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TENANCY AND AGRICULTURAL PRODUCTIVITY IN SOUTHERN INDIA: NATURE, EXTENT, TRENDS AND DETERMINANTS

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ABSTRACT

The study reconfirmed prevalence of reverse tenancy in dryland agriculture in Southern India in recent years (2009-10 and 2011-12) as was in the mid-seventies. Household level panel data collected from six villages by ICRISAT under its Village Level Studies (VLS) and Village Dynamics Studies (VDS) programme were analysed. Area under tenancy has increased in recent years, mostly in the form of sharecropping. Panel Data Probit analysis revealed that likelihood of a household to be a tenant is positively linked with bullock ownership and large farm size while age and education of the household head, and dependence on non-farm income had a negative association. Determinants of extent of tenancy (rented in area) were measured through Panel Data Feasible Generalised Least Square (FGLS) regression analysis. Results indicated that an additional bullock increased rented-in area by 0.22 ha. On the other hand, large farmers had 0.47 ha more area under rented-in compared to other tenants. There was negative relationship between rented-in area and age and education of the household head indicating that educated and elderly people participated less in the tenancy market. Input use level, crop yield and profitability were generally higher in own land than that of rented-in land in the mid-seventies. In recent years, we observed mixed (inconclusive) outcome for input use, crop yield and profitability. Reduction of production risks in one of the study villages has not only reduced tenancy but also abolished reverse tenancy.

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Introduction

Relation between tenancy and agricultural productivity has long been investigated in Indian agriculture. Several studies (Jodha, 1981; Pant, 1981; Radwan, 1987; Walker, Singh and Ballabh, 1988) have investigated the situation in the semi-arid tropics (SAT) regions (also known as dryland agriculture regions) in Southern India in the seventies and early eighties. The SAT region has some special characteristics such as erratic rainfall, persistent drought and less fertile soil along with high risk in crop production. These factors accompanied by other factors such as skewed distribution of land among landless and large land-owning farmers had resulted in widespread tenancy in dryland agriculture in the seventies and early eighties. Much of the prevailing wisdom in the seventies and eighties about the land market in South Asia stemmed from perceptions about and experiences in irrigated agriculture, particularly in the Indo-Gangetic Plain spanning north-western and north-eastern India (Walker and Ryan, 1990). Views about the "frozen", uncompetitive nature of the land market, economic polarisation, distress sales as means to accumulate land, increasing landlessness, landlords' exploitation of tenants, and extreme fragmentation of holdings were common (Myrdal 1968; Ladejinsky 1965). Earlier studies (Bardhan, 1978; Bardhan and Rudra, 1978) on tenancy and agricultural productivity have revealed widespread tenancy in irrigated agriculture and negative impact of tenancy on productivity. Due to inadequate financial resources and lack of access to formal institutional credit, tenants were unable to use required inputs for crop production. As a result, productivity or crop yield was less in the plots under tenancy than that of owner operated land. Tenants have underutilised resources such as bullocks and family workers which can be used in farming to increase their employment and income. Large landholding farmers have more land which they cannot effectively manage and get maximum benefit from their land.

Compared to irrigated agriculture, the situation of dryland was quite opposite. Jodha (1981) reported dominance of reverse tenancy in six study villages of Andhra Pradesh and Maharashtra. He observed that large farmers had emerged as tenants and small farmers as landowners in the mid-1970s. This contradicted the conventional presumption, where the tenant is usually thought of as a poor and small operator while the landlord is believed to be invariably a large farmer. In the study villages, 42 to 52 per cent of total leased-out land was acquired by large farmers; and 56 to 89 per cent of total leased out land belonged to small and medium farmers.Tenancy was primarily an out-growth of bullock power adjustments and credit market imperfections (linked transactions with credit). The study by Jodha (1981) observed that human labour market seemed to be functioning sufficiently well, and few households seemed to lease out land for

reasons of excess or shortage of family labour in relation to owned land or because of difficulties in hiring daily labour. Terms of tenancy were very flexible and depended on: (1) land productivity (2) capital availability on the part of landowner and tenant, and (3) mid-season contingencies affecting either of the parties. This was true across villages and within villages. Due to the practice of direct linking of output shares to input shares and because crop choice was largely the tenant's decision, tenancy does not appear to discourage adoption of (high cost) new technology (Jodha, 1981).

During the last three decades, many changes have taken place in rural India. Custom-hiring services for machines for land preparation, harvesting and irrigation equipment have emerged with fixed payment, thereby, some constraints of managing farms have been removed. Optimum scale of operation of such changes might have also been changed. Therefore, two possibilities for tenancy market might have developed: (1) expansion of owner cultivation, or (2) expansion of a vibrant tenancy market owing to economies of scale and increased labour scarcity. There is lack of empirical literature about changes in tenancy situation and impact of tenancy on input use level, agricultural productivity and profitability in dryland agriculture in India. In this context, we have investigated the following research questions: What is the extent of tenancy in dryland agriculture? Has it changed over time? Who rents out? Who rents in? What are the terms and conditions (operational modalities) for tenancy? Are there any major changes over time? Why tenancy exists? What are the consequences of tenancy on input use, productivity and profitability in farming?

This paper has documented the changes in tenancy situation in dryland agriculture in Southern India and analysed the factors responsible for tenancy. It has also quantified impact of tenancy on input use, productivity and profitability in dryland farming.

Methodology

Data: Household level panel data collected from six villages by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) under its Village Level Studies (VLS) and Village Dynamics Studies (VDS) programme are used. The VLS-VDS dataset has been collected by ICRISAT's resident field investigators who lived in the villages to periodically revisit the same households over the years. The study villages fall under SAT region of south and south western part of India. Out of the six villages, two villages (Aurepalle and Dokur) are located in Mahabubnagar district of Telangana, two villages (Shirapur and Kalman) are in Solapur district of Maharashtra and another two villages (Kanzara and Kinkhed) in Akola district of Maharashtra. The study villages and sample households are same as in the study of Jodha (1981) plus split households from the original households. Data collected for the period 1975-76 and 1979-80, 1983-84, 2005-

06 and 2011-12 are analysed in this paper. Thus, it is a real revisit and findings are comparable across time.

Farm size categories were defined in terms of operational holding and varied across study villages (see Table 1). Data from 40 households (10 each from functionally landless, small, medium and large landholding groups) for each of the study villages were collected since 1975-76. Sample size was not proportional to the number of households in each category of households in the village. In subsequent years split households from the original sample households were included. In case of migration of a household from any farm size group it was replaced by another household of same farm size category. In 2011-12, total number of sample households increased to 384 from 240 in 1975-76. Distribution of sample households in 2011-12 was: 70 in Aurepalle, 50 in Dokur, 89 in Shirapur, 61 in Kalman, 62 in Kanzara and 52 in Kinkhed.

Table 1: Farm Size Classification Based on Operational Landholdings (ha) in Study Villages

Farm size (ha)	Region					
	Mahabubnagar		Sholapur		Akola	
	Aurepalle	Dokur	Shirapur	Kalman	Kanzara	Kinkhed
Landless	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Small	0.2-1.2	0.2-0.9	0.2-2.0	0.2-3.6	0.2-1.8	0.2-2.0
Medium	1.2-3.2	0.9-2.1	2.0-5.3	3.7-8.5	1.8-5.3	2.0-4.5
Large	>3.2	>2.1	>5.3	>8.5	>5.3	>4.5

Note: Operational farm size is defined as owned land minus rented/sharecropped out land plus rented/ sharecropped-in land.

Source: Walker and Ryan (1990) and Authors' calculation based on VLS-VDS database.

Analytical Methods: Analytical methods used to quantify the extent of tenancy and determinants of tenancy are described below. Tenancy is defined as a situation where tenant cultivates the land owned by another household and pays rent with cash or with a portion of the produce. Extent of tenancy in a particular year for a sample household was estimated as percentage share of land under tenancy to the total cultivated land area of the respective household. Factors influencing tenancy such as household characteristics, resource endowments, effects of farm size, village infrastructure were identified and their relative contribution was estimated at the household level using a random effect Panel Data Probit Model as in Equation (1). Expected sign and definitions of variables are given in Table 2.

Table 2: Expected Sign and Description of the Variables Used in Panel Data Probit Model and in Panel Data FGLS Regression Analysis

Variables Notation	Description	Definition	Panel Data Probit Model (Expected Sign)	Panel Data FGLS Regression Analysis (Expected Sign)
Y (Equation 1)	Dependent variable. Taken value 1 if Household is a tenant and 0 otherwise	Tenancy status		
Y (Equation 2)	Dependent variable	Rented in area (Ha)		
IRRR	Proportion of own cultivable land under irrigation	Proportion of irrigated land	-	-
AGEHH	Age of the household head	Age in years	+	+
EDUHH	Head's years of education	Years of schooling	-	-
AG Worker	Number of persons whose primary occupation is agriculture	Number of agricultural workers		+
DRATIO	Dependency ratio	Ratio of dependent and working persons	+	-
NFI Share	Proportion of non-farm income to total income	Proportion of non-farm Income	-	+
LagKRAIN	Lag Kharif rainfall	Previous year rainfall June-October ('00' mm)	+	+
LFARM_D	Large farm dummy	Taken value 1 if the household is large farm household and 0 otherwise	+ -	-

(Contd...)

Table 2 *(Contd...)*

Variables Notation	Description	Definition	Panel Data Probit Model (Expected Sign)	Panel Data FGLS Regression Analysis (Expected Sign)
NBULL	Number of bullocks	Number of bullocks		
PERIOD_D	Period dummy	Taken value 1 if year > 2000 and 0 otherwise		
V1, V2, V3, V4, V5	Village dummies	Aurepalle considered as reference category, Thus V1=1 for Dokur, 0 otherwise; V2=1 for Kalman, 0 otherwise; V3=1 for Kanzara, 0 otherwise; V4=1 for Kinkhed, 0 otherwise and V5=1 for Shirapur, 0 otherwise		
Ui	Error term	Random disturbance term which is assumed to be normally distributed with zero mean		

$$Y = A + \beta_1 IRRR + \beta_2 AGEHH + \beta_3 EDUHH + \beta_4 DRATIO + \beta_5 NFIShare + \beta_6 LagKRAIN + \beta_7 LFARM\_D + \beta_8 NBULL + \beta_9 PERIOD\_D + \beta_{10} V1 + \beta_{11} V2 + \beta_{12} V3 + \beta_{13} V4 + \beta_{14} V5 + U_i \quad .....(1)$$

Factors influencing rented in area by the tenant households and their relative contribution was estimated using a Panel Data Feasible Generalised Least Square (FGLS) regression as in Equation (2). Expected sign and definition of the variables are given in Table 2.

$$Y = A + \beta_1 IRRR + \beta_2 AGEHH + \beta_3 EDUHH + \beta_4 AGWorker + \beta_5 NFIShare + \beta_6 LagKRAIN + \beta_7 LFARM\_D + \beta_8 NBULL + \beta_9 PERIOD\_D + \beta_{10} V1 + \beta_{11} V2 + \beta_{12} V3 + \beta_{13} V4 + \beta_{14} V5 + U_i \quad .....(2)$$

Extent and Determinants of Tenancy

Basic Characteristics of the Sample Households: As mentioned earlier, the study villages represent three different agro-climatic zones in peninsular semi-arid tropical India. Aurepalle and Dokur have erratic rainfall, red

soils with heterogeneous soil quality. On the other hand, Shirapur and Kalman have deep black soils in lowlands and shallow lighter soils in uplands. Rainfall is erratic in Shirapur and Kalman. In case of Kanzara and Kinkhed, soils are black and of homogeneous quality, and rainfall is assured (Jodha, Asokan and Ryan, 1977; Walker and Ryan, 1990). In the mid-seventies and early eighties, there were some dug wells in Solapur village and limited irrigation facilities in Akola village. At that time, irrigation and agricultural intensification in Mahabubnagar villages were around dug wells and tanks. In the absence of irrigation facilities and due to unassured rainfall, Solapur farmers faced frequent crop failures in the 1970s and 1980s. Expansion of canal irrigation and open well irrigation in the 1990s has reduced uncertainty and crop damage to the Shirapur farmers in recent years. Akola village experiences relatively assured rainfall situation. In recent years, they are also having irrigation facilities from canal and open well. Lack of water in the ponds creates a problem to the Dokur farmers particularly during the time of persistent drought. In the mid-1970s, major crops grown by Mahabubnagar farmers in the Kharif, or rainy season were sorghum, castor, pearl millet, paddy (rice), pigeonpea and groundnut. In the Rabi or dry season they grew paddy, groundnut, safflower and Rabi sorghum. For Solapur farmers, major growing season was Rabi (post-rainy) and they cultivated sorghum, pigeonpea and minor pulses. Akola farmers used to grow cotton, sorghum, mung bean and pigeonpea in the Kharif season and wheat in Rabi season. Cropping pattern has changed in all the study villages over time. In recent years (2009-2011), Mahabubnagar farmers are growing paddy, cotton, castor, Kharif sorghum, groundnut and sunflower, whereas Solapur farmers are growing Kharif pigeonpea, onion, Rabi sorghum and sugarcane. Akola farmers cultivate soybean, cotton, pigeonpea and sorghum in Kharif season and wheat and chickpea in Rabi season.

Table 3: Basic Characteristics of the Sample Households: 1975-77 and 2009-11

Characteristics	Aurepalle		Dokur		Kanzara		Kinkhed		Kalman		Shirapur	
	1975-77	2009-11	1975-77	2009-11	1975-77	2009-11	1975-77	2009-11	1975-77	2009-11	1975-77	2009-11
Household size (Number)	5.78	3.85	5.35	4.63	6.21	5.04	5.25	5.36	6.23	4.99	6.70	4.90
Average age of household head (Years)	51	50	47	47	42	47	42	49	44	53	47	48
Household head's average schooling years	1.35	2.32	1.09	3.25	2.71	6.84	4.55	7.22	2.58	4.26	2.29	5.11
Per household own land (Ha)	2.86	1.40	1.68	1.54	4.12	2.03	4.22	2.04	4.74	2.39	3.56	1.63
Per household rented out land (Ha)	0.00	0.29	0.00	0.10	0.03	0.29	0.00	0.64	0.02	0.20	0.00	0.03
Per household rented in land (Ha)	0.04	0.50	0.13	0.31	0.23	0.64	0.28	0.25	0.85	0.33	0.67	0.10
Per household operational holding (Ha)	2.90	1.90	1.81	1.85	4.35	2.67	4.49	2.29	5.59	2.71	4.24	1.73
Dependency ratio	0.50	0.28	0.25	0.35	0.68	0.35	0.63	0.39	0.53	0.36	0.67	0.50
% of female-headed households	8.33	15.38	25.00	19.04	9.16	1.61	0.00	9.09	5	5.82	9.16	11.07
Irrigable area (%)	12.05	26.24	53.82	70.80	1.09	70.92	0.78	46.12	8.69	32.94	9.19	77.15
Number of agricultural workers per household	1.24	0.63	1.31	1.27	1.6	1.52	1.77	1.36	1.56	0.92	1.67	0.76
Per capita income (USD)	56	744	79	697	84	632	79	456	62	570	101	990

Note: 1975-77 indicates 1975-76 and 1977-78 and 2009-11 indicates 2009 -10 and 2011-12
Source: Authors' calculation based on VLS-VDS database.

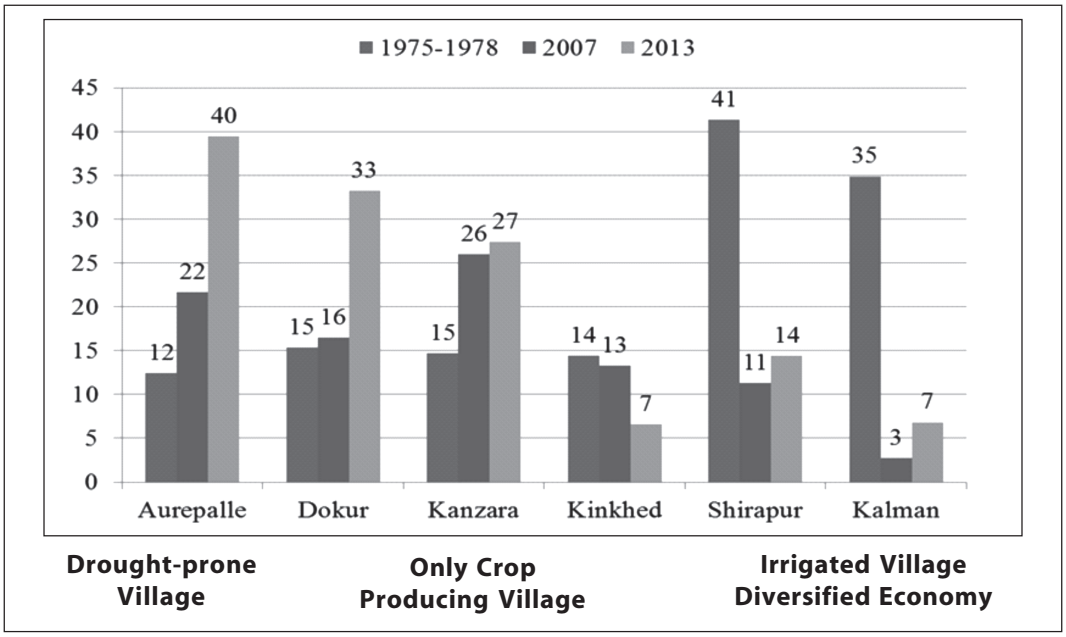
Basic characteristics of the sample households in the mid-seventies (1975-76 and 1977-78) and recent years (2009-10 and 2011-12) are reported in Table 3. Due to preference for less children and split of joint families to nuclear families, household size has reduced from six in the mid-seventies to five in recent years except in Kinkhed. In this village, it was stagnant at about 5.3. Operational holding of the households has decreased in all villages except Dokur which was stagnant at 1.8 ha. Average age of the head of household varied between 42 to 53 years. Over the last four decades, average years of schooling of the household head increased from one to four years. Dependency ratio has decreased in all the villages except Dokur (slight increase) indicating that now there are more bread earners than bread eaters in the family. Percentage of irrigable area has increased. In the mid-seventies, irrigable land area ranged between 0.8 and 12.1 per cent in the study villages, except in Dokur where irrigable area was about 53 per cent. Availability of water from a big pond was the source of irrigation in Dokur. Between mid-seventies and recent years, per capita household income increased by 5.8 to 13.3 times. Highest income increase was in Aurepalle (from USD 56 to USD 744) and lowest income increase was in Kinkhed (from USD 79 to USD 456). Income of all households is reported in nominal dollars which are computed using exchange rate for rupees and dollars prevailed in the respective years.

Trends in Tenancy over Time: What has happened to the tenancy situation over time? Has it increased or decreased? A comparative analysis of census data collected from all households in the study villages in the mid-seventies (1975-76 and 1978-79) and recent years (2007-08 and 2013-14) revealed that reverse tenancy has increased in three villages – Aurepalle, Dokur and Kanzara (Figure 1). Two of these villages (Aurepalle and Dokur) are more prone to production risks due to frequent droughts. These two villages are also near to the rapidly growing Hyderabad city and nearby district town Mahabubnagar. On the other hand, Kanzara village economy is mostly crop agriculture. There is a lack of diversified income opportunities in these three villages. In addition, small and functionally landless farmers do not have bullocks to complete critical farming activities. Thus, production risks accompanied by lack of economic viability for households to earn adequately in the village and lack of access to critical inputs have forced the poorer households to rent out their lands to the large landholding households.

Our analysis also revealed that tenancy as well as reverse tenancy has reduced during the same period in three other villages (Kinkhed, Shirapur and Kalman). Why the opposite scenario was observed in these villages? These three villages have benefited from the introduction of irrigation through canals and/ or drip and sprinkler irrigation. Thus, production risks were reduced. Shirapur and Kalman villagers also benefited through

diversified economic growth which helped to increase household income. Many households are now part-time farmers. They are able to engage in activities other than farming. Therefore, we can conclude that spread of reverse tenancy is linked with lack of access to critical production inputs (such as bullocks/ tractors), production risks, lack of viable employment and income opportunities within the village for small land holder farmers and functionally landless households. These are explained in detail in subsequent sections.

Figure 1: Trends in Extent of Tenancy in the Study Villages, 1975-1978, 2007-08 and 2013-14.



Source: For 1975-1978, Jodha (1984); for other years, authors' calculation based on VDSA village census data.

Table 4: Share of Different Farm Size Groups in Tenancy Land Area in Study Villages: 1975-76 to 2013-14

Village	Area rented in (%)				Area rented out (%)			
	Landless*	Small	Medium	Large	Landless*	Small	Medium	Large
				1975-76 and 1977-78				
Aurepalle	NA	27	4	69	NA	42	16	42
Dokur	NA	17	41	42	NA	22	59	19
Kanzara	NA	34	16	50	NA	22	34	44
Kinkhed	NA	56	30	14	NA	31	27	42
Kalman	NA	39	48	13	NA	59	30	11
Shirapur	NA	26	17	57	NA	19	41	40
				2007-08				
Aurepalle	0	1	22	77	89	7	1	4
Dokur	0	1	13	86	54	7	21	18
Kanzara	0	10	46	44	81	2	13	4
Kinkhed	0	17	38	46	72	16	9	4
Kalman	0	24	28	48	84	10	7	0
Shirapur	0	7	51	42	31	55	12	3
				2013-14				
Aurepalle	0	1	18	81	79	3	4	14
Dokur	0	2	9	89	71	7	7	16
Kanzara	0	16	36	48	92	2	0	6
Kinkhed	0	30	70	0	19	22	60	0
Kalman	0	20	34	46	88	12	0	0
Shirapur	0	10	24	67	84	0	16	0

Note: * Functionally landless category (Owning land up to 0.50 ha) was included in the small farm size category by Jodha (1984) for 1975-1978.

Source: Jodha (1984), Table 3 for 1975-1978; Authors' calculation using VDSA household census data.

It is important to know who rents in land. Results of our analysis of Census data are presented in Table 4. Contrary to the conventional belief that "tenants" are invariably small farmers or landless labourers being exploited by landlords with large landholdings, Table 4 reveals that large farmers leased in and small farmers leased out most of land under tenancy. In the seventies, in four out of the six study villages, large farmers had the largest share (42 to 69 per cent) of total land as leased in. Only in one village (Kinkhed) small farmers received the largest share of leased in land. On the other hand, of the total land leased out, large farmers received the largest share in three villages. In fact, the bulk of the land leased out belonged to small and medium-scale farmers (Jodha, 1984). Similar situation existed in recent years. In 2007-08, large farm size groups had the highest share in rented in area in two villages (77 per cent in Aurepalle and 86 per cent in Dokur) and high share in rest of the villages (48 per cent in Kalman, 46 per cent in Kinkhed,44 per cent in Kanzara and 42 per cent in Shirapur). None of the functionally landless households in any of the study villages were tenants in recent years. In 2013-14, large farm size group of households were the dominant tenant in all the study villages except in Kinkhed. In 2013-14, large farmers had a share of 81 per cent of the total rented in area in Aurepalle, 89 per cent in Dokur, 67 per cent in Shirapur, 48 per cent in Kanzara and 46 per cent in Kalman. On the other hand, in Kinkhed 70 per cent of the total rented in area were under the medium farm size categories.

Our in-depth investigation in this study is based on the sample households who are part of the VDSA regular household surveys. Amongst them, who had lease out land? In the mid-seventies, not a single sample household of the large landholding category leased out their land. All leased out lands in the mid-seventies amongst the sample households were from small farm size category in Dokur. On the other hand, all leased out lands in Kanzara and Kalman were from medium farm size holders. None of the sample households of two villages (Aurepalle and Dokur) leased out their land in the mid-seventies. In recent years (2009-10 and 2011-12), 86 per cent of the leased out land in Shirapur was from small farm size holding groups. About sixty per cent of the land leased out in Aurepalle and Kalman was from the small farm holders. In case of Dokur, 46 per cent of the total leased out land was from small farm size category followed by medium farm size category (33 per cent). In Kanzara and Kinkhed, more than 70 per cent of the leased out land was from small and medium size of holdings. In recent years, some leased out land were from large landholding households except in one village (Kalman) where none of the large land-owning households rented out their land. Share of land leased out by the large farmers to the total leased out land was highest in Kinkhed (32 per cent), followed by Kanzara (29 per cent), Aurepalle (25 per cent), Dokur (21 per cent) and Shirapur (14 per cent). Many of these large landholding households are engaged in non-farm activities which contribute substantially to their household income.

Table 5: Distribution of Tenant Households: 1975-76 and1977-78 & 2009-10 and 2011-12

Village Name	1975-76 & 1977-78				2009-10 & 2011-12			
	Small	Medium	Large	All	Small	Medium	Large	All
Aurepalle	60.00	40.00	0.00	100.00	23.22	41.07	35.71	100.00
Dokur	0.00	62.50	37.50	100.00	0.00	18.18	81.82	100.00
Kanzara	16.66	33.33	50.00	100.00	45.46	23.64	30.91	100.00
Kinkhed	30.77	46.15	23.08	100.00	70.37	18.52	11.11	100.00
Kalman	41.67	20.83	37.50	100.00	47.06	17.65	35.29	100.00
Shirapur	40.00	26.67	33.33	100.00	92.85	7.14	0.00	100.00

Note: Labour households who participated in tenancy transactions are included with small farmers.
Source: Authors' calculation based on VLS-VDS database.

Who had lease in land? Among the sample households, large farm size category had rented in lands from small and medium farmers in recent years as well as in the seventies (Table 5). In recent years, large farmers in Dokur have rented in about 82 per cent of the total lands under tenancy. About one-third of the tenant households in Aurepalle, Kanzara and Kalman have large farms. It may be noted here that large farmers in Aurepalle did not lease in land in the mid-seventies. Thus, our analysis revealed existence of reverse tenancy in the dryland agriculture and increased prevalence in recent years. Contrary to the findings of recent literature on irrigated agriculture (Goswami et al. 2013, Vijay et al. 2013 and Ahmed 2011) where tenancy (renting in by small and functionally landless households from large land holder farms) contributed towards adjustment in land resources in the society, we have found expansion of reverse tenancy in the dryland agriculture in southern India. We have explored the causes of such reverse tenancy in the subsequent analysis.

Causes of Reverse Tenancy in Dry land Agriculture: An analysis of characteristics of tenant households Vs leased out/ rented out households showed that average land ownership of the tenant households (1.04 ha) was higher than that of households who have leased out/ shared out their land (0.44 ha) in the mid-seventies (Table 6). During the same time, per capita income of tenant households was 130 dollars as against 51 dollars of the households who rented out their land. This clearly indicates the case of reverse tenancy in the mid-seventies. What is happening now? Per capita land ownership of tenant households was 0.39 ha compared to 0.63 ha for the households who have leased out. Average per capita income of the tenant household during 2009-10 and 2011-12 was 836 dollars against 574 dollars for the households who leased out their land.

Table 6: Comparison of Characteristics of the Tenant Households Vs. Leased Out/ Shared out Households, 1975-76 and 1977-78 & 2009-10 and 2011-12

Indicators	Tenant Households		Leased out/ Shared out Households	
	1975-76 1977-78	2009-10 and 2011-12	1975-76 and 1977-78	2009-10 and 2011-12
Household size	6.65	5.20	5.67	4.23
Dependency ratio (%)	65.00	38.00	54.44	34.30
Age of head (Years)	44.02	47.81	36.50	51.80
Education of head (Years)	2.36	4.86	1.67	5.18
Per capita land ownership (Hectares)	1.04	0.39	0.44	0.63
Per capita farm income (USD)	107	588	27	172
Per capita non-farm income (USD)	23	248	24	402
Per capita total income (USD)	130	836	51	574

Source: Authors' calculation, based on VLS-VDS database.

Table 7: Distribution of Bullock Ownership Among 'Landlord' (Rented out) and Tenant Households: 1975-76 to 2011-12

Year	'Landlord' (Rented-out) Households				Tenant Households			
	No Bullock/s	1 to 2 Bullock/s	3 to 4 Bullocks	5 and more Bullocks	No Bullock/s	1 to 2 Bullock/s	3 to 4 Bullocks	5 and more Bullocks
1975-76	3 (100)	0 (0)	0 (0)	0 (0)	1 (4)	17 (65)	5 (19)	3 (12)
1976-77	0 (0)	1 (100)	0 (0)	0 (0)	1 (4)	17 (65)	5 (19)	3 (12)
1977-78	1 (50)	1 (50)	0 (0)	0 (0)	3 (9)	20 (63)	6 (19)	3 (9)
1978-79	3 (100)	0 (0)	0 (0)	0 (0)	6 (30)	9 (45)	4 (20)	1 (5)
1979-80	-	-	-	-	3 (14)	16 (76)	2 (10)	0 (0)
1983-84	-	-	-	-	25 (64)	10 (26)	2 (5)	2 (5)
2005-06	49 (91)	4 (7)	1 (2)	0 (0)	33 (36)	52 (57)	6 (7)	0 (0)
2006-07	57 (89)	7 (11)	0 (0)	0 (0)	36 (39)	51 (55)	5 (5)	1 (1)
2007-08	54 (89)	6 (10)	0 (0)	1 (2)	29 (35)	47 (56)	8 (10)	0 (0)

(Contd...)

Table 7 *(Contd...)*

Year	'Landlord' (Rented-out) Households				Tenant Households			
	No Bullock/s	1 to 2 Bullock/s	3 to 4 Bullocks	5 and more Bullocks	No Bullock/s	1 to 2 Bullock/s	3 to 4 Bullock	5 and more Bullocks
2008-09	60 (88)	7 (10)	1 (1)	0 (0)	44 (40)	59 (54)	7 (6)	0 (0)
2009-10	33 (89)	3 (8)	1 (3)	0 (0)	30 (46)	28 (43)	7 (11)	0 (0)
2010-11	49 (89)	6 (11)	0 (0)	0 (0)	26 (39)	32 (48)	7 (11)	1 (2)
2011-12	53 (91)	5 (9)	0 (0)	0 (0)	31 (47)	29 (44)	6 (9)	0 (0)

Note: Values in the parentheses indicate percentage of the total.

Source: Authors' calculation, based on VLS-VDS database.

Distribution of bullock ownership among landlord (rented out) households and tenant households is presented in Table 7. Lack of bullock ownership was common among the so called 'landlord' households who have rented out their lands. Most of the households (about 90 per cent) who have rented out their land had no bullocks and about 10 per cent households have up to two bullocks.This condition was more or less same throughout the study period (mid-seventies to the recent years). On the other hand, most of the tenant households (more than 90 per cent in the seventies and about 50 per cent in recent years) owned at least one pair of bullocks.Three to four bullocks were owned by about 20 per cent of the tenant households in the seventies while approximately 10 per cent of the tenant households in recent years. Five or more bullocks were owned by about 10 per cent of the tenant households in the seventies which is very rare in recent years.Thus, it appears that bullock ownership was an important factor for land cultivation.

Non-existence of a market for bullock hire services in the seventies are well documented in the literature and the underlying reasons for the absence of such a market have been lucidly summarised in Bliss and Stern (1981). The situation has not changed much in the study villages even in recent years.Thus, a household that owns land but has insufficient bullock labour to cultivate may lease out a part of its land, since in the absence of a market for bullock hiring it cannot hire in additional draft animal services (Pant, 1981). In recent years, mechanisation of tillage and threshing activities has reduced dependence on bullocks for land cultivation to some extent. However, there are some critical functions such as land levelling and harrowing for which farmers have to depend on bullocks.

Table 8: Distribution of Total New Land Transfers by Type of Land Transactions in Six Study Villages, 1975-76 and 1977-78 & 2009-10 and 2011-12

Village	1975-76 and1977-78				2009-10 and 2011-12		
	Transferred Area (Ha)*	Percentage of Transferred Area Via:			Transferred Area (Ha)*	Percentage of Transferred Area Via:	
		Tenancy	Sale/ Purchase	Others		Tenancy	Sale/ Purchase
Aurepalle	64.3 (14)	89	10	1	111.92 (28)	93	7
Dokur	80.5 (20)	77	20	3	65.67 (24)	69	31
Kanzara	117.6 (16)	92	0	8	126.52 (25)	94	6
Kinkhed	87.7 (15)	96	2	2	48.62 (14)	77	23
Kalman	257 (36)	97	1	2	72.62 (14)	85	15
Shirapur	416 (46)	90	6	4	48.85 (10)	55	45

Note: * Figures in parentheses indicate the transferred land as percentage to total operated area of sample households.

Source: Jodha (1981) for 1975-78 and VLS-VDS database for 2009-11.

Studies (Bardhan and Rudra, 1978; Jodha, 1981) have argued that agricultural land market in India is largely a tenancy market. We have investigated the issue in recent years. Table 8 presents a comparison of the land transfers occurred in the mid-seventies (1975-78) and in recent years (2009-10 and 2011-12) via leasing-in, leasing-out, return of land due to termination of earlier leases, sale, purchase, gift, succession, property division, etc., in which at least one party was a VLS-panel respondent. In the seventies, in our study villages, every year, 14 to 46 per cent of the operated area of the sample households was temporarily or permanently changing hands through different types of land transfers. Furthermore, 77 to 97 per cent of new land transfers were due to tenancy transactions only (Jodha, 1981). In recent years (2009-10 and 2011-12), 10 to 28 per cent of the operated area of the sample households changed hands temporarily or permanently. Majority of the transfers were in the form of tenancy in all the study villages. However, sale / purchase was high in Shirapur (45 per cent), Dokur (31 per cent)

and Kinkhed (23 per cent). In all the villages except Aurepalle, share of purchase and sale to the total transfer has increased. This indicates that rigidity in rural land market has decreased in recent years than four decades ago.

Table 9: Adjustment of Resources Through Land Tenancy: 1975-76 to 2011-12

Year	Availability of Land (Ha) before and after Land Transactions (Tenancy)							
	Per Bullock				Per Agricultural Worker			
	Tenant		Landlord (Rented-out) Household		Tenant		Landlord (Rented-out) Household	
	After	Before	After	Before	After	Before	After	Before
1975-76	1.66	2.36	0.00	0.00	14.24	20.23	4.11	1.42
1976-77	2.54	3.86	1.82	1.62	34.00	51.70	0.00	0.00
1977-78	2.86	4.35	4.17	2.43	9.76	14.86	0.00	0.00
1978-79	3.33	4.67	0.00	0.00	7.18	10.08	0.00	0.00
1979-80	3.03	4.49	-	-	4.92	7.29	-	-
1983-84	5.52	8.60	-	-	8.48	13.23	-	-
2005-06	1.27	2.86	13.71	4.20	3.38	7.58	3.05	0.93
2006-07	1.76	3.38	11.14	3.62	6.94	13.28	2.63	0.86
2007-08	1.65	3.20	9.42	3.15	7.53	14.59	3.68	1.23
2008-09	1.63	3.27	11.08	3.99	4.43	8.90	3.92	1.41
2009-10	1.80	3.67	13.67	4.98	3.86	7.86	3.64	1.33
2010-11	1.65	3.17	12.13	4.89	4.73	9.07	3.51	1.42
2011-12	1.55	3.16	15.16	6.55	2.84	5.78	3.41	1.47

Source: Authors' calculation based on VLS-VDS database.

Adjustment of bullock and agricultural workers before and after land transactions through tenancy market is presented in Table 9. It is expected that cultivated area of the rented out household before renting out will be higher than after renting out. On the other hand, for a tenant household cultivated area per bullock will increase after he / she has taken land through tenancy. It was observed that the so called landlord (Rented out household) who rented out the land in four out of six study years in the seventies and early eighties had no bullock. Therefore, they had no other choice than renting out the land. In

those days bullocks were critical for tillage and threshing operations. Custom-hiring was very limited. In recent years, tillage and threshing operations were done by machines hired on a payment basis. Some critical operations such as laddering and hoeing were done through bullocks. Custom-hiring for bullocks are not available. Tenants have been able to increase their cultivated area per bullock through rent in land. In the seventies, cultivated area of the tenants per bullock was about 3.0 hectares before renting in which increased to about 4.5 hectare after renting in. In the 2000s, before and after transactions, area under per bullock per tenant farmer increased from 1.6 to 3.2 hectares.

On the other hand, cultivable area per bullock for the landlords decreased from about 12 to 5 hectares. Thus, it can be argued that farmers are adjusting the full utilisation of scarce bullock resources through tenancy. In case of agricultural workers, such type of adjustments are absent. It is mainly because labour market is more dynamic. Workers have opportunities to be employed in farm as well as in non-farm activities. Road connectivity has also increased their mobility to work outside the village and in the nearby towns. Therefore, we can say that lack of access to critical input such as bullock is also responsible for renting out by small farmers. Similar observations were made by Jodha (1984) who reported that 6 and 21 per cent of tenancy transactions could be regarded as "interlinked factor market operations". It may be recalled that interlinking of factor markets in Indian agriculture was an observation also made by other studies (Bharadwaj, 1974; Bardhan and Rudra, 1978).

Operational Modalities in Tenancy: Two types of tenancy (share-renting and cash-renting) were observed among the sample households. In the cash-renting mode, the tenants pay a certain amount of money for using the land for a period of one year for crop production, usually before starting of the season. Cost of all inputs is borne by the tenant and he/she gets all outputs grown on that land. In case of share-renting method, tenant shares a certain proportion of output with the land owner. The land owner may or may not share some of the input costs which depend on the negotiation between the land owner and the tenant farmer. Analysis of the extent and pattern of tenancy contract has revealed that sharecropping has increased in all the study villages in recent years. Cash-renting was the dominant mode of tenancy (in 85 per cent cases) in the seventies which has reduced to 61 per cent in recent years in some villages. In the mid-seventies all rented in land in Aurepalle and Shirapur was under cash-rent system. More than 90 per cent of the rented in land in Dokur and Kanzara was under cash-rent system. About two-thirds of the rented in land in Kinkhed and three-fourths of the rented in land in Kalman was under cash-rent system. In recent years, dominant mode of tenancy in Shirapur (79 per cent), Kinkhed (67 per cent) and Kalman (100 per cent) is share-renting. Share of rented land under share tenancy has also increased in three other villages (Aurepalle, Dokur and Kanzara). About 13 per

cent of the land under tenancy in Aurepalle was through sharecropping basis while it was 29 per cent in Dokur and 16 per cent in Kanzara.

Determinants of Tenancy: Who is likely to be a tenant? To answer this question, we have carried out the Panel Data Probit Model described in Equation (1) Dependent variable was tenancy status of the household (Tenant=1 and 0 otherwise). Estimated parameters revealed that likelihood of a household to be a tenant is positively linked with bullock ownership and household to be in the large farm category (Table 10). To overcome the multi-collinearity problem, we have used these two variables (NBULL and LFARM_D) in alternate specifications. Both indicate the presence of reverse tenancy among sample farmers. Likelihood of household with similar resources in Kanzara to be a tenant is higher than in Aurepalle. Same is true in case of the dummy for second period (2005-06 and 2011-12). On the other hand, it is negatively related with age and education of household head, and dependence on non-farm income and village dummies for Kalman and Shirapur.

Table 10: Results of the Panel Probit Regression of the Leasing Decisions of the Sample Households

Variables	Period 1 (1975-79 and 1983)		Period 2 (2005-2011)		All Years	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
A	-1.4749***	-1.6753***	-0.6610*	-0.7089**	-0.8190***	-1.0165***
IRRR	0.5173*	0.4740	-0.0984	-0.1310	-0.0480	-0.0663
AGEHH	-0.0098	-0.0116*	-0.0087*	-0.0108**	-0.0116***	-0.0118***
EDUHH	-0.0351	-0.0686***	-0.0333*	-0.0300*	-0.0271**	-0.0305***
DRATIO	0.0905	0.0671	0.0056	0.0172	-0.0048	-0.0093
NFIShare	-1.0770***	-0.8533***	-1.0947***	-0.9348***	-0.9576***	-0.8349***
LagKRAIN ('00' mm)	-0.0079	-0.0283	0.0126	0.0181	-0.0117	-0.0155
LFARM_D	0.0264		0.8359***		0.6710***	
NBULL		0.1985***		0.4451***		0.2897***
PERIOD_D					0.3931***	0.5479***
V1	0.2565	0.4793	0.0221	0.2303	-0.0094	0.1548

(Contd...)

Table 10 *(Contd...)*

Variables	Period 1 (1975-79 and 1983)		Period 2 (2005-2011)		All Years	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
V2	0.9267***	1.1620***	-1.2301***	-1.3624***	-0.5439***	-0.5566***
V3	1.1555***	1.2761***	0.4946**	0.2404	0.5203***	0.4285**
V4	0.5327	0.9014***	-0.2795	-0.3626	-0.1416	-0.1000
V5	1.2326***	1.4241***	-1.1468***	-1.1449***	-0.5520***	-0.5228***
Log likelihood	-367.201	-355.210	-1080.292	-1058.350	-1554.295	-1526.651
Prob> chi2	0.000	0.000	0.000	0.000	0.000	0.000
Number of observations	1195	1195	3574	3574	4769	4769

Note: ***=1%, **=5% and *=10% level of significance.

Source: Authors' calculation based on VLS-VDS database.

In the seventies, reverse tenancy was linked with the interlinked factor market (Jodha, 1981). With the spread of formal credit, availability of custom-hiring of machines, free availability of seeds in the market, easy access to the market through better connectivity and change in cropping patterns towards crops which have better marketability and relatively less fluctuation in prices have eased the situation to a large extent. With increased scarcity of labour, it was expected that reverse tenancy would have been abolished. However, some constraining factors have been contributing to the other way. For example, bullocks have been found statistically significant at one per cent level of significance both in the seventies and in recent years. While land preparation activities have largely been mechanised and no bullocks are used for threshing purposes, bullocks are still critical for land levelling and for intercultural operations such as hoeing and use of bullock drawn cultivators. Bullocks are also rare and custom-hiring is very limited. Usually large farmers own the bullocks. This is one important reason for existence of reverse tenancy among the sample households.

What are the factors determining the extent of tenancy? To answer this question, we have carried out a Feasible Generalised Least Square Regression (FGLS) analysis (Table 11). The analysis has been carried out for three different time periods: Period-1 (1975-1979 and 1983), Period-2 (2005-2011) and Overall Period (all study years). Rented in area (ha) was the dependent variable. In our descriptive analysis, we have seen the existence of reverse tenancy and critical role of bullock ownership in the tenancy market. For econometrically testing the importance of

these factors, we have included two variables. Ownership of bullock was directly linked with land ownership. Correlation coefficient for these two variables was 0.50 in the first period, 0.47 in the second period and 0.49 in the overall period. Because of high correlation there will be multi-collinearity problem if we use both the variables in the same equation. Therefore, we have used the variables (NBULL and LFARM_D) in alternate specification. In practical purpose both will tell about the existence of reverse tenancy if the sign of the estimated parameter is positive and significant.

Table 11: Household Level Determinants of Land Tenancy: A Panel FGLS Regression Analysis

Variables	Dependent variable= rented in land in hectare					
	Period 1 (1975-79 and 1983)		Period 2 (2005-2011)		All Years	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
A	0.259	0.471*	0.634***	0.739***	0.498***	0.633***
IRRR	0.1613	0.2901	-0.1497***	-0.1063***	-0.0948**	-0.0484
AGEHH	-0.0043	-0.0040	-0.0038***	-0.0032***	-0.0039***	-0.0034***
EDUHH	-0.0476***	-0.0354***	-0.0074*	-0.0074*	-0.0150***	-0.0123***
AG Worker	0.0669*	0.0537	-0.0554***	-0.0678***	0.0039	0.0011
NFI Share	-0.2478*	-0.4194***	-0.2904***	-0.4211***	-0.2830***	-0.3892***
LagKRAIN ('00' mm)	-0.0171	-0.0092	0.0090	0.0048	-0.0117	-0.0104
LFARM_D		0.1610		0.5425***		0.4717***
NBULL	0.1518***		0.3140***		0.2227***	
PERIOD_D					0.1591***	0.0749*
V1	0.0236	-0.1485	0.1128**	-0.0014	0.0553	-0.0547
V2	0.7647***	0.6211***	-0.1537***	-0.0816	0.0934*	0.1056**
V3	0.3715***	0.3228**	0.0663	0.2019***	0.1732***	0.2250***
V4	0.3193**	0.1202	-0.2117***	-0.1753***	-0.0658	-0.1097*
V5	0.8075***	0.7005***	-0.1973***	-0.1974***	0.0136	-0.0158

(Contd...)

Table 11 *(Contd...)*

Variables	Dependent variable= rented in land in hectare					
	Period 1 (1975-79 and 1983)		Period 2 (2005-2011)		All Years	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
Log likelihood	-2103.36	-2116.08	-4816.53	-4902.05	-7201.89	-7257.52
Prob> chi2	0.000	0.000	0.000	0.000	0.000	0.000
Number of observations	1195	1195	3574	3574	4769	4769

Note: ***=1%, **=5% and *=10% level of significance.

Source: Authors' calculation based on VLS-VDS database.

During the overall period, number of bullocks owned by the household was significant and positive at 1 per cent level of significance. Estimated parameter value (0.22) indicates that an additional bullock will provide a scope for renting in 0.22 ha of land by the tenant. The estimated parameter for dummy for large farm (0.47) was positive and statistically significant at 1 per cent level of significance. This indicates that large farmers have 0.47 ha more area under rented in compared to other tenants. Village dummies for Kalman and Kanzara villages were also positive and significant indicating that these two villages have higher level of tenancy compared to Aurepalle village.

There was negative relationship between rented in area and age & education of the household head indicating that educated and elderly people participated less in the tenancy market (Table 11). It is quite natural that with education there are more opportunities to work than without education. On the other hand, aged people are less interested to take land through tenancy. Similarly, share of non-farm income had negative relation with area under rented in. This indicates higher the share of non-farm income to the total income lower the area under rented in. Households engaged in non-farm activities and relying mostly on non-farm income for their livelihood prefer to expand their participation in non-farm rather than participating in tenancy. Ratio of irrigable area was also negative and significant indicating that households having irrigated land have better scope to utilise their resource. It may be recalled here that studies (Walker and Ryan, 1990) have treated one hectare of irrigated area can be equivalent to 4 ha of dryland. Period dummy for recent years was positive and significant indicating that households with similar kind of characteristics have rented in more in Period 2 (2005 to 2011) than in the seventies. Descriptive analysis has also revealed the same.

We have observed similar kind of relationship between tenancy and explanatory variables except for the village dummy for Shirapur and Kalman. In the seventies (Period 1) it was positive and in the second period it was negative. These two villages face erratic rainfall and in period 1 there was no scope for irrigation in these villages. Major crop growing season was Rabi season rather than Kharif season which is the main season throughout India. Shirapur has been receiving canal irrigation since late 1990s. On the other hand, Kalman villagers have some micro-irrigation facilities; new crop varieties are less prone to water stress. Reduction in risks in crop production in the second period has resulted in reduction in tenancy in these villages. So the sign of the village dummies are quite consistent with the real world observation.

Tenancy and Crop Productivity

There are two schools of thought explaining the outcome of tenancy. These are Marshallian Inefficiency theory and Cheungian (or "transactions costs") theory. The Marshallian view argued that sharecropping was inefficient because it assumed that enforcing the landlord's preferred level of effort was prohibitively costly. Therefore, the tenant will not invest on optimum level of inputs. On the other hand, the Cheungian (or "transactions costs") view argued that sharecropping was efficient because it assumed that the landlord could costlessly enforce his/her preferred level of effort (http://www.encyclopedia.com/topic/sharecropping.aspx). Review of studies (Otsuka and Hayami, 1988; Singh, 1989; Hayami and Otsuka, 1993; and Otsuka, 2007) on empirical literature on the efficiency of sharecropping tenancy showed that the evidence on systematic downward bias in input use and productivity are far from universal. Some recent studies (Venkateswarlu, 2003; Nasrin and Uddin, 2013; and Goswami and Bezbaruah, 2013) even tried to establish alternative conditions under which share tenancy can be no less efficient than owner-operated or fixed-rent contracts. Therefore, we have made an attempt to empirically investigate the situation where production environment is risky and uncertain and at the same time reverse tenancy is present among the sample households.

Tenancy and Input Use: A comparison of input use level in owner-operated land versus land under tenancy revealed that average use of fertiliser, organic manure and labour was higher in owned-land than in land under tenancy in the mid-70s (Table 12). Per hectare fertiliser use in own-land (175 kg) was 6 per cent higher than that of cash-rented in land and 27 per cent higher than that of share cropped land. Average use of organic manures in own-land was 133 per cent higher than that of cash-rented in land and 150 per cent higher than that of share-rented land. Per hectare labour use in own-land (162 days) was 142 per cent higher than that of cash-rented in land and 153 per cent higher than that of share-rented land. The situation has changed in recent years (2009-10 and 2011-12). Use of organic manure and labour was highest in the cash-rented land followed by owner operated and share-rented land. Use of all inputs (fertiliser, organic manure and labour) was lowest in share-

rented land. In cash-rented land, farmers' use of organic manure (5961 kg/ha) was 22 per cent higher than that of owner operated land. Similarly, labour use in cash-rented land (136 man-day/ha) was 8 per cent higher than that of owner operated land. In case of fertiliser use, highest use (279 kg/ha) was in owner operated land which was 3 per cent higher than cash-rented land and 6 per cent higher than share-rented land.

Table 12: Comparison of Input Use Level in Owner Operated Land Vs Land Under Tenancy

Input	1975-1977			2009-2011		
	Own Land	Cash Rental In	Share Crop In	Own Land	Cash Rental In	Share Crop In
Fertiliser (Kg/ha)	175	165	138	279	270	262
Organic material (Kg/ha)	12,370	5,315	4,942	4,877	5,961	3,647
Family Labour (Manday/ha)	74	32	34	60	69	44
Hired Labour (Manday/ha)	88	35	30	66	67	40

Source: Authors' calculation based on VLS-VDS database.

Tenancy and Agricultural Productivity: In the mid-seventies, productivity in own land was generally higher than that of cash-rented and share-rented land except for chickpea and wheat (Table 13). Productivity in the owner operated land was 12 to 172 per cent higher than that of cash-rented land for different crops except chickpea. Chickpea yield in the seventies was highest (237 kg/ha) in cash-rented land followed by own land (215 kg/ha) and share cropped land (124 kg/ha). Compared to the share-rented land, productivity in the owner operated land was 22 to 220 per cent higher for all crops except wheat. Yield of wheat in the share-rented land was highest (1660 kg/ha) in the mid-seventies followed by owner operated land (968 kg/ha) and cash-rented land (656 kg/ha). In recent years (2009-10 and 2011-12), productivity of chickpea, pearl millet, pigeonpea, and sorghum was higher in cash-rented land. Productivity was higher in owner operated land for other crops (cotton, paddy, sugarcane and wheat). Productivity of share-rented land was lower than that of owner operated land for all crops. Therefore, it cannot be concluded that owner operated or cash-rented land provided consistently higher yield.

Table 13: Tenancy and Productivity (Kg/Ha) of Selected Crops

Crop name	1975-76 and 1977-78			2009-10 and 2011-12		
	Own Land	Cash Rental In	Share Crop In	Own Land	Cash Rental In	Share Crop In
Chickpea	215	237	124	899	1243	759
Cotton	282	172	125	1178	917	1084
Paddy	2130	1906	1752	4701	4149	4299
Pearl millet	173	69	54	490	495	-
Pigeonpea	174	64	118	717	856	417
Sorghum	385	174	101	539	778	366
Soybean	-	-	-	1330	1188	1008
Sugarcane	20658	-	-	70859	-	51813
Wheat	968	656	1660	2637	2565	2192

Source: Authors' calculation based on VLS-VDS database.

Tenancy and Profitability: Profitability in crop cultivation is very important. Farmers tend to allocate more areas and inputs to those crops which have higher profitability. Profitability can be measured in different ways. We have used the concepts of returns to land, family labour and management. It is the difference between gross return and total cost for all inputs except family labour and land. Gross return was obtained through summing up of the value of the main product and the by-product. Total cost was obtained through adding of all costs for inputs (seed, fertiliser, irrigation, pesticide, hired labour). Costs of family labour and rental value of the land was not included. It allowed comparisons to be made over a long period of time involving several villages in a meaningful way. It is pertinent to mention here that rental market for land and opportunity costs for family labour is not exactly the same as that of hired labour, since many people are ready to work in their own land but unwilling to work as wage labourers due to social stigma.

In the seventies, per hectare returns to land, family labour and management in own land was generally higher than that of cash-rented and share-rented land except Dokur and Kanzara villages (Table 14). Profitability in the owner operated land was 172 to 286 per cent higher than that of cash-rented land for different villages except Dokur. In this village, highest profitability was on cash-rented land. Compared to the share-rented land, profitability in the owner operated land was 150 to 350 per cent higher for all villages except Dokur and Kanzara. In recent years, per hectare returns to land, family labour and

management was higher in owner operated land compared to cash-rented land for all villages. On an average, returns to owned land were 60 per cent higher than cash-rented land for all villages. In Kanzara, it was 57 per cent higher while it was 70 per cent higher in Kinkhed. On the other hand, it was 3 per cent higher in Aurepalle and 8 per cent higher in Dokur.

Table 14: Comparison of Net Returns and Returns to Land, Family Labour and Management per Hectare

Village Name	1975-76 and 1977/78			2009-10 and 2011-12		
	Own Land	Cash Rental In	Share Crop In	Own Land	Cash Rental In	Share Crop In
Returns to land, family labour and management (USD/ Ha)						
Aurepalle	48	17	-	368	358	698
Dokur	123	173	235	522	485	302
Kalman	43	24	12	320	-	159
Kanzara	63	29	71	610	388	448
Kinkhed	52	30	34	309	182	253
Shirapur	185	17	-	1313	-	568
All Villages	80	33	30	618	387	339
Net returns (USD/ Ha)						
Aurepalle	27	-1	-	94	85	39
Dokur	80	121	119	253	224	82
Kalman	31	17	6	127	-	-23
Kanzara	47	22	60	370	223	212
Kinkhed	35	13	21	153	49	68
Shirapur	172	11	-	812	-	92
All Villages	62	22	17	339	170	95

Source: Authors' calculation based on VLS-VDS database.

Per hectare net returns in own land was generally higher than that of cash-rented and share-rented land (Table 14). In the mid-seventies, per hectare net returns from owner operated land ranged between 27 dollars in Aurepalle and 172 dollars in Shirapur. During the same period, per hectare net returns from cash-rented land was in the range of 11 dollars (Shirapur) and 22 dollars (Kanzara) except two exceptions in Aurepalle (where net loss of 1 dollar per ha) and Dokur (where net return was 121 dollar per ha, higher than that of own land). In case of share-rented land per hectare net return varied between 6 dollars in Kalman and 119 dollars in Aurepalle. Net return from share-rented land was lower than that of owner operated land in all villages except in Aurepalle where it was higher than that of owner operated land. In recent years (2009-10 and 2011-12), farmers received per hectare net return between 94 dollars (in Aurepalle) and 812 dollars (in Shirapur). During this period, net return from cash-rented land ranged between 49 dollars (in Kinkhed) and 224 dollars (in Dokur). On the other hand, net returns from share-rented land varied between negative 23 dollars (net loss) in Kalman and 212 dollars in Kanzara.

Summary and Conclusions

Extent of tenancy has increased in recent years. Modalities for tenancy have changed across villages. Cash-rent has increased in Aurepalle, Dokur and Kanzara whereas sharecropping increased in Kinkhed, Kalman and Shirapur. We have documented the increase in reverse tenancy in the study villages. This is quite opposite from the recent literature which covers mostly irrigated agriculture.Increase in reverse tenancy in three villages (Aurepalle, Dokur and Kanzara) was linked with production risks along with lack of economic viability for households to earn adequately in the village and lack of access to critical inputs like bullocks. Many of the functionally landless and small households who have leased out their land are engaged in temporary migration and commuting to the nearby cities for work. Decrease in tenancy in three other villages (Shirapur, Kalman and Kinkhed) was associated with reduction in production risks (through introduction of irrigation facilities), livestock rearing and growth in non-farm economy. Panel Data Probit analysis revealed that likelihood of a household to be a tenant is positively linked with bullock ownership and household to be in the large farm category while age and education of the household head, and dependence on non-farm income had negative association. Determinants of extent of tenancy (rented in area) were measured through Panel Data Feasible Generalised Least Square (FGLS) regression analysis. Results indicate that an additional bullock will provide scope for renting-in 0.22 ha of land by the tenant. On the other hand, large farmers have 0.47 ha more area under rented in compared to other tenants. Educated and elderly people participated less in the tenancy market. Input use level, crop yield and profitability were generally higher in own land than that of rented-in land in the mid-seventies. In recent years, we observed mixed (inconclusive)

outcome for input use, crop yield and profitability. Reduction of production risks in Shirapur has not only reduced tenancy but also abolished reverse tenancy. Share tenancy has expanded more than the cash-renting system. Expansion of sharecropped tenancy can be viewed as a mechanism for sharing risks among the owners of land and tenant farmers. Reduction of reverse tenancy in dryland agriculture will require reduction in production risk either through drought-resistant crop varieties or through availability of supplementary irrigation accompanied by custom-hiring services for some critical inputs (for example, bullock for intercultural operations).

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