
	(42.24)	*(41.81)*	*(23.71)*	*(17.67)*	*(6.90)*	*(27.16)*	(57.76)	(100.00)

Source: Author’s field study
In parentheses percentage to the total households
** Overall is not equal to sum of column 3, 4, 5, 6 and 7 as such households are earning from more than one sources.*

3.2 Characteristics of Farmers

Farm Size

Distribution of farmers by size class of operational holdings and ownership holdings of cultivable land, showed that that pure farmers have smaller land sizes compared to the mixed income farmers. Size of operational holdings of pure farmers is 1.3 hectare against 1.4 hectare of mixed income farmers. Similarly, size of ownership holdings of cultivable land of pure farmers is 0.7 hectare and it is 1.1 hectare for mixed income farmers (Table 3).

Table 3: Size of Holdings by Types of Farm Households (area in hectare)

Types of farmers	Operational holdings	Ownership holding of cultivable lands
Pure farmers	1.31	0.74
Mixed income farmers	1.36	1.10
All	1.34	0.95

Source: Author’s field study

[3] It refers to the earnings by working as agricultural laborer.

Educational Status

Educational level of the head of the household (HoH) has an influence in deciding the income diversification among farm households. The sample data corroborates this as HoH from mixed income farmers are found to have higher educational attainment compared to pure farmers. Almost a quarter of pure farmers were found to be illiterate against 15.7 per cent among mixed income farmers (Table 4). Proportion of matriculates among HoH was also higher among mixed income farmers as compared to pure farmers. This indicates that with increase in educational attainment level, the diversification of activities from cultivation to other activities by farm households tend to increase.

Table 4: Percentage Distribution of Farm Households by Educational Attainment of the HoH

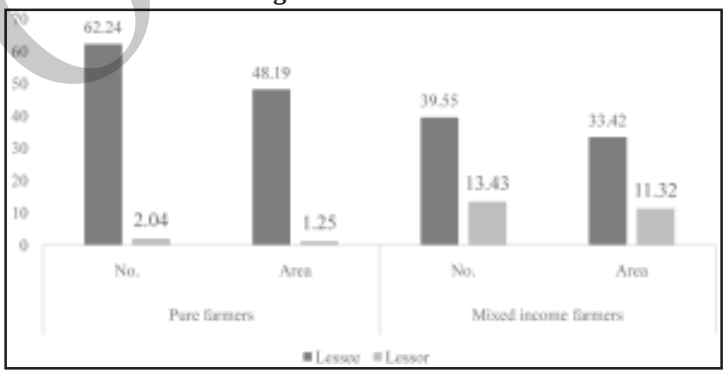
Types of farmers	Illiterate	Below Primary	Primary to High School	Matriculate to Under graduate	Graduate & above
Pure farmers	25.51	14.29	38.78	21.43	0.00
Mixed income farmers	15.67	9.70	44.78	21.64	8.21
All	19.83	11.64	42.24	21.55	4.74

Source: Author's field study

Status of tenure

As mentioned earlier security of tenure is an important factor deciding the farm practices. The survey findings revealed that a total of 62.2 per cent of pure farmers were lessee while the same for mixed income farmers was 39.6 per cent. In terms of percentage of area leased in to the operational area the pattern observed is same as in lessee (Figure 1). On the other hand, the extent of leasing out is more among mixed income farmers than the pure farmers in terms of both number of lessor and area leased out. Thus, pure farmers are mostly tenant while mixed income farmers are lessor. This practice of leasing out land by farm households is partly because of the high cost of cultivation vis-a-vis return and availability of opportunities for other gainful employment with better educational attainment.

Figure 1: Tenure Status



Source: Author's field study

Caste

In India farming practices have strong caste biases. In the early modernist discourse on Indian society, caste was invariable counterpoised to class (Jodhka 2003). The discussion on class–caste relations was well articulated in the "mode of production" debate that took place in the 1970s. Several scholars argued that the Indian agrarian economy in its contact with capitalism led to the emergence of a capitalist class—and, class-based exploitation was mediated through caste identities (Omvedt 1978; Rudra 1978; Gough 1980). Extensive debates of that time indicated that caste does perform certain crucial economic functions like it determines access to land (the principal means of production), control over the labour process, and forms of exploitation (Rao 2017).

Although sample households from general category had higher proportion, yet proportion of pure farmers was found to be lower among two types of farm households within the general category households. Pure farmers were proportionately higher among other caste groups. In contrast, mixed income farmers were mostly from general caste households. The social position of farm households decides their bargaining strength in markets and their production decisions. Besides, the level of education, access to various support services also has decisive influence on farming practices across farm households from various social groups.

Table 5: Percentage Distribution of Farmers by Caste

Types of farmers	General	SC	ST	OBC/MOBC
Pure farmers	37.76	10.20	24.49	27.55
Mixed income farmers	47.76	4.48	22.39	25.37
All	43.53	6.90	23.28	26.29

Source: Author's field study

Dependency on Credit

It has been found that pure farmers are more dependent on credit than the mixed income farmers for conducting their farm operation. Indebtedness was fairly high (67.4 percent) among pure farmers for cultivating their land as against 41.8 percent of mixed income farmers found to have borrowed money for cultivating their land. The mixed income farm households who are primarily engaged in government jobs have ready source of funds for investing in their farm activity unlike the pure farming households who do not have alternate sources of income available for investment in farm activities. One of the reasons for high incidence of indebtedness among pure farmers is the lack of own investible resource. Among the mixed income farmers households who derive their income from trade and other agricultural activity are more likely to be indebted.

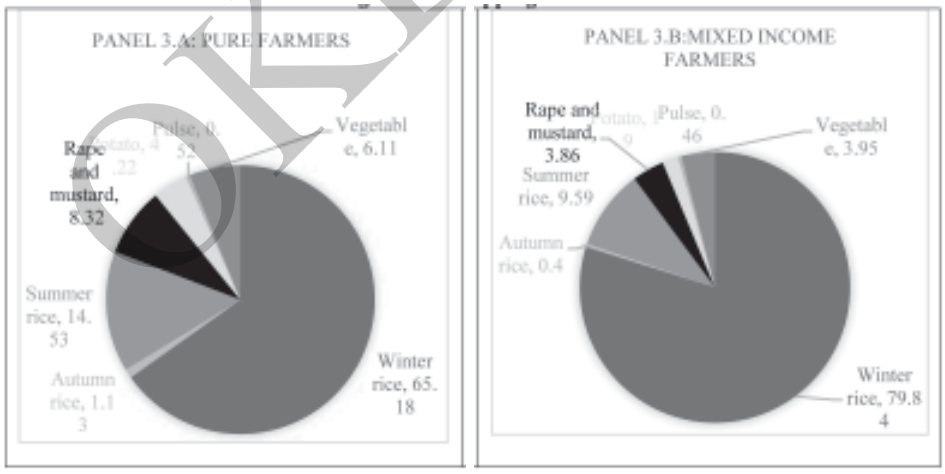
Figure 2: Extent of Borrower

Source: Author's field study

Cropping Pattern

While rice is the major crop grown by the sample households, pure farmers are found to be relatively more diversified towards cultivating other crops compared to the mixed income farmers in terms of area under crop (Figure 3). Around 81 per cent of the cropped area of pure farmers is under rice cultivation while it is around 90 per cent in case of mixed income farmers. Further, winter rice is the dominant crop for both groups of farmers. The second major crop grown by pure farmers is rape and mustard followed by vegetable, potato and pulse repetitively. In case of mixed income farmers, vegetable is the second major crop followed by rape and mustard, potato and pulse respectively. Crop diversification by pure farmers is mostly taken up for two reasons: (a) it helps the farmers to reduce the risk of crop failure and (b) they are able to earn extra cash from cultivation of dry season crops.

Figure 3: Cropping Pattern



Source: Author's field study

3.3 Degree of Mechanisation

In India, the level of mechanisation varies greatly by region. States in the north such as Punjab, Haryana and Uttar Pradesh have high level of mechanisation due to the highly productive land in the region as well as a declining labour force. Studies have shown that there are evidences of positive impacts of mechanisation on production and productivity enhancing practices of agriculture (Hamid 1972, Agarwal 1984, Singh, G 2006, Singh, J 2006 and Verma 2008) and on efficient utilisation of cultivable land. However, the level of mechanisation continues to be low in Assam (https://farmech.dac.gov.in/FarmerGuide/NE/index1.html). There are a number of reasons behind this. Factors such as high transportation cost, lack of state financing and other financial constraints due to socio-economic conditions and dearth of agricultural machinery manufacturing industries have hindered the growth of farm equipment sector within the state. Nevertheless, in order to boost up farm mechanisation, special thrust has been given by the State Agriculture Department. Mechanisation of farm practices also varies with farming practices.

In our study, the sample observations revealed that with respect to ploughing, there has been fairly high level of mechanisation among both the groups of farmers though it was more extensive among the mixed income farmers (80.6 per cent) than the pure farmers (75.5 per cent). Also, the intensity of mechanised[4] ploughing was more across mixed income farmers (78.3 per cent) compared to pure farmers (65.4 per cent). In respect of mechanised irrigation, it was observed that a little more than half the proportion of pure farmers (52.0 per cent) went for mechanised irrigation and it was even lower in case of mixed income farmers (40.3 per cent). The intensity of mechanised irrigation was also found to be fairly low among both groups of farmers, though pure farmers (26.9 per cent) relatively used more mechanised irrigation compared to mixed income farmers (19.0 per cent). In order to see whether the observed difference between the two groups of farmers with respect to intensity of mechanisation of irrigation and ploughing was significant, we have used Fisher's *t*-test[5].

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[4] Intensity of mechanisation of ploughing has been defined as the percentage of gross area ploughed using machinery at least for one round of ploughing during the reference period of the study to the gross cropped area. Similarly, the intensity of mechanised irrigation has been defined as the percentage of gross irrigated area using machinery at least for one round of irrigation during the reference period of the study to the gross cropped area.

[5] The null hypothesis for both ploughing and irrigation mechanisation are-H_O: there is no difference between values of intensity of mechanisation (both ploughing and irrigation) of pure farmers and mixed income farmers Alternative hypotheses for ploughing and irrigation mechanisation are respectively-H_A: value of intensity of loughing mechanisation of pure farmers < value of intensity of ploughing mechanisation of mixed income farmers H_A: value of intensity of irrigation mechanisation of pure farmers > value of intensity of irrigation mechanisation of mixed income farmers

Table 6: Results of Fisher's t-test

Activity	Levene's Test for Equality of Variances	Fisher's *t*-test for Equality of Means	
		t-statistic	p-value
Ploughing	F=3.971 p-value =0.047Result= variances are not same	-1.529 (200.521)	0.064
Irrigation	F=3.353p-value =0.068Result= variances are same	1.908(230)	0.029

Source: Author's field study In parentheses degrees of freedom

Results of the Fisher's *t*-test showed that the intensity of mechanisation with respect to irrigation for pure farmers was significantly more than that of the mixed income farmers (Table 6). This observed difference could be due to the relatively large-scale adoption of crops like summer rice, winter vegetable, rape and mustard, potato, pulse and so on by the former group than by the latter group (Figure 3). On the other hand, in case of the intensity of mechanised ploughing the observed advantage of mixed income farmers over pure farmers was not significant and irrespective of farmer types, mechanised ploughing has been adopted by both the group of farmers.

3.4 Land Productivity Utilisation

The sample data showed that pure farmers had reported higher incidence of cropping intensity, crop diversification and consumption of fertiliser in their farm practices[6] (Table 7). On an average, the extent of area under HYVs is 16.6 per cent. It was also found that some farm households grow only the HYVs of crops while some others grow only traditional variety of crops. The farm size ranges from 0.1 hectare to 6.8 hectare with an average size of 1.3 hectare. The proportion of leased in area to the total operational holdings is 0.3 across the sample farmers. The ratio of gross mechanically ploughed area to gross cropped area was found to be fairly high (0.72). In contrast, the proportion of gross area irrigated to the gross cropped area is just 0.3. The average application of fertiliser by sample farmers has been found to be 62.1 kg/hectare with a maximum of 768.4 kg/hectare while some farm households has not used fertiliser at all.

[6] The values of cropping intensity, crop diversification and fertiliser consumption are 120 per cent, 0.5 and 78 kg/hectare for pure farmers respectively against 111 per cent, 0.4 and 38 kg/hectare in case of mixed income farmers respectively in the sample households.

Table 7: Descriptive Statistics of Explanatory Variables

Variable	Obs	Mean	S.D.	Min	Max
Percentage of area under HYVs	232	16.58	32.76	0	100
Types of farmers (1=pure farmer, 0= mixed income farmer)	232	0.42	0.50	0	1
Farm size (in hectare)	232	1.34	1.04	0.13	6.76
Extent of tenancy	232	0.32	0.36	0	1
Extent of ploughing mechanisation	232	0.72	0.41	0	1
Extent of irrigation	232	0.26	0.35	0	1
Access to credit (1= borrower, 0=otherwise)	232	0.53	0.50	0	1
Access to extension service (1= if consulted, 0=otherwise)	232	0.24	0.43	0	1
NPK (in kg) per hectare of gross cropped area	232	62.07	103.48	0	768.41
Lakhimpur	232	0.41	0.49	0	1
Morigaon	232	0.31	0.46	0	1
Kamrup	232	0.28	0.45	0	1

Source: Author's field study

The results of regression analysis reveal that coefficient of independent variable TYP is positively significant at five per cent in case of both cropping intensity and fertiliser consumption. However, it is not significant in case of crop diversification[7]. It implies that the probability of intensive cultivation and use of fertilise per unit of cropped area is significantly more by pure farmers as compared to the mixed income farmers while there is no such difference between them with respect to diversification of cultivation. Thus, it is found that pure farmers utilise land productivity more the mixed income farmers.

[7] As data set is cross sectional, problem of heteroskedasticity and multicollinearity have been checked. While there is no such problem of multicollinearity, heteroskedasticity has been found to be present with respect to all the three regressions. Estimating robust standard error, problem of heteroskedasticity has been corrected.

Table 8: Results of Regressions

	Cropping Intensity			Crop Diversification			Fertiliser Consumption		
	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity			Breusch-Pagan / Cook-Weisberg test for heteroskedasticity			Breusch-Pagan / Cook-Weisberg test for heteroskedasticity		
	$chi^2(1)$ = 75.85			$chi^2(1)$ = 13.72			$chi^2(1)$ = 311.17		
	Prob > chi^2 = 0.0000			Prob > chi^2 = 0.0002			Prob > chi^2 = 0.0000		
	Average VIF=1.66			Average VIF=1.34			Average VIF=1.28		
	Maximum VIF=3.09			Maximum VIF=1.74			Maximum VIF=1.53		
Variable	Coefficient	Robust SE	p-value	Coefficient	Robust SE	p-value	Coefficient	Robust SE	p-value
TYP	15.39**	7.84	0.05	0.06	0.05	0.22	31.61**	13.34	0.02
TEN	-3.19	11.77	0.79	-0.07	0.07	0.36	-15.06	19.80	0.45
FS	-6.88	4.26	0.11	0.03	0.02	0.21	0.59	4.10	0.89
EPM	-3.91	9.62	0.69	-0.20***	0.06	0.00	--	--	--
ERR	31.18**	15.66	0.05	0.32***	0.08	0.00	225.68***	32.38	0.00
ATF	19.79**	8.27	0.02	0.18***	0.05	0.00	20.12	14.07	0.15
ATE	13.54	9.56	0.16	0.11**	0.05	0.05	-15.16	13.14	0.25
HYV	0.29	0.19	0.14	--	--	--	--	--	--
Morigaon	3.18	11.81	0.79	0.25***	0.06	0.00	-38.40**	17.08	0.03
Kamrup	-9.09	10.33	0.38	0.11	0.07	0.11	-3.34	12.21	0.79
Constant	78.66***	10.99	0.00	-0.09	0.06	0.15	-11.67	10.87	0.28
F	4.09 (10, 222)***			9.58 (9, 223)***			20.86 (8, 224)***		
n	232			232			232		
Pseudo R^2	0.0355			0.2498			0.0611		

In parentheses degrees of freedom *** and ** represents significant at 1% and 5% respectively

Among the control variables, coefficient of EPM has been found to be negatively significant in case of crop diversification. This may be because mechanisation of ploughing is more among the mixed income farmers while the extent of diversified cultivation is less among them compared to pure farmers. The coefficient of ERR has been found to be positively significant in case of all the three indices considered while coefficient of ATF has been found to be significant positively only in case of cropping intensity and crop diversification. It implies that the cropping intensity and crop

diversification are positively affected by both irrigation and access to finance while fertiliser application is enhanced by irrigation but not by access to finance. The positively significant coefficient of ATE in case of crop diversification depicts that spread of agricultural extension services by the state government departments has helped in encouraging farmers to diversify their cultivation basket. Results also reveal the presence of impact of locational factors on crop diversification and application of fertiliser. Across locations, it has been found that crop diversification is more in Morigaon as compared to Lakhimpur and vice versa in case of fertiliser consumption. In Lakhimpur, monsoon rainfall has increased continuously over the years during Kharif season and thus incidence of flood and its severity also increased that has more damaging impact on the late summer and autumn crops (De and Bodosa 2014).

4. Conclusions and Policy Implications

From the present study, it has been found that the adoption and use of irrigation mechanisation is more among pure farmers than the mixed income farmers. However, there is no such difference between the two types of farmers in case of ploughing mechanisation. Regarding the utilisation of farm land, pure farmers are found to be cultivating more intensively than the mixed income farmers. The pure farmers are also well ahead of the mixed income farmers with respect to application of fertiliser. However, both types of farmers are more or less equally diversified crops grower. Findings thus indicate that the pure farmers utilise cultivable land more intensively than the mixed income farmers.

This calls for provisioning of government support to for achieving higher return in farming for small sized farm households. Further, government can concentrate in development of land lease market to the hands of cultivators who utilise the agriculture land efficiently.

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What Determines Farmers' Decision to Own Water Extracting Devices in Water Abundant Regions? A Study of Groundwater Markets in Assam

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Abstract:

Development of groundwater based irrigation has resulted in emergence groundwater markets or water markets in many parts of India. The size and growth of the market depend upon the status of agricultural development, agro-climatic conditions, and level of groundwater development and power policy of the state concerned. Unlike other parts of India, Assam in eastern India has abundant groundwater reserves with heavy monsoon precipitation facilitating easy replenishment. With the proliferation of groundwater-based irrigation since 1980's, groundwater markets have emerged in some pockets of the state mostly driven by capital scarcity of participating farmers.This paper examines the functioning of the market in a water abundant state i.e. Assam and the determinants of ownership of Water Extracting Devices (WEDs) using farm-level data collected from 198 farm households in two districts viz. Nagaon and Morigaon. The results have shown that own farm size, access to formal sources of credit, availability of off-farm income sources, education and age of the head of the household have significant and positive influence on the probability of a farmer's decision to own tubewells.

1. Introduction

Groundwater market, popularly known as water market, is a localised informal institutional arrangement where a farmer owning a Water Extracting Device (WED) (e.g. pump sets or tube wells)sells excess of the groundwater extracted from beneath his land to the willing buyers in the neighbourhood of the owner's plots (Shah, 1991, 1993; Pant, 1992; Zhang, 2006). Development of this market, in general can be attributed to the expansion of groundwater based irrigation in agriculture in Asian countries. The market has its significant presence in India especially in states like

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Gujarat, Maharashtra, Haryana, Andhra Pradesh, Tamil Nadu, Western Uttar Pradesh, Punjab and West Bengal. Other Asian countries such as Pakistan, Bangladesh, (Rinaudo and Stosser, 1997; Meinzen-Dick, 1998; Shah, 1991, 1993; Saleth, 1996, 1998), Indonesia, Jordan (Meinzen-Dick and Mendoza, 1996) and China (Zhang, 2006), and countries like Mexico (Thobani, 1997; World Bank, 1999), etc. have also seen pervasive presence of water markets in irrigation based agriculture.

The development of the market is not uniform across regions in India. The size and rate of proliferation of the market and its inherent issues depend upon the status of agricultural development, agro-climatic conditions and level of groundwater reserves and state of groundwater development (Shah, 1993; Saleth, 1997). While water markets in India display a wide variation in terms of organisational features and behavioural pattern (Saleth, 1998), researchers also note that these differences are obvious as groundwater markets are village level localised institutions (Pant, 1991; Shah, 1993; Joshi, 2005; Zhang, 2006). Water markets in water abundant regions present issues which may be in quite contrast to the water scarce regions. Noting the presence of such differences, Dubash (2000) points out that instead of looking at how the markets work or do not work, it is important to look at how and why they work differently in different locations, under different social and hydrological circumstances and with what effects. Shah (1991) also observes that water abundant regions offer a major scope for development as water markets can transform the stagnant agriculture to a booming economy. The question in abundant region, as Shah has pointed out, is how to speed up the development of water markets and saturate the available potential. When one can easily come by plethora of studies on water market from water scarce regions of any country, more so in India, the studies from water abundant regions are fairly scarce.

Assam in eastern India has abundant groundwater reserves with heavy monsoon precipitation facilitating easy replenishment. However, in view of a very limited use of ground water for agricultural purposes, development of groundwater based irrigation has been promoted since 1980's. Out of the ground water based irrigation structures, tube well based irrigation constitutes more than 80 percent of the total groundwater structures and shallow tube well constitutes 87.28 percent of the total tube wells in the state (Govt. of Assam, 2011a, 2011b). One of the striking features of minor irrigation development in Assam is that these shallow tube wells are installed under private/ individual ownership. As per the Minor Irrigation Census 2000-01 of Government of India, about 98 percent of the total STWs in Assam are under individual ownership. As installation of shallow tube wells requires relatively large investments which a resource poor marginal and small farmer finds difficult to afford, water transaction takes place between owners of WED and the non-owners. As a result, groundwater market has emerged in the state as an alternative institutional arrangement facilitating the access of groundwater to small and marginal farmers as well (Dutta, 2011, 2012).

In the present paper, an attempt has been made to examine the functioning of the market and especially the factors that affect ownership of WEDs in groundwater markets in Assam, a groundwater endowed state in the eastern part of India. The rest of the paper is organised under six sections. Section 2 deals with the data source and

type of data used in the study. While section 3 discusses the methods for examining the determinants of WED ownership, section 4 presents a discussion on the structure of the market and interface of groundwater market with other rural markets. Section five includes a discussion of the factors affecting the water buying decision of farmers based on theoretical and empirical findings. The estimated results of the logit regression model are discussed in section six. Section seven provides a conclusion to the paper.

2. Data source and methodology

Groundwater has been an abundant resource in Assam especially more in the low lying areas. As per available estimates of the Central Groundwater Board (CGWB), out of total available replenishable amount of groundwater, only 22 percent of it has been developed so far (Govt. of India, 2006). With the development of groundwater based irrigation, some drastic changes in cropping pattern of the state has been noticed, for e.g. there has been a gradual shift from winter rice cultivation to summer rice cultivation in some districts of the state. The cultivation of summer rice in the state is undertaken solely based on groundwater irrigation during November to April in any agricultural year. The study area has been chosen from the areas where the cultivation of summer rice is carried out and where farmers recourse to groundwater transaction.

2.1. Study area

The study was carried out in the Central Brahmaputra Valley Zone (CBVZ) of the state. The districts of Nagaon and Morigaon had been purposively selected for the study. The selection is guided by the fact that the presence of groundwater markets is quite widespread in the low lying pockets of the two districts especially in the cultivation of summer rice. For inclusion of farmers in the sample, initially the locations where the market has widespread presence were identified. In the next stage, a few villages from those locations were randomly selected and finally information on various issues of ground water market and agricultural practices were collected from a few randomly selected farm households from each of these villages. Since market practices are found to be similar in a particular village or in the same crop field, emphasis was on including farmers from more number of villages, so that spatial/regional variations on market practices market could be captured.

Figure 1 : Land use map of Nagaon and Morigaon District

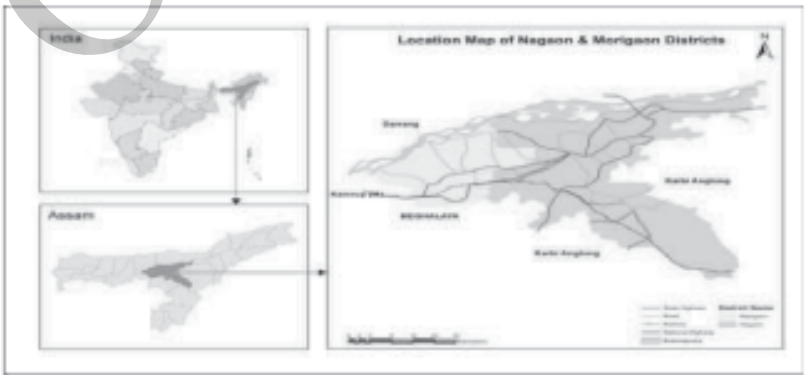
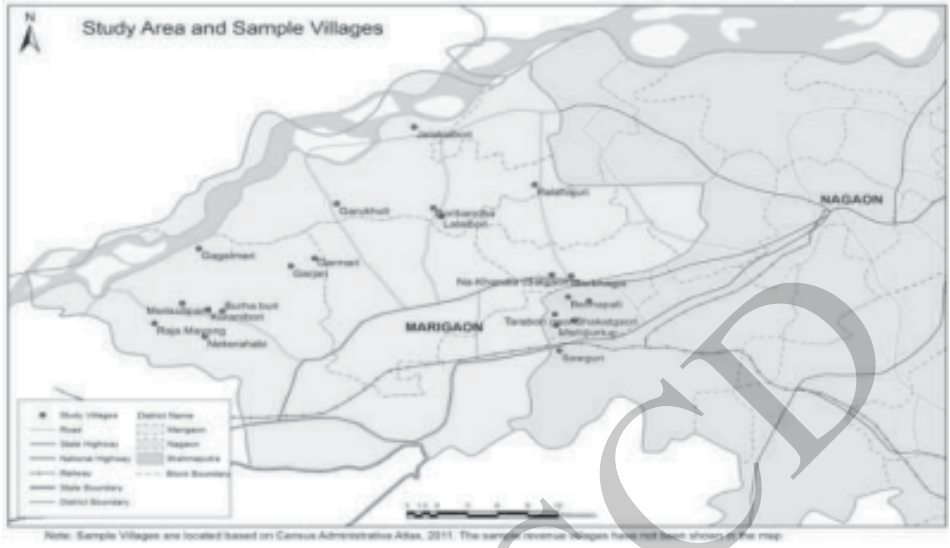


Figure 2 : Study Area



2.2. Data base and sample

The total number of farmers included in the sample was 198 who are engaged in the cultivation of summer rice with sole reliance on virtually unrestricted access to groundwater. A specially structured and pre-tested questionnaire had been administered to collect data on various aspects of production and groundwater markets for the agricultural year 2011-12. Data was collected mostly on farm and non-farm activities, demographic and locational characteristics. While the data on farm activities include number of irrigation, labour, wages, farm size, crop output and prices, capital assets, costs of cultivation, fertiliser application, etc., the data on the market related issues include the size of the market, mode of transaction, non-market factors and the issue of reliability. After selecting the sample, they were categorised into seven different types[1]: Self-users (SU), Self-users + sellers (SU+S), Self-users+ sellers + buyers (SU+S+B), Self-users + buyers (SU+B), Buyers (B), and Owners+sellers (OS).

[1] Self-users+sellers: Farmers with independent or joint ownership (or both) of tube wells, use water for cultivating their own plots as well as selling water to needy farmers in the vicinity of the tube well after meeting their own requirement. Buyers: The farmers who buy water from the nearest tube wells usually adjacent to their agricultural plots. However, there is the possibility of water purchase from any distant source when there is facility for water conveyance. Self-users+sellers+buyers: The owner of tube wells who cultivate their agricultural plots with water from own tube wells, sell water to willing buyers after meeting their own requirement and buy water from other tube wells in another location, when their cultivable land is fragmented. Self-users+buyers: the farmers with independent ownership or joint ownership of tube wells use water from their own tube wells for own use in one plot and buy water from other tube wells in another plots. Owner+sellers: refers to a situation in which some farmers have invested on tubewells, not to meet their own irrigation requirement, but for using it primarily for selling water to other farmers. Self-users: Farmers with individual or joint ownership of tubewells and use it for cultivation on own plots.

2.3. Methods

The ownership of a tube well of a farmer is a binary or dichotomous-response variable taking on the values "0" or "1". Therefore, in order to identify the factors and their relative role in influencing the response variable in probabilistic sense, the logit model based on cumulative logistic distribution function was found to be suitable (Maddala, 1983; Aldrich and Nelson, 1984; Cramer, 2003; Gujarati, 2004; Gujarati and Sangeetha, 2007; Hill et al., 2011). The logit model used in the study was formulated as follows.

The logit model postulates that P_i, the probability that i^{th} farmer owns a tubewellis a function of an index variable $Z_i$summarising a set of explanatory variables X_{ki}. That is,

$$P_i = f(Z_i) = f\left(\alpha + \sum \beta_k X_{ki}\right) = \frac{1}{1+e^{-z_i}} = \frac{1}{1+e^{-\alpha+\sum \beta_k X_{ki}}}$$

Where,

Z_i =An underlying and unobserved index for the i^{th}farmer (when Z exceeds some threshold Z*, the farmer is observed to be ownerotherwise non-owner.

X_{ki} = The k^{th}explanatory variable for the i^{th} farmer that may affect his decision to own tubewells.

$i=1,2...$N; where, N is the total number of sample farmers included in the study

k= 1, 2 …M; where M is the total number of explanatory variables.

α = Constant

β = Vector of coefficients

e = Base of the natural logarithm and approximately equals to 2.718.

Now, in the estimation context $Z_i$can be estimated as, $\log(\frac{P_i}{1-P_i}) = z_i = \alpha + \sum \beta_k X_{ki}$. Thus, Z_i is a linear function of a host of explanatory variables. In fact $Z^2_i$is equal to the natural logarithm of the odd ratio[3], i.e. the ratio of probability that the farmer has owned a tube well to the probability that the farmer does not. The goodness of fit of the model has been checked using the Log-likelihood Ratio tests and a few pseudo coefficients of determination. In order to assess the effect of each selected explanatory variable on the probability of ownership decision, the marginal effects and elasticity coefficients are estimated. Marginal effects of the explanatory variables are the partial derivatives of probabilities with respect to the vector of explanatory variables and are computed at the mean of the explanatory variables. The value of the coefficient of marginal effects indicates the changes in decision of a farmer to buy water which is caused by a one unit change in the independent variable, *ceteris paribus*. The elasticity coefficient

[2] Z_i the natural logarithm of the odd ratio is referred to as logit. It is also called logit transformation as it transform Y which is restricted in the range of [0,1] to a range of [-", + "].

[3] A odds ratio is the ratio of odds of success for one group divided by odds of success for another group

indicates that 1 percent change in the explanatory variable will change the probability of farmers' decision to buy water equal to the respective percentage of the elasticity coefficient (Khair et al. 2012).

3. Groundwater markets in the study area

3.1. Market Arrangement

The distribution of the sample farmers participating in groundwater markets according to their size of operational holding is presented in Table1.A large majority of the sample farmers, (about 90.90 percent) are engaged in water transaction. The "buyers" alone constitute the largest segment (39.90 percent) followed by "self-users+sellers" (38.38 percent), "self-users" (9.09 percent), "self-users+sellers+buyers" (7.07 percent), "owner+sellers" (3.54 percent) and "self-users + buyers" (2.02 percent). The majority of the buyers are found to be marginal (56.82 percent) and small farmers (41.54 percent). It implies that about 98.36 percent of the buyers are in the category of small and marginal farmers. Buyers in the semi-medium category are only 5.13 percent. With relatively larger farm size, the number of buyers is very less (5.13 percent of the total sample farms). Thus buyers in the groundwater markets are usually small and marginal farmers and the finding is similar to the results of Fujita and Hossain (1995) in Bangladesh; Meinzen-Dick (1997) in Punjab province of Pakistan; Zhang et al. (2007) in China; Bhandari and Pandey (2006) in Nepal; and a couple of studies such as Deepak et al. (2005), Sharma and Sharma (2006), Khanna (2006), Singh and Singh (2006), Manjunatha et al. (2011a), Dutta (2012), Manonmani and Malathi (2012), etc. in India.

Table 1: The Distribution of Sample Farmers According to the Structure of the Groundwater Market

Size class of operational land holding (in hectare)	Category of participants in the water market						Total
	Self-users	Self-users + sellers	Self -users+ sellers + buyers	Self-users + buyers	Buyers	Owner+ sellers	
Marginal	5(5.68)	25(28.41)	2(2.27)	-	50 (56.82)	6(6.82)	88 (100)
Small	5(7.69)	25(38.46)	5(7.69)	2(3.08)	27(41.54)	1(1.54)	65(100)
Semi-medium	8 (20.51)	22(56.41)	6 (15.38)	1 (2.56)	2(5.13)	0	39(100)
Medium	0	4(66.67)	1(16.67)	1(16.67)	0	0	6 (100)
Total	18(9.09)	76(38.38)	14(7.07)	4(2.02)	79(39.90)	7(3.54)	198 (100)

Note: Figures in parentheses indicate percentage of the row total.

Out of the total sample "self-users+sellers", about 65.78 percent are marginal and small farmers. Taking all the categories together, the total number of sellers in one or other form of selling activities is 97 out of which 65.98 percent are marginal farmers (34.02 percent) and small farmers (31.96 percent). But against this, about 28.86 percent are in semi-medium and 5.15 percent in medium farm holding categories.

The size of operational holdings of the farmers under different categories of groundwater users show that the average size of operational holdings of the buyers is 0.9 hectares while the minimum and maximum size of operational holdings are 0.20 hectares and 3.08 hectares respectively (Table:2). But the average size of operational holdings of the sellers in all categories (except the "owner+sellers"), remains higher than the average size of operational holdings (1.35 hectare) for all the market participants. It implies that, on the average, the size of operational holdings of the water sellers is comparatively larger than the buyers. However, there is an exception to this trend. It was observed that a few members of the group "owners+sellers", though do not hold any cultivable land are in the possession of shallow tube wells and engage in water selling. This category of water sellers owns the tube well primarily for selling water to other farmers and to their tenants. The finding includes a new dimension in water market while explaining the conditions for the existence of groundwater market. Thus, on the seller's side, it shows that the market has helped some of the tube well owners to sell water not only in excess of their own use on self-operated area but also taking groundwater pumping as an additional source of income. It also suggests that the market is not residual to the buyers in all cases.

Table 2: Size of the Operational Holdings of Different Categories of Groundwater Users

Categories of water users	No. of Farms	Minimum (in hectare)	Maximum (in hectare)	Average (in hectare)	Standard Deviation
Self-users	18(09.09)	0.40	3.34	1.68	0.99
Self-users+sellers	76(38.38)	0.27	4.95	1.64	1.05
Self-users+sellers+buyers	14 (07.07)	0.27	4.41	2.09	1.24
Self-users+buyers	4(02.02)	1.07	4.01	2.58	1.59
Buyers	79 (39.90)	0.20	3.08	0.90	0.55
Owner+sellers	7 (03.54)	0.00	1.74	0.29	0.65
Total	198	0.00	4.95	1.35	1.00

Notes: Figures in parentheses indicate percentage of the column total.

3.2. Interface of the groundwater market with non-market factors

Palmer-Jones (1994), Meinzen-Dick (2000) and Dubash (2002) have outlined the complexity in the nature of water contracts which is mostly governed by the social processes. As discussed above, the water charge is not fixed by any formal written agreement between the buyers and the sellers. At the same time, it has been observed that the sample buyers' choices of water sellers are also restricted due to lower tube well density in the crop fields, and limited availability of conveyance facilities if buyers' plots are located in a distant plot (Hussain et al. 2005). This lends the water sellers some market power to charge different prices from different buyers (Shah, 1993; Wood, 1995; Shah and Ballabh, 1997; Pant, 2003; Jacoby et al., 2004). Though, sample sellers' were not found to have charged different water charges from different buyers, some of them have been found to have given concession on water charges to some of their buyers. This finding is similar to the results of Shah (1993) who has found that transaction between water buying and water selling farm households were

personal in a few cases depending on personal relation. However, this finding is not similar to the results of Zhang (2006) who has found that in Northern China groundwater markers are almost fully impersonal. The extent of this price concession in the study area varies from 10.00 percent (1.49 quintal per hectare) to23.3 percent (5.97 quintal per hectare). In majority of the cases, about 2.98 quintals per hectare concession is given. While the brothers of the water sellers have enjoyed either 5.97 quintal per hectare concession from the water sellers or full concession (conditioned by serious illness), the relatives of the water sellers have enjoyed a concession of 2.98 quintal per hectare.

The studies on water market report that there always remains an overdue in the payment of water charge by the water buyers (Khanna, 2006). In the present study, a few buyers have been found to be defaulters in making payment of water in time. Out of a total of 97 water sellers, about 55.67 percent have reported that there remains an overdue in the payment of water charge. Out of the total sample buyers, the relatives of the sample water sellers, are the highest defaulters (about 44.45 percent of the total defaulters). This is followed by buyers (37.04 percent of the defaulters) who are neither the relatives nor the tenants of the water sellers. Compared to these two groups, the number of tenants who failed to make payment on time is less (9.26 percent of the total defaulters). A few buyers, who are tenants and relatives of the water sellers, have also been found to be defaulting on payment of water charge. Though a majority of buyers have remained defaulter for a year, out of the total defaulters, about 38.88 percent are permanent defaulters. Among the permanent defaulters, about 57.14 percent are relatives of the sample water sellers. Thus, it is clear that brothers and close relatives of the sample water sellers are the defaulters in the payment of water charges. Thus, there are free riders in water market. It raises a serious question why the sellers have not retaliated to punish these permanent free riders? When institutional economics dealing with resource management suggests that free riders are usually punished –sometimes, severely (Ostrom, 1990;Baland and Plateu, 1996) the study results here suggests that if the free riders are the sellers' relatives, they are allowed to continue with default which may render it unsustainable in future.

The nature and mode of operation of the village level groundwater market also show that the price does not always guarantee access to water (Wood, 1995). In addition to water charge, some of the buyers are required to render some other services to the water sellers like operating the pump and irrigating the well owner's field (Janakarajan, 1993, 1994). In the present study too, about 35.05 percent of the buyers are found to provide some sort of free services to their respective water sellers in addition to the water charge paid. The buyers are required to provide these services in order to maintain a cordial relationship with the sellers, so that they are provided with timely supply of water at the time of requirement. A few sample buyers(8.82 percent) providing other services refused to render these free services but were denied water by the sellers leading to giving up of cultivation by the farmers. There is also a preferential treatment of the buyers by the sellers. Normally, siblings and close relatives are provided with high preference in providing water by the sellers. The presence of this type of preferential

treatment has also been reported by Narayanamoorthy (1991) in a study on water markets in Puddukkottai district of Tamil Nadu. Thus market practices are not purely based on conventional economic model which is endogenous to the water market. Instead, the water sellers exercise some monopoly power, though not reflected in the water charges, through some other means which are exogenous to the market system. Similar type of practice was also reported by Ray (1998) in the operation of rural credit market. In the light of these findings, a comparison with a few aspects of water market reported by existing studies on water market can be made. *Firstly*, the market in the study area is like the market in Gujarat (Shah, 1993) and Tamil Nadu (Janakarajan, 1994) where the market is found to have more oligopolistic and monopolistic in nature; *Secondly*, it resembles the observation made by Saleth (1998) that "…in a market where the buyers and sellers have about the same sized farms and share a common socio-economic background is likely to be more equitable and less exploitative". *Thirdly*, the market in the study area is less exploitative like the same in case of Madhya Pradesh where in a study Kajisa and Sakurai (2003) have found that the sellers' behaviour is not exploitative.

4. Factors influencing ownership of WEDs

To understand the factors influencing ownership of water supply resources, a binary logit model has been used and the sample farmers have been categorised into two classes, viz., tube well owner and non-owners. The total number of sample farmers included in the analysis is 198. The typology of the farmers according to their ownership of tube well is presented in Table 3.

Table 3: Typology of Sample Farmers According to Their Decision to Own a Tubewell

Category of Farmers	Ownership of tubewell		Total
	Non-Owners	Owners	
Self-users	0	18	18 (9.09)
Self-users +sellers	0	76	76 (38.38)
Self-users+sellers+buyers	0	14	14 (7.07)
Self-users+buyers	0	4	4 (2.02)
Buyers	79	0	79 (39.89)
Owner+sellers	0	7	7 (3.53)
Total	79	119	198 (100)

Notes: Figures in parentheses represent percentages to column total

The available theoretical and empirical literature reflects a number of factors that determine the decision of a farmer to own a tube well (Bhandari and Pandey, 2006). However, subject to the availability of data and their relevance in the context of the present study, a few factors have been identified so as to capture their possible influences on tube well ownership decision of a farmer. The description of the explanatory variables, the theoretical justification for the inclusion of them and the nature of their likely impact on the probability ownership decision are given in appendix A.2. The definition of the explanatory variables and expected signs of the coefficients of the variables are summarised in Table 4.

Table 4: Definition of the Explanatory Variables and their Likely Impact on Farmers' Decision to Own a Tubewell

Sl. No.	Variable	Definition	Expected the coefficients
1	*WFS*	Own farm size (area in hectare)	+
2	*TOHL*	Total operational holding (area in hectare)	+
3	*AULC*	Area under the largest compact plots (in hectare)	+
4	*ACIC*	Access to institutional credit (1 = Yes; 0, otherwise)	+
5	*SSI*	Subsidiary source of income in the farm household (1 = Yes; 0, otherwise)	+
6	*AGE*	Age of the head of the farm household (in years)	+
7	*EDN*	Education of the head of the farm household (in years)	+
8	*NFPT*	Nos. of fragmented plots	-
9	*CSTE*	Caste of the farm household (1 = General caste; 0, otherwise)	+
10	*AVLE*	Availability of electricity facility (1 = Yes; 0 = No)	+
11	*SCES*	Score of the extensions services (in number)	+

The descriptive statistics of the explanatory variables considered in the model are presented in Appendix A-2.

5. Results and discussion

The maximum likelihood estimates (MLEs) of the coefficients of logit regression model, marginal effects and elasticity are presented in Table 5.

Table 5: Logit Estimates for the Likelihood of Tube well Ownership Decision of the Sample Farmers

Variables/Particulars	MLEs		Marginal Effects		Elasticity
	Coefficient	Standard Error	dy/dx	Standard Error	
CONSANT	-5.2814***	1.332549			
OFS	1.209369***	0.358655	0.228348	0.05379	0.419718
TOHL	0.049986	0.350906	0.009438	0.06632	0.016894
AULC	1.059901*	0.645966	0.200126	0.12307	0.21462
ACIC	1.045966**	0.47818	0.170697	0.06753	0.064063
SSI	-0.2173	0.381554	-0.04117	0.07265	-0.02551
AGE	0.045399**	0.018547	0.008572	0.00353	0.543313
EDN	0.125517**	0.049673	0.0237	0.00913	0.165603
NFPT	-0.17756*	0.223077	-0.03353	0.04226	-0.06956
CSTE	0.413706	0.436251	0.076431	0.07876	0.041703
AVLE	0.481328	0.468672	0.090882	0.08898	0.152928
SCES	0.13174**	0.065304	0.024875	0.01269	0.084553
Log-likelihood of full model					-92.433
Log-likelihood of null model					-133.87
LR Chi^2					81.48*
Overall pseudo R^2					0.305
Degrees of freedom					11
Nos. of observation					198

, ** and * represent significance at 10 percent, 5 percent and 1 percent levels. For a dummy variable, dy/dx is the discrete change of dummy from 0 to 1.*

The estimated model gives a good fit indicated by the significant Likelihood Ratio Test (L-R Chi^2) keeping in view the cross section data set used. The model has provided correct prediction to the extent of 77.78 percent of the dependent variable. The Variance Inflation Factor (VIF) values used to check multi-collinearity (Appendix-3) have shown absence of multi-collinearity problem in the model. As evident from Table 5, the pseudo R^2 has turned out to be 0.305. Though a high value of pseudo R^2 is desirable, in logit model they are not always considered at par with the adjusted R^2 like in OLS.

The coefficient of "*OFS*" is found to be significant and positive, which implies that when own farm size increases, farmers' probability of tube well ownership increases. In other words, with large own farm size a farmer decides to own a WED. Thus, own farm size has a positive and significant influence on ownership of WED. The partial probability of own farm size is estimated to be 0.228. It implies that other things remaining the same, one unit increase in own farm size will increase the probability of ownership by 0.228 points. Similarly, the elasticity coefficient which is estimated to be 0.419, implies that one percent change in the own farm size increases the probability of tubewell ownership by 41 percent, *ceteris paribus*.

The coefficient of "*AUL*" has been found to be positive and fairly significant which shows that the area under the largest compact plots induces a farmer to own a pump set rather than resorting to buy water. The possible explanation for this could be the advantages enjoyed by a farmer with relatively larger plot in terms of scale of operation. The partial probability of the variable was found to be 0.200 which shows that when the area under the largest compact plots increases by one hectare, the probability of owning a tube well increase by 0.214 points, other things remaining the same. The elasticity coefficient of the variable implies that one percent increase in the compact plots the probability to own a tube well will increase by 21 percent, *ceteris paribus*.

Initial investment on tube wells requires a large capital outlay in buying the pump sets, equipments and installation of the boring. Though a financially capable and large farmer can invest on a tube well, it has been found that the provision of formal credit may enable farmers to own a WED as the coefficient of the variable "*ACIC*" is found to be significant and positive. The elasticity coefficient implies that when the farmer has an access to formal credit, the probability of owning a tube well increases by 6 percent, other things remaining the same.

The coefficient of "*EDN*" has been found to be positive and significant and with education, the farmer may see the benefits of ownership of WED in terms of cost and reliability in supplying water to the field during its requirement at different stages. The available literature on water markets also points to the positive impact of education on water ownership decision of the farmers (Bhandari and Pandey, 2006). The partial probability is estimated to be 0.023 which indicates that when education of the farmer increases by one year of formal schooling, the probability of the farmer to own a tube well will increase by 0.023 points. The elasticity coefficient of 0.165 of the variable implies that when education of the farmer increased by one year of formal schooling, the probability of tube well ownership increases by 16 percent.

The coefficient of "*AGE*" is also found to be significant and positive. When a farmer becomes more and more experienced from the point of view of better farming, he is more likely to own a WED. The partial probability of the variable is found to be 0.008 which implies that, other things being equal, one year increase in age of the farmer/ farm household will increase the probability of tube well ownership by 0.008 points. The elasticity coefficient of the variable implies that when age of the farmer increases by one percent, the probability of tube well ownership, *ceteris paribus,* will increase by 54 percent.

In order to explore the likely impact of number of fragmented plots on farmers' decision to own a WED, the variable "*NFPT*" was considered in the study. The coefficient of the variable is found to be significant and negative. This implies that when the number of fragmented plots increases, the probability of farmers' tube well ownership decreases. The partial probability of the variable is found to be (-) 0.03. It implies that when the number of fragmented plots increases, the farmer's probability to own a tube well decrease by 0.03 points, other things remaining the same. The elasticity coefficient of the variable shows that, *ceteris paribus,* a one percent increase in number of fragmented plots will increase the probability of tube well ownership of a farmer by 6 percent.

The coefficient of "*ACES"* is found to be positive and highly significant. Thus when a farmer receives better extension services in the form of information on farming practices, the farmer is more likely to own a tube well. The observation in the field also confirms that farmers with better contact with agricultural extension workers are in a better position to avail different facilities given by the government under its different schemes. The partial probability of the variable which is found to be 0.024 implies that when the farmer's scores on extension services increases by one point, *ceteris paribus,* the probability of tube well ownership will increase by 0.024 points. The partial elasticity coefficient shows that one percent increase in farmer's scores increases the probability of tube well ownership by 8 percent, other things remaining the same.

Though the coefficients of "*TOHL"* and "*SSI"* are found to be statistically insignificant in the context of the present study but their signs are positive as expected. Similarly, the "*AVLE"* is not a significant determinant of ownership of tube well. But the variable bears a positive sign as expected. In addition, "CSTE" is also not a significant determinant of ownership of tube well by a farmer.

6. Conclusion:

The results of the logit analysis of the determinants of tube well ownership have shown that tube well ownership is skewed towards the larger farm holdings. Own farm size, land fragmentation, education and age of the head of the household, access to credit and availability of off-farm income sources have been found to be significant determinants of tube well ownership.

Though groundwater based irrigation has been promoted in the state for furthering agricultural development as the state is endowed with abundant replenishable

groundwater reserves, it has been found that the cost of pumping is high due to the dependence on diesel operated tube wells. This has resulted in decline in the absolute number of groundwater buyers over the years. Although electricity operated tube wells entail lower cost per unit of water supplied, absence of electricity connections (in a few places) and low voltage, irregular supply with several power cuts (where electricity connections are available) are some of the major obstacles felt by both water sellers and water buyers. Thus, the investments in rural electrification are necessary pre condition so that the farmers can tap the ground water resource. In the similar line, it can be mentioned that fragmentation of land holdings has been found to have negative impact on ownership decision of tube well. Therefore, in order to enable marginal and small farmers to own a tube well, consolidation of land holdings and joint ownership of tube well may be promoted under suitable policy.

Though groundwater markets have facilitated access to groundwater among small and marginal farmers, the study finds that the small farmers may not be able to buy the pumpset as it involves relatively large capital outlay. This is further constrained by farmers' inability to access formal credit sources. While provisioning of subsidized credit facility can help the farmers to own a tube well it is also likely to bring down cost of cultivation in the long run.

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Appendix:

A.1: Empirical model for determinants of WED ownership:

Incorporating the explanatory variables shown in Table 7, the functional form of the model specified above can be formulated for estimating the parameters affecting WED ownership decision of the relevant sample farmers as where $\log(\frac{P_i}{1-P_i}) = z_i$ where P_i is the probability to own a tubewell.

$$Z_i = \alpha + \beta_1(WFS) + \beta_2(TOHL) + \beta_3(AULC) + \beta_4(ACIC) + \beta_5(SSI) + \beta_6(AGE) + \beta_7(EDN) + \beta_8(NFPT) + \beta_9(CSTE) + \beta_{10}(AVLE) + \beta_{11}(SCES) + U_i$$

U_i is the error term.

A.2: The description of the explanatory variables:

***Own Farm** Size (OFS):* Own farm size, measured in hectare, is the total cultivated area owned by a sample farmer. Existing empirical literature (Pant, 1992; Shah, 1993; Bhandari and Pandey, 2006, etc) points out that: OFS of a farmer is positively related to the probability of owning tubewell.

Size of Operational Holdings (**TOHL**):

In most instances though own farm size of a farmer is low, if the farmer has the possibility to lease in land, the farmer may choose to own a tubewell. The size of total operational holdings measured in hectare is important to consider as a factor that influences tube well ownership decision of a farmer. Thus, larger is the size of operational holdings greater may be the possibility to on tube well.

Fragmentation of Land Holdings (NFPT):

The fragmentation of land has been captured as the number of fragmented plots where summer rice is cultivated. When farmers' cultivable plots are dispersed in many plots, it is quite unlikely that with single water extracting device a farmer will be able to irrigate all his land. Besides, moving pumps around frequently may also cause early break-down which may entail more cost. Therefore, when degree of fragmentation is high and fragmented plots are smaller in size: a farmer may not own a pumpset or a farmer with pump set may not be willing to own more than one pump set. Thus larger the number of fragmented plots, lesser is the probability to own a tube well.

Area under the Largest Compact Plots:

Even though a farmer might have many fragmented plots, if the dispersed plots are large in size, the farmer is more likely to own a WED. It can be hypothesized that when area under largest compact plots increases the farmer is more likely to own a WED. Therefore, area under largest compact plot (denoted in short as *AULP)* is positively related with ownership of tube well by a farmer.

Subsidiary Occupation (SSI)*:*

Since, a farm family with stable subsidiary source of income may enjoy capacity to invest on pump sets, a farmer with subsidiary sources of family income find it easier to own a tube well, such a farmer might have less concentration on farming and might not invest heavily in agriculture. The income from the subsidiary sources may also not be sufficient to own a tube well. Therefore, a farmer with subsidiary source of income may or may not turn out to be an owner. The role of this variable on the probability of tube well ownership could be captured by constructing the dummy variable whether the farmer family has subsidiary income sources or not.

Education (EDN):It is captured as the number of formal years of schooling attended by a farmer. It's a proxy variable for know-how of information regarding improved farm practices, managerial skills, etc. are important for effective farming. Since, education reflects possible effect of human capital (Bhandari and Pandey, 2006) and managerial ability (Singh and Singh, 2006) it may enhance farmer's understanding to capture the chance to sell water as a viable economic opportunity and own a tube well.

Age (AGE):Age of the water sellers measured in terms of years. Its proxy for experience of farmer in farming that helps in effective farming. Experience may encourage the farmer to own a tube well to ensure adequacy in applying irrigation in undertaking summer rice cultivation which is a water intensive crop and based primarily on groundwater irrigation. Besides, an experienced farmer may also take an initiative to own a WED jointly in order to minimise its own share in initial investment required to buy a pump set.

Access to Institutional Credit (ATIC):

Initial investment on tube well requires a large capital outlay in buying the pump set, equipments and installation of the boring which a large farmer is capable of buying a WED through his own savings. But most of the poor farmers cannot afford to install a WED in particular and other agricultural inputs in general. The provision of formal credit may enable farmers to own a WED. Thus, access to credit from formal sources is expected to affect ownership of tube well of the farmer and is positively related to the tube well ownership decision of a farmer. A dummy variable has been constructed to capture the effect of farmers' access to institutional credit assuming the value "1" if the farm household has an access to institutional credit and "0" otherwise.

***Caste*:**

A few available literatures also conclude that ownership of tube well is skewed towards higher caste. It is expected that farmer who belong to upper caste may have access to financial resources, etc. and thus be able to own a tube well. Therefore, in the context of the present study, the variable is considered to examine how caste as a variable affects tube well ownership. The probable impact of this variable can be captured as a dummy assigning the value "1" if the farmer belongs to the general caste, "0', otherwise.

Electricity Availability:

The STWs are operated with electricity or diesel. Though, in the present study, the concentration of diesel operated tubewells is more than the electricity operated tube wells, capital outlay, operation and maintenance expenditure is substantially lower in case of electric tube wells (Shah, 1993; Bhandari and Pandey, 2006; observation of the researcher). Because of low operational cost buyers prefer to buy water from the electric tube well than the diesel operated tube wells. Therefore, it may be hypothesised that the availability of electricity enables a farmer to own electric tube well and attract more buyers. The role of this variable on the probability of tube well ownership has been captured building a dummy variable (denoted in short as *AVLE*) assigning he value "1" is if electricity facility is available or "0" otherwise.

Table A.1: Descriptive Statistics of the Explanatory Variables that Influence Farmers' Decision to Own a Tubewell

Sl. No.	Variable		Minimum	Maximum	Mean/ Mode	Std. Deviation
	Name	Definition				
1	*WFS*	Own farm size (area in hectare)	0.00	12.04	1.37	1.58
2	*TOHL*	Total operational holdings (area in hectare)	0.00	4.95	1.34	0.99
3	*AULC*	Area under the largest compact plots (in hectare)	0.13	2.01	0.80	0.45
4	*AGE*	Age of the head of the farm household (in years)	22.00	77.00	47.37	11.79
5	*EDN*	Education of the head of the farm household (in years)	0.00	15.00	5.22	4.91
6	*NFPT*	Nos. of fragmented plots	1.00	5.00	1.55	0.79
7	*CSTE*	Caste of the farm household (1 = General caste; 0, Otherwise)	0	1	0.40	0.491
8	*AVLE*	Availability of electricity facility (1 = Yes; 0 = No)	0	1	0.74	0.438
9	*SCES*	Score of the extensions services	0	9	1.67	2.017
10	*ACIC*	Access to institutional credit (1 = Yes; or 0, Otherwise)	0	1	0.24	0.430
11	*SSI*	Subsidiary source of income in the farm household(1 = Yes; 0 = No)	0	1	0.46	0.500

Appendix A.3: Collinearity diagnostics for independent variables influencing WED ownership decisions of a farmer

Table A.3: Collinearity Diagnostics for independent variables influencing water buying decision of a farmer

Variable	VIF	SRT VIF	Tolerance	R-Squared
OFS	1.71	1.31	0.58	0.42
TOHL	1.49	1.22	0.67	0.33
PAUB	1.28	1.13	0.78	0.22
NFPT	1.04	1.02	0.97	0.03
DFNSI	1.16	1.08	0.86	0.14
AGE	1.28	1.13	0.78	0.22
EDN	1.41	1.19	0.71	0.29
SSI	1.14	1.07	0.87	0.13
ACIC	1.13	1.06	0.89	0.11
SCES	1.17	1.08	0.85	0.15
PSNR	1.40	1.19	0.71	0.29
CSTE	1.35	1.16	0.74	0.26
TNCY	1.25	1.12	0.80	0.20
Mean VIF	1.29			

Note: There are many recommendations for acceptable levels of VIF. While the most commonly suggested maximum level of VIF is 10 (Kennedy, 1992), a recommended maximum VIF value of 5 and even 4 have also been found in the literature. Considering the most commonly used VIF value of 10, the presence of collinearity in preferred model has been checked.

Composition and Determination of Rural Non-Farm Sector at Household Level-Evidences from Undivided Sonitpur District of Assam

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Abstract

It is an accepted fact that the agricultural sector in India continues to be characterized by subsistence and is not capable of creating additional opportunities for gainful employment. The economy of Assam is predominantly agrarian and frequent flooding during monsoon has been the bane of its agrarian economy. This has led to sizeable shift of workers from agriculture to other sectors. The Rural Non-Farm Sector (RNFS) which has accommodated the labour shift from agriculture has attracted considerable policy attention in recent years. Assam is also no exception in this regard. The share of non-farm sector in Assam has been increasing over the years. This paper examines the composition and determinants of the rural non farm sector in undivided Sonitpur district where non- farm activities are the fastest growing sector. Based on primary data collected from sample households in undivided Sonitpur district, the paper shows that education, ownership of land holding and size of household influence non-farm employment.

1. Introduction

It is an accepted fact that the agricultural sector in India by itself, is not capable of creating additional opportunities for gainful employment and as a result, the impetus for achieving sustained development in rural areas has to pivot around expanding the base of non-farm activities (Mehta: 2002). Consequently, the Rural Non-Farm Sector (RNFS) which had been neglected for long by policy makers attracted considerable attention in recent years. Studies have also shown that with the passage of development, the share of income and employment in non-farm activities of the rural household increases. The combination of both farm and non farm income at the household level also provides a cushion against adverse situations in agriculture. This is because

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agriculture in developing countries suffers from low land-man ratio, low productivity of farming land, mono-cropping and traditional methods of farming etc. In India, the proportion of rural workers engaged in agriculture in relation to the total workforce remained stagnant at around 78 percent until 1993-94 and then declined to 68 percent in 2009-10 (Goswami and Bhattacharyya, 2014). Studies on diversification in rural employment e.g. (Basant and Kumar, 1989; Chadha 1993; Papola and Sahu, 2012; Visaria 1995) have revealed that the share of RNFS has been increasing over time and the sector has the potential to absorb the growing rural workforce productively. Some of the non-farm activities flow directly from farm sector while others are distinct, ranging from full- time but temporary wage employment in industry or construction to regular or part-time self employment in home- based handicrafts and trading or other services (ILO, 1983). In India too, economic opportunities in the non-farm sector have increased. The percentage of RNFE in total rural employment increased from 16.6 per cent in 1977-78 to 18.4 per cent in 1983, to 21.6 per cent in 1993-94 and to 23.8 per cent in 1999-2000 and 32.1 percent in 2009-10[1]

2. Insights from studies on RNFS and its linkages to economy

Though agriculture and rural manufacturing play a significant role in employment growth in the rural sector, there are but other industries like construction, trade, transport and business services that have emerged as important in recent years. A number of factors like infrastructure, per capita income, population density determine employment growth in these industries. Also government policies and regulatory framework influence these factors.

Although RNFS was viewed as a low productivity sector which produced low quality goods but over past couple of decades it has been observed that this sector has been instrumental in developing countries in creating employment opportunities, poverty reduction and more spatially balanced population distribution (Jean O. Lanjouwa and Peter Lanjouwa's). It is recognized as an important sector for economic development and growth. Bangladesh which is an agrarian country with low land-man ratio has also seen remarkable growth of rural non-farm economy (M. Hussain:2004). The share of non-agriculture in rural household income in Bangladesh grew from 42 per cent in 1987 to 54 per cent in 2000. The share of non-agriculture in rural employment increased from 34 to 52 per cent over 1987- 2000. The distribution of income from trade and services, however, remains a concern because opportunity to take up newer avenues of non- farm income remained confined to households that had better access to education and physical capital. The worsening of income inequality in rural Bangladesh was mainly on account of the increased share of income from business and services, which were more unequally distributed than the income from agriculture. In India, Punjab has been the largest beneficiary of green revolution. However, over the years, stagnation in agricultural yield, declining land man ratio, falling labour absorption capacity of agriculture and high cost of capitalist agriculture with declining/negative growth return has pushed workers out of agriculture (Ghuman: 2005). Based on a

[1] NSSO various Rounds on Employment Unemployment

insights drawn from a study of three districts Ghuman concluded that the increase in the proportion of rural non-agricultural workers in total workers and in total rural workers in Punjab was attributed mainly due to "push effect" rather than "pull effect". It was found that

> '*the informal private sector RNFS, in the study villages, could not generate employment with reasonable level of earnings so as to equate even with marginal and small farmers. This has been one of the main reasons for the non-switch over of much of the rural workforce (though unemployed, disguisedly employed, underemployed) to RNFS. The low level of awareness and competency, lack of self-initiative and entrepreneurial skill are the other reasons for such an apathetic situation. In fact, development and sustainability of RNFs in Punjab is closely connected with the level of skill and education. As regards rural-urban linkages of the RNFS, it was almost missing as far as production linkages are concerned as there was no manufacturing unit in the study area. However, some single-worker processing unit had some backward production linkages with the urban areas and forward production linkages with the rural areas in a crude sense'.*

In the eastern Himalayan region, Maja Micevska and D.B. Rahut (2008) made an attempt to understand the determinants of participation in non-farm activities and incomes across rural households. A study covering the two states of Sikkim and West Bengal, showed that services dominated the rural non-farm activities, at the same time the shares of non-farm wage income exceeded the shares of non-farm self-employment income across all categories of rural households. This suggested the need for more attention to the service sector and to wage employment, versus the traditional focus on rural manufactures and self-employment. While the majority of the households did diversify their activities, access to high-return from nonfarm activities might be limited in terms of special skills or capital needs. Promoting the generation of nonfarm income earning opportunities could be an important focus on poverty reducing strategies. Again, regional location affected specific sources of income. In the highlands of West Bengal, participation in and incomes derived from nonfarm employment were lower than that in Sikkim. In West Bengal age, financial family support, marriage relationship and wealth were very important determinants of non-farm manufacturing entrepreneurship of farmers. In addition, marital status, fate/work-effort, and risk were also important determinants (Dutta: 2007). It was observed that a farmer's probability of being a non-farm manufacturing entrepreneur went down with age. This indicates that a younger farmer had a higher likelihood of being a non-farm entrepreneur. As regard to wealth, it was found that a wealthy farmer was less likely to become non-farm manufacturing entrepreneur. On the other hand, a farmer who had accumulated investible fund through the benefit from green revolution felt shy to enter the field of industry. For a prosperous rural industrialization programme, wealthy farmers needed to be invited to start non-farm enterprises with their investible capital. Otherwise, rural non-farm economy had limited scope to come out of the low level equilibrium trap. For the growth of rural industrial sector, institutional intervention was required, allowing more public investment on rural physical and social infrastructure. In the far eastern Himalayan region of Arunachal Pradesh which is landlocked, there was a continuous

sectoral shift in favour of NFE during the period 1971 to 1991, in the rural economy (Panda:1999). Among the various constituents of RNFE, transport, storages, communication, construction, non-household manufacturing, trade and commerce became the dynamic sector of employment generation. Agricultural growth, urbanization, education, infrastructural development and distress diversification were found to be the major determinants of the level of RNFE. In Arunachal Pradesh except for agricultural growth in 1991, the other variables did not have any determining effect on the level of RNFE in both the years i.e. 1981 and 1991. Agricultural growth promoted RNFE mainly via consumption induced demand. Since unemployment rate in Arunachal Pradesh was the lowest in the country, and hence this variable was unlikely to have any determining effect on the level of RNFE. There is considerable scope for increasing the share of RNFE in the state by means of increasing farm production and farm productivity. As urbanization in Arunachal Pradesh is not matched with adequate infrastructural development, especially in terms of transport and communication facilities, the rural people therefore could neither commute for employment in non-farm enterprises in the towns nor could they start high value non-farm enterprises in the rural areas. This finding underscores the importance of policy initiatives towards the modernization of agriculture and the development of transport and communication for the full realization of the potential of employment generation in the non- farm sector.

The nonfarm activities in India got a major boost in the post reforms period both in terms of employment generation and overall growth of the sector. However there were regional variations across the country and in Maharashtra which has been one of the economically advanced states, did not see any transformation in the non farm sector, rather there was stagnation (Mishra: 2014). Analysis of the unit level NSS data on employment and unemployment for four quinquennial rounds 50^{th}, 55^{th}, 61^{st} and 66^{th} showed that female participation was quite low as compared to the male in non-farm sector. A large portion of male workers were mainly engaged in trade, hotels, restaurants and constructions etc. People from backward classes were mostly employed in non-farm activities as compared to the others cast because of low education level. Mishra observed that poor education and lack of training created the problem of growth of non-farm activities and concluded that the higher education and better training facilities lead to employment opportunities in the non farm sector which in turn could help in growth of non-farm sector. Another major impact of the non-farm sector has been its potential to generate female employment opportunities. An analysis of sectoral distribution of workers by Goswami and Bhattacharyya (2014) showed that the proportion of male workers engaged in farm sector declined in favour of the non farm sector, At the same time a large proportion of females have been engaged in farm sector leading to its feminization. They found that the rural females in Assam are the most disadvantageous position in the labour market as indicated by their low WPR, Women's growing contribution of labour in agriculture adds to the already heavy work burdens of most rural women, thereby further undermining their well-being, and suggests that the feminization of agriculture may better be described as the feminization of agrarian distress. This hollowing out of rural areas, the un-manning of agriculture, has been brought about by a steadily deepening crisis in household economies and Assam is no

exception. In a situation where the labour absorption capacity of agriculture becomes limited and the urban industrial sector is not able to accommodate the ever-growing labour force, the RNFS tend to act as a cushion for the surplus labour. The RNFS thus acts like a residual sector in which rural workers concentrate on account of their distress conditions. This is popularly known as the push phenomenon or distress hypothesis which is supported by several scholars (Vaidyanathan: 1986, Bhalla:1990, Unni;1991, Singh:1994). Usually scholars have identified two kinds of distress situation which has contributed towards RNF activity to absorb residual labour force: supplementary workers who have no main occupation, but engage in subsidiary work to supplement household income; and those with main occupation also engaged in a secondary activity.

3. Context of the Study

The economy of Assam is predominantly agrarian. More than 50 percent of the workers (both main and marginal categories) in the state were cultivators both (Census, 2011) but the contribution of agriculture to State GDP was 19 percent. The State has largely remained distant from the benefits of green evolution, large scale industrialization and more recently from foreign investment and value chain production system. The State still continues to be characterized by subsistence agriculture. In fact in Assam, due to the inadequate availability of irrigation facilities, mono-cropping is done in most of the areas, resulting in substantial seasonal unemployment. Further increasing population in the state has led to the fragmentation of land holding rendering modernization of agricultural practices unviable. Further, frequent flooding in Assam during monsoon has been the bane of its agrarian economy. This has led to sizeable shift of workers from agriculture to other sectors. The inter censal data (2001-2011), shows that the rural population in the state increased at 1.54 percent per annum, but employment of main workers in agriculture declined at a rate of 2.1 percent. With agriculture recording negative growth in employment, it is obvious that the shift from far sector is likely to be accommodated in the non farm sector. The proportion of rural workers in nonfarm activities has increased from 35 percent in 1999-2000 to 40 percent in 2011-12 (Saha: 2016).

It is against this backdrop, the present study has analysed the composition, income share of RNFS activities for rural households and also tried to identify the household level determinants for entering into non-farm sector. An empirical study has been taken up in the undivided Sonitpur district of Assam. The economy of this district continues to be predominantly agrarian. In fact, the dependency of population on agriculture and allied activities was approximately 80 percent (Sonitpur District Inventory of Agriculture, 2015-16). But, the productivity and production of agriculture sector are not much satisfactory due to traditional method of production, natural calamities (like-flood, drought, various diseases) and it is seasonal also. Besides this, only 31.03 percent of area is cultivable out of total geographical area and most of operational land holder is marginal (36.45 percent).[2] The large size land holdings comprise 5.10 percent of cultivable land of the district, whereas marginal land holdings occupy 15.82 percent.

[2] http://sonitpur.gov.in/html/agri.html

The small size land holders (42.80 percent) have the highest occupation of cultivable land.

4. Data Source and Methodology

The study was based on both primary and secondary sources of data. The secondary data were collected from various government and non-government, published and un-published data like- Population Census of Assam 2001 and 2011, 4th and 5th Economic Census of Assam, District Statistical Handbook of Sonitpur, Sonitpur District Inventory of Agriculture 2015-16 and Various issues of Statistical Handbook of Assam. The primary data was collected from a survey of 130 sample households in four villages of (undivided) Sonitpur district of Assam. The sample households were selected through a multistage random sampling technique. At the first stage, two sub-divisions were selected purposively on the basis of extent of rural non-farm sector viz., Gohpur and Biswanath sub-division. In the second stage, two blocks from each sub-division were selected namely Chaiduar, Pub-chaiduar, Bihali and Sakomota blocks purposively on the basis of extent of rural non-farm sector. In the third stage, one village from each block was selected on the basis of two criterions: 1.distance from the block head quarter and nearest town and 2. size of total population. An attempt was made to include low population size and high population size of village. At the final stage, the sample households were selected randomly. An attempt was made to select at least 30 households from village with low population size and 40 households from village with high population size on the basis of farm and non-farm or both activities.

The data have been analysed by using descriptive statistical measures like Pie-diagrams, mean, standard deviation and for a causal analysis logit regression has been used.

5. Results and discussions

5.1. Composition of the Surveyed Households by Caste

In the rural economy of Assam, caste is often found to play an important role in case of choice of occupation and they may act as a barrier to only in particular vacation. In this study, the households were divided into five categories on the basis of caste namely-

i. General (GEN)
ii. Schedule Caste (SC)
iii. Schedule Tribe (ST)
iv. Other Backward Class (OBC) and
v. Tea Tribes

The details are shown in the Figure 1.

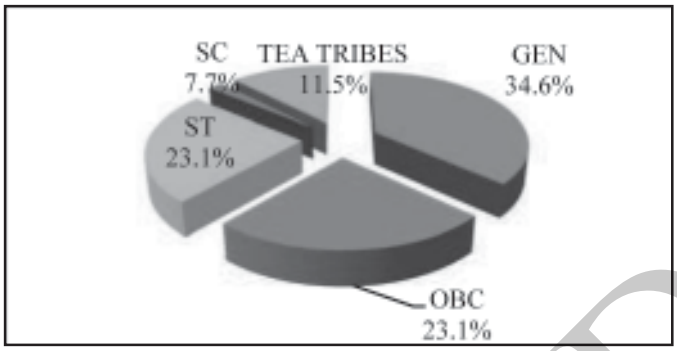

Figure 1: Caste Composition of Surveyed Household

Source: Field Survey, 2017

Among 130 surveyed households, 34.6 percent belonged to general caste, while 23.1 percent were OBC and ST category respectively. Further, 11.5 percent constituted of tea tribes category and the proportion of SC households in the sample was around 7.7 percent.

Table 1: Occupational Classification of Surveyed Households by Caste *(in percent)*

	GEN	OBC	ST	SC	Tea Tribes
Cultivation	31.11	23.33	36.67	12.5	17.64
Self employment	2.22	3.33	3.33	0	0
Household Industries	2.22	3.33	0	0	0
Transport	2.22	6.67	3.33	0	0
Petty traders	28.89	30	30	75	0
Services (Salaried Job)	13.34	20.00	16.67	0	0
Daily labor	4.45	6.67	6.67	0	58.82
Other Services	15.55	6.67	3.33	12.5	23.52
Total	100	100	100	100	100

Source: Field Survey, 2017

It was found that ST and general category households were relatively more dependent on cultivation. ST's had a higher proportionate share (36.67 percent) of workers in agriculture among all the occupations. Salaried job was the third major source of income after cultivation and petty trade for general category and ST and OBC households. Petty trade was the major source of income for SC households. At the same time, no members from SC households were found to be engaged in salaried jobs and services. Among the three socially disadvantaged groups of SC, ST and OBC, the SCs were found to be more disadvantageous in so far as livelihood security was concerned. Along with the SC households, tea tribes were another group which was more disadvantageous. Majority of tea tribes (58.82 percent) were engaged as daily laborers

in tea plantations and a small proportion was engaged in agriculture (18 percent) and other casual works and services (24 percent). This shows that there has not been much of an occupational diversification by the tea tribe, worse still none of the tea tribe households had any person in salaried job. This in a way reflects the distress and crisis of tea plantation labour households in Assam.

The livelihood crisis among the SC and tea tribe households could be attributed to the overall educational attainment, household income and level of awareness which was comparatively lower among these households.

5.2. Non-Farm Employment

Land is an important asset among the households which is often found to have important implications for the pursuance of non-farm activities. In States like Punjab where agricultural productivity increased during green revolution, yet workers engaged in non-farm sector moved out from the farm activities due to push effect of agricultural sector rather than the pull effect of non-farm sector (Ghuman: 2005).

Although there were no landless households found in the sample households, nevertheless the average size of land ownership was found to be low. (Table: 2). Majority of the households (61.53 percent) had marginal holdings, followed by households with small size holdings (22.32 percent). Households with large size holdings were found to be only 3.08 percent.

Table 2: Operational Land Holding Status of Sample Households *(in percent)*

Land Size[3]	**Percentage**
Landless	Nil
Marginal (Less than 1 hc)	61.53
Small (1 hc to less than2 hc)	22.31
Medium (2 hc to less than 4 hc)	13.08
Large (4 hc and Above)	3.08

Note: 1 bigha=0.13387Hectres Source: Field Survey, 2017

The pattern of ownership of agricultural land is a significant factor in influencing the choice of occupation by rural households. The occupational classification of surveyed households by size of land holding reveals that engagement in non-farm activities is found to be relatively high among households with marginal (89.74 percent) and large (83.33 percent) land holding size. Clearly, households with agricultural land sizes of less than an acre were more distressed and looked for alternative sources of income. Households with land sizes of less than an acre are forced to take up activities outside agriculture because ownership of such land sizes does not help in creating assets and

[3] The land size classification in the study does not conform to the standard classification of land size given in official statistics of the Government of Assam. This classification has been done by the researchers for the present study only.

generate surplus for investment in farm activities (Table: 3)

Table 3: Distribution of Non-Farm Workers by Land Holding Status *(in percent)*

Land HoldersNon-Farm workers	Marginal	Small	Medium	Large
Self Employment Enterprises	1.28	0	1.92	16.67
Household Industries	1.92	4.34	1.92	0
Petty trade	**26.92**	17.39	17.31	8.33
Services	19.88	**20.29**	**28.82**	**33.33**
Daily labour	18.59	4.36	0	0
Others	21.15	**20.29**	7.69	25
Total	**89.74**	**66.67**	**57.70**	**83.33**

Source: Field Survey, 2017

On the other hand ownership of large tracts of agricultural land increases the value of household assets and enables households to create opportunities for acquisition of better educational attainment and other skills and thereby become better equipped to move into more remunerative non-agricultural occupation. Engagement in non-farm activities among households with small and medium size of land holding varied from 66.67 to 57.7 percent. One observes a U shaped curve showing the relation between size of land holding and diversification into non-farm activities (Diagram:2). For the households with land size of less than one hectare, returns from farm activities did not provide for sustenance and well being and hence working age people have moved out to non- farm activities in low skill areas like petty trade and business. On the other hand households with land holding sizes of more than one hectare have moved more into services (20 percent) and others (20 percent) compared to petty trade (18 percent).

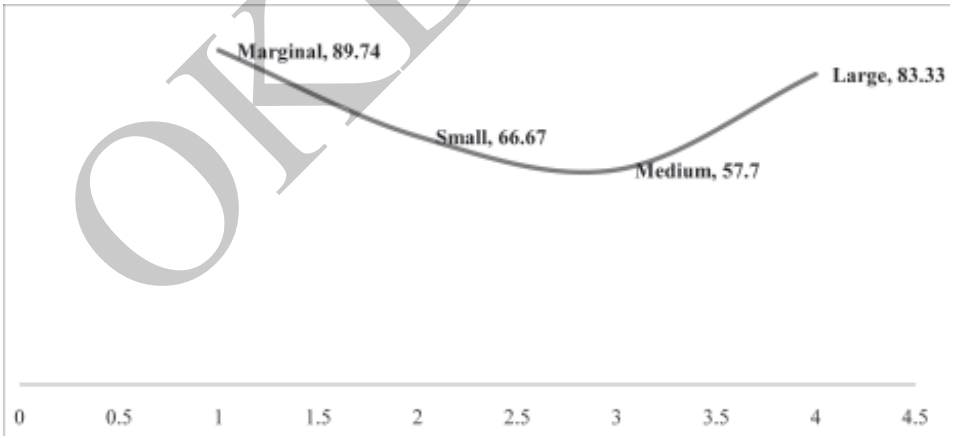

Figure 2: Non-Farm Workers by Land Holding Status

Source: Field Survey, 2017.

The households in the threshold of land ownership of one hectare to less than four

hectares gradually seek out for more secured livelihood by moving into salaried jobs. The study corroborates the trends observed elsewhere in India that with increase in land sizes diversification also takes place in occupations. Thus increase in land holding sizes of the households help in diversifying income earning opportunities. Interestingly, distress in farm activities for households with lower land holding sizes force households to shift to lower end activities like petty trade and casual work, while distress felt by households with fairly endowed agricultural households tend to move out gradually to more secured livelihood opportunities like salaried jobs and own enterprises and their dependence on petty trade as an alternative source of income also diminishes gradually.

5.3. Income of Rural Households (Farm, Non-Farm and Mixed)

The composition of the sources of income among the surveyed households showed that two thirds of the surveyed households were dependent on both farm and non farm income. This could be attributed to the seasonality of agriculture and income from farm is not adequate for sustenance. Barely 0.33 percent of surveyed households derived their income purely from agricultural activities which shows a distinct trend towards non-farm activities and one third of the surveyed households derived their income only from non-farm activities (Diagram:3).

Among the various non- farm activities taken up by the surveyed households, salaried job was found to have highest proportionate share (44.77 percent) followed by self employment (32.19 percent) (Table; 4). Non- farm wage labour comprised less than 10 percent of the non-farm income earning sources.

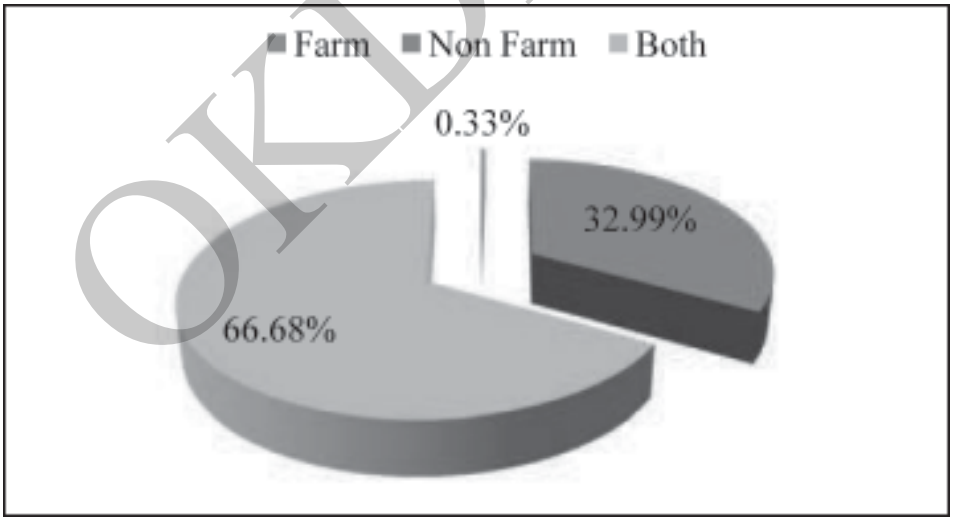

Figure 3: Income Orientation among Surveyed Households

Source: Field Survey, 2017.

Table 4: Composition of RNFI in Surveyed Villages *(In Percentage)*

Rural Non Farm Activities	Total
Non-Farm Wages	9.02
Salaries	44.77
Skilled & Semi Skilled Worker	11.97
Self Employment in RNFS	32.19
Household Industries	0.63
Others	1.42
Total	100

Source: Field Survey, 2017

Since, a good proportion of income is derived from self employment and skilled & semi-skilled work activities, it would be worthwhile to desegregate self employment income by various subsectors (Diagram 4) viz. (i) Self employment in Trade and business, (ii) Skilled and Semi-Skilled workers, (iii) Household industries and (iv) Others.

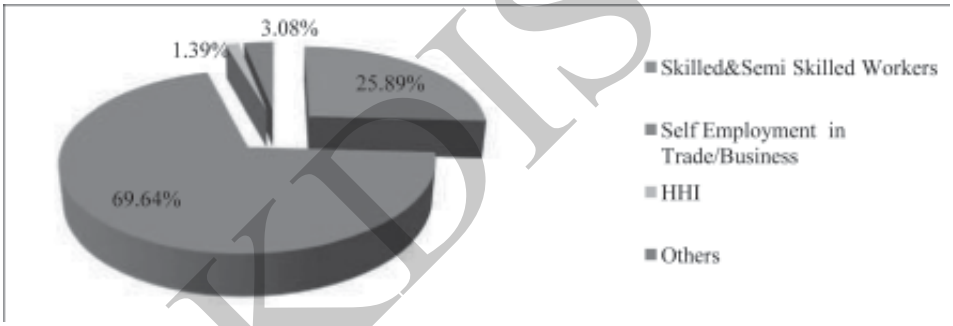

Figure 4: Self Employment Income by Sub Sectors

Source: Field Survey, 2017

Within the self employment 69.64 percent households, drew their income from trade/ business. In other words, non-farm self employed workers among surveyed households were mostly engaged in trade and business for their livelihood. At the same time, skill and semi-skilled activities like-machine operator, embroidery, waving cotton and fishnet, oil and rice mills, drivers, electricians, plumbers etc. contributed 25.89 percent. Only 1.39 percent of income was generated from household industries (like- furniture, bamboo items producer, sweet and backs product, ring well and various cement items producer etc.) in the surveyed villages. Household industries contributed low income than other self employed income due to low level of entrepreneurial skill, low production linkages, lack of finance and most of workers from nuclear family.

The findings reveal that shift to non-farm activities has been mostly in jobs and petty

trade and business.

5.4. Factors Influencing Non-Farm Activities- A' Logit Analysis

To understand the factors or determinants of non- farm activities pursued by households logit regression has been used where the primary source of income of the household(Y) has been taken as the dependent variable. To capture the non-farm income, the dependent variable Y will obviously be a binary variable that takes value 1, if income (Y) is derived from non-farm activities and takes 0, if income (Y) is from farm activities. The possible determinants are (i) Age (AGE), (ii) Educational level (EDN), (iii) Gender (Binary Variable),(iv) Total family member (TFM), (v) Per capita size of land holdings (PCL) and (vi) Caste (Binary Variable: caste of the households takes 0 when they are general and takes 1, if they belong to other caste)

Functional specification of the model

As the dependent variable (Y) is binary, the logit model is specified as:

$E(Y_i)= P(Y_i=1)$ ——————————————————————————(i)

$Y_i=1$, if head of the household engaged in non-farm sector.

$Y_i=0$, if head of the household is not engaged in non-farm sector.

Or, $P(Y_i=1)= f$ (Caste, EDN, Age, Gender, PCL,TFM) ——————————(ii)

Before estimating the parameters, presence of problems of heteroscedasticity has been checked among the explanatory variables. The estimated results of the logistic regression model are shown in Table 5.

Table 5: Results of Logit model

Explanatory Variables	B	Wald	Sig.	Exp(B)
ConstantCaste	1.0550.641	.3891.794	.533.180	2.8721.898
EDN	0.152	6.032	.014**	1.164
Age	-0.007	.166	.684	.993
Gender	1.132	1.023	.312	3.101
PCL	-0.533	12.733	.000***	.587
TFM	-0.275	6.421	.011**	.759

Source: Field Survey, 2017

*Note:** and *** indicates 0.05 and 0.01 level of significance.*

Note: EDN represent Education, PCL represent Per Capita Land and TFM is Total Family Member.

The regression results showed that three explanatory variables namely per capita land, education level and size of family had significant impact on participation of non-farm

activities. The most significant variable is per capita land holding (at 0.01 level of significant) but with a negative coefficient which indicates that lower the size of per capita land holding, higher the participation of non-farm activities and vice-versa. This may be due to the fact that households with land holding size of less than a hectare or landless are forced to take up non-farm activities due to non sustainable income from land which is prized as the most productive asset in rural areas. The results also showed that the probability of a worker participating in non-farm activities increases with an increase in years of completed education level of head of households. This explains the reason for salaried jobs emerging as a major non farm income among the surveyed households. On the other hand increase in household size reduces the odds of a worker participating in non-farm activities because of low educational level and engaged in own agricultural activity, other thing being held constant. In other words, the larger the household size, the higher is the likelihood of the worker being engaged in agricultural activity than in non-farm sector. Age as a determinant is inversely related with non- farm activity, higher the age of the worker, lower is the probability of shifting to a non-farm activity from farm activity because occupational switch over decreases with age. Thus, relatively younger workers are more likely to be employed in non-farm activities.

6. Conclusion

The broad conclusion emerging from analysis based on primary data shows that the non-farm sector is a major source of employment for the people in the study region. The RNFS encompasses a wide verity of activities including salaried jobs, self employment ventures and casual wage based employment among the households. It has been observed that caste plays an important role in influencing the choice of occupation. For example it is found that ST workers were relatively more dependent on cultivation than any other caste categories, because of landholding sizes by caste is relatively larger in case of STs and a relatively high proportion of SC workers were found to be employed either in petty traders or in other services. This is quite expected as households belonging to marginal category of land holdings. At the same time it is found that ownership of agricultural land critically influences the choice between farm and non-farm occupation as diversification into non-farm activities was found to be significantly high among farmers with land holdings of less than an acre and farmers with land holdings more than four acres because households tend to diversify their income basket with higher levels of endowments.

However, vulnerability of households emerges as a basic feature among the surveyed households because as many as two thirds of the households combine both farm and non farm income for their sustenance. This is largely due to the seasonality of agriculture and the income from farm is not adequate. It is interesting to observe that only 0.33 percent of surveyed households derived their income purely from agricultural activities and these households mostly belong to marginal land holdings and have low educational attainment. Among various types of non-farm activities salaried jobs had the highest proportion (44.77 percent) followed by self employment in RNFS (32.19 percent). The non-farm wage labor like- helpers in carpentry and paint works, drivers, conductors, etc.

consisted only 9.02 percent. In case of self employment in non-farm sector it is found that 69.64 percent of income contributed by self employment is from trade/business. It means most of the non-farm self employed workers were engaged in trade and business for their livelihood.

Among the various factors that may influence shift to non- farm activities, education is the most significant factor. The other significant factor is per capita land holding and size of household. The higher the level of educational attainmen better is the chances of a shift over and coping mechanism in non-farm activity. This is because higher capabilities would not only equip workers better to tackle the uncertainties of distress induced shift but also help in finding sustainable sources of non-farm income. In fact development and sustainability of RNFS is closely connected with the level of skill and education, and the findings in the study corroborate similar results confirmed through studies by Ghuman (2005), Saha (2016), Unni (1991). As low educational attainment level in rural households leaves them employable only in low skilled activities and petty works, there is a need for initiating skill-oriented relevant training programmes to enhance their employability in RNFS in Sonitpur district and the state of Assam as a whole where RNF is a fast emerging sector.

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Book Review

Ecology, Economy and Society: the three pillars of Development

Monjit Borthakur*

Felix Padel, Ajay Dandekar & Jeemol Unni. (2013). Ecology Economy: Quest for a Socially Informed Connection. New Delhi: Orient Black Swan. xxiii + 315 pp, Rs795 (hardcover)

The material being of any society depends on how humans interact with their immediate nature. Human ability to produce their means of subsistence makes them distinct from other animal being (Marx & Engels, 1968). The paleolithic hunters and gatherers advanced the forest, the agricultural men ploughed the soil and the industrial men extracted the raw material for production of their need. Through their production relation, human being interacts with and leaves behind distinctive imprint on the nature. Some interact symbiotically and some alter it completely. The industrial capitalist society has caused inexorable damage to nature which has left behind a trail of exploitation to sustain a 'development', based on continuous production and consumption of the resources. 'What is real development?' - a financial system based on debt to support massive 'development' for resource cartel or a communitarian system based on equal right over the resources to support life and livelihood of the poor and marginalised? Seeking answers to these questions, the Book, *Ecology Economy: Quest for a Socially Informed Connection* attempts to reinvent meaning of some key concepts revolving around ecology, development, growth, right and freedom.

The book critically engages with the debate between 'two cultures' – environment and development, or, to put more explicitly – the conflict between right to livelihood and the right to determine the nature of 'development'. The introductory chapter in the book begins by raising questions about the divide between mainstream model of economic development and ecological value of traditional communities. The attempt to understand the linkage 'ecology and economy' only through economic considerations, as the authors put forwarded, cannot generate any standoff between the two cultures. To untangle the conflict between the 'two cultures', a contradiction to Jairam Ramesh's argument of 'going beyond traditional system' to 'valuing the nature'(Ramesh, 2010), requires a third perspective – the Society, which extends balance between the two poles, ecology and economy (p. 6). Society, ecology and economy are closely interlinked

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and inconceivable to understand in isolation. Throughout the book, the authors explore the interrelation of these three perspectives with some empirical evidences. The mainstream environmental economics of cost benefit analysis (CBA) and green accounting of natural resources by using monetary value ignores non-measurable social and ecological factors. To avoid the implicit bias of these mainstream models, the book argues for ecological economics that offers holistic approach to value the ecosystem and the society while accounting for any development intervention. The approach apprises that the economy of the traditional societies, the Adivasi, is closely interlinked with nature and maintains a harmony between ecology and economy through their traditional way of life.

The Affluent Adivasi Economy

The Adivasi societies are deeply rooted to the idea of long term sustainability through their symbiotic relation with the nature; driving ways of subsistence from the ecosystem without intrinsically damaging it. In his seminal work, Marshall Sahlin argued that society of the hunters and gatherers was the original affluent society, in which all the people's material wants were easily satisfied. As stated by Sahlin, "To assert that the hunters are affluent is to deny then that the human condition is an ordained tragedy, with man the prisoner at hard labor of a perpetual disparity between his *unlimited wants* and his *insufficient means*" (Sahlins, 1972, p.1). The authors have made an attempt to extend the concept to Adivasis in India to define 'Adivasi economy' as a social system which is radically decentralised and highly embedded in the idea of 'moral economy'. The 'moral economy' of the Adivasi societies – the spirit of sharing land and labour, food and drink, helps to create a social system of redistributive justice, which makes them affluent. The Adivasi economy is, thus, based on the principle of sharing, a sharp contrast to mainstream market economy of competition for continuous production and consumption of resources (p. 23). These societies, although, remain outside of unlimited desire or wants and lack in industrial mindset, are under siege throughout the world. They are being displaced from their land and livelihood by 'development projects', which are largely funded by a financial system based on debt.

Resource cartel – Dispossession of the marginalised

The resource rich belts of central India have become major focus of the world mining companies, thriving on minerals at a highly subsidised rate. These companies, through their negotiation with the state, are continuously dispossessing the Adivasis from the mountains, hills and rivers, which they have been conserving since time immemorial. Throughout the chapters from three to six, the book highlights a plethora of empirical evidences over a range of resources – water, minerals, power, land, labour and livelihood, indicating the exploitation of ecology and environment by the mainstream development paradigm. Chapter three, for instance, brings the debate on big dam and its apocalyptic power to ruin the ecology as well as the socio-economic life of traditional communities. The 'MoU virus' of the big dams was injected through loans or advance payments from private powers to the state even in the peripheral regions of the country. The major problem with these big dams, as the authors indentified, involve huge discrepancies

between proposed benefits and actual outcome (p. 66). Similarly, the prodigious vision of interlinking Indian rivers and extending the Green Revolution to every nook and corner of the country would also have specific political outcome. The chapter offers a strong critique to the 'political arithmetic' of cost benefit analysis, which locates these interventions as neutral technological artefacts and engine of neoliberal economic growth.

The ravaging illness, mining the minerals and generating power for an industry increasingly geared towards export, is discussed in subsequent chapters. Considering the ecological importance of mineral deposits, the authors assert a fundamental question, 'do we really need these metals so much, so fast, at such a terrible cost?' (p. 80). The mining companies, however, completely ignore the irreparable damage caused by their 'development' interventions to the ecosystem as well as communities. The book draws an array of examples to substantiate the argument that mineral production, (be it aluminium, iron or coal) has posed a grievous threat to the well-being of traditional communities. The role of the state, providing huge subsidies on land and water to these mining companies, is also highly questionable. The extent of these subsidies in India, though remain unrevealed till date, yet it is assumed to be very large and have been pursued continuously by the resource cartel. The authors named the Adivasi regions of the country as 'resource-cursed region' to summarise that abundant resources attract abundant exploitation, where the ruthless invasion of subsistence villages is projected as 'development' (p. 92). The book further illustrates that, the privatisation of natural resources in the mega power generation projects through coal, nuclear energy and natural gas is a 'theft of the global commons', which only contributes to deterioration of the environment and displacement of the locals. The authors appropriately raise some vital questions - 'are water and minerals, forests and animals, basically resources, to be exploited for maximum profit? Or, to survive, will we have to start viewing these resources primarily as 'sources' of life itself? (p. 139)

Struggle over land, labour and life forms

As a sharp contrast to the Independent India's aim of land redistribution, the neoliberal state policy is marked by rising land speculation, corporatisation of agriculture, informalisation of labour, privatisation of agro-based industries and promotion of global production chains. Chapter six provides a holistic overview of the struggle over land, labour and life forms. The increasing burden on agrarian system and farmers' suicide is an indication towards a systemic crisis to agriculture. Withdrawal of the state support, against which we can locate India's agrarian crisis, has resulted in low public investment, absence of minimum support price, formal credit institutions and extension services in agriculture. The authors categorically highlight the necessity to understand the agrarian crisis and the incidence of farmer's suicide within the context of neoliberal development paradigm. The growth emanating from globalisation and open market, as visualised by mainstream economics, fails to reduce poverty through the trickle-down effect and the book goes on to elaborate that 'globalisation becomes a cause of poverty than a solution' (p. 152). The growth process in India has generated more employment than output in the informal sector, pushing more and more numbers of workers without

any stable employment and income. Informalisation of labour through 'labour rationalisation' involves ruthless exploitation of the workers negating their fundamental rights. Globalisation or integration of global production chain has changed the way production is organised. The global finance capital has been shifted to the 'developing' countries to absorb cheap labour in the production network. High rate of profit is achieved through lowering the price of labour power or by increasing the intensity of work (p. 157). Alongside labour and employment, some of the ancient life forms of India, the pastoralist and Adivasis, have lost ground under the same profit motive of the global finance capital.

Finance capital and the burden of debt

Over accumulation within a given territorial system means a condition of surpluses of labour and surpluses of capital. These surpluses - labour and capital, may be absorbed by temporal displacement through investment and spatial displacement through opening up new markets and production capacities. The relocation of labour and capital requires mediating help of financial and/or state institutions, which have the capacity to generate credit (Harvey, 2004, p. 64).Chapter seven discusses the basic pattern of spatial displacement of capital in the form of loan or investment to support the massive 'development projects'. The imperialist forces of the global north with their controlling power over global financial institutions (like World Bank and IMF) are able to break the economy of the developing countries through growth bubbles based on debt. The book underlines the association between debt, associated money-laundering through tax havens and 'development' trajectories towards exploitative interventions. In recent years, debt has emerged as an instrument of control to subserve the political institutions, whereby key policy decisions are being controlled through global financial institutions. This financial system has inverted the benefits of the 'development paradigm' and caused rapid ecocide of global south. The authors argue for an alternative economic system, a transition towards 'planned de-growth', to have harmonious coexistence with nature. The book deserves credit for emphasising the capacity of rule of law to place life-supporting ecosystem and Adivasi economy on top of the directives of global financial elites. The rule of law, for instance, the Panchayats (Extension to Scheduled Areas) Act 1996' (PESA) and the Forest Rights Act (FRA), 2006 provide strong legislation for protecting the environment, as well as right to life and livelihood. It also highlights the contravention between the 'pro-corporate' and 'pro-people' laws (PESA and FRA), which limits the implementation of the later and necessitates drawing the centralised legal procedure in the perspective of customary laws to find an equitable balance between ecology and economy (p. 233).

The book is worthy for its critical engagement with present development discourse seeking transformation to a 'real development' for collective well being. Although the book does not locate the issues of ecology, economy and development within a detailed theoretical framework, nevertheless, it does raise pertinent questions on 'mainstream development' discourse. For instance, though the authors have discussed Adivasi mode of production, dispossession and enclave colonialism, the book misses out systematic explanations to these concepts. The book's strength lies in its empirical

evidences and is an important contribution in understanding the socially informed connection between ecology and economy with the role/character of the neoliberal state. The book offers the reader a wide terrain of clues to rethink future engagements on political ecology debates in India.

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