CHAPTER 1-1: INTRODUCTION: HEAVY AGRICULTURE AND LIGHT INDUSTRY IN SOUTH INDIAN VILLAGES

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The green revolution was introduced to the Indian subcontinent about thirty years ago in the wake of an influential report from the Ford Foundation, followed by a period of experimentation and planned diffusion and then two years of serious, generalised drought (Farmer, 1977; Vaidyanathan, 1994). Its features are well known and combined a mixture of market incentives, heavily regulated market provision and state-administered, non-market distribution. This process of *heavy agriculturalisation* required long-term state subsidies and co-ordinated planning. The transfer, adaptation and development of high yielding varieties of wheat and rice from Mexico and the Philippines to the plains of Punjab in the north and the rice deltas of the south-east required assured irrigation and consolidated plots large enough to take machinery; on top of which production credit, subsidised input prices, stable output prices and state-funded infrastructure (ranging from electricity and water to roads, market sites, research and development and extension) all had to be developed.

Twenty out of some 300 Indian districts were selected for intensive agriculture, along lines later copied, with lags, idiosyncrasies and less abundant resources, in less

advantaged regions. As a result, while the area cropped in India grew by 8 per cent between 1960 and 1987, yields increased by 51 per cent and total production rose (by 81 per cent) (Vaidyanathan, op. cit., Table 2, p. 68).

But by the mid-1990s it had become evident that this green revolution had faltered. While foodgrains production grew at 3.5 per cent per annum during the 1980s, it had decelerated to 1.5 per cent from 1990-6 despite a run of very good, well distributed rainfall. This was lower than the rate of population growth (although that too is decelerating). The policy environment is a more likely candidate than is the physical environment to account for this recent mediocre performance, although the physical environment is continually being modified by policy. [1] In particular, the terms and conditions of fertiliser provision affect soil quality, and those of electricity affect the availability of irrigation water. It was in precisely these policy areas that the new era of liberalisation was expected to define itself. The Indian state was poised to privatise state electricity boards and to remove the considerable subsidies for agricultural electrification. Meanwhile subsidies on fertiliser had been partially removed, and its price structure had been reorganised. Rural banking was to be deregulated and concessional credit more tightly targeted. The price bias against agricultural products, particularly the quiet taxation of rice, was being rectified, with increases in the prices at which food was purchased by state agencies, though there was little sign then of any more radical change in the provisioning role of the state.[2]

In otherwise neglecting agriculture, the economic reforms reinforced a reactionary agrarian politics and supported an anti-agricultural policy that is now difficult to reverse. An example of the former is the fact of increasing interregional disparities in absolute yields between the revolutionary heartlands of Punjab, Haryana and western Uttar Pradesh in the north west, and the underdeveloped peripheries of Bihar, Orissa and Assam in the north and east, despite catch up growth in the latter region (Vaidyanathan , op. cit.; Rogaly et al, 1999). A 'reverse land reform' advocacy is another case in point. An influential body of opinion is now on record arguing for the lifting of land ceilings in the interest of 'efficiency' and corporate agro-commercial capital (Rao and Gulati, 1994; Johl, 1995).

Examples of anti-agriculture policy are the stagnation of state outlays on research and development and infrastructure (especially irrigation and other capital expenditure) and proposals to reduce other agricultural subsidies (Cassen, Joshi and Lipton, 1993). Reforms affecting food and agriculture are administered outside the agriculture ministry and departments proper: for example irrigation works and rural roads, electricity, credit, rural development, food and social welfare. Cuts in any of these departmental budgets affect agriculture. And while the central government controls the food sector, each constituent state is constitutionally responsible for 'agriculture'. So state level political forces independently affect agricultural policy. In many of the constituent states, the food and agricultural sector reforms have been strenuously

resisted by the expedient of borrowing. By 1996, many states approached their credit limits.

Yet agriculture still directly provides the livelihoods of two-thirds of the Indian population. If agriculture fails to release labour and capital; if it fails to provide food, other basic wage goods and industrial raw materials and if agrarian demand is not created for non-agricultural products, a wide-based economic development does not take place (Dobb, 1975). Agriculture's nosedive down the policy agenda of the nineties therefore has ramifications for the entire economy and polity.

In this introductory chapter, we summarise our main findings about the social impact of the transformative agricultural technologies since the early seventies in one region of northern Tamil Nadu, a rice growing state in south India. Tamil Nadu governments have a long established, distinctive and competitive politics of rural development and welfarist redistribution. [3] As outlined in the Preface , these have been tracked at close quarters since 1972 in a series of three studies of eleven villages. [4] The history of the fieldwork and the selection of villages and households is summarised in Appendix 1, and a reflection on the methodology of village level studies is provided in Appendix 2. What follows then are the highlights of our findings, divided into four sections : (1) the impact of the Green Revolution; (2) trends in real incomes and poverty; (3) rural industrialisation; (4) the rural impact of India's economic reforms. In the first section,

some material on long term changes which is not presented in other chapters of part 1 is treated in greater detail than in a normal introduction. Conclusions have been italicised - to help a busy policy maker, who is also directed to the introduction to parts 2 and 3 (chapter 2-1) and to the concluding chapter (chapter 4-1).

(1) The Impact of the Green Revolution - 1972-94

The Coromandel plains region lies squarely in the large agro-climatic zone of the semi arid tropics which constitutes about 42 per cent of India's area, and accounts for the same proportion of its production of foodgrains. It is characterised by rainfall dependence, subject to periodic droughts which may last for more than one year. Rainfall varies between 850 -1000 mm, distributed roughly equally between the southwest and north east monsoons (though the latter precipitation is much more intense and concentrated than the former). Historically, the region's agricultural population has protected itself against the seasonal vagaries of rainfall and against longer periods of drought by systems of tank irrigation, collectively maintained, which also served to recharge underground aquifers (Janakarajan 1996 and here, chapter 1-2). The latter were reached by open wells. In 1972-3 a significant minority of these were still operated by human **(etram)** or bullock **(kavalai)** power. A combination of investible agricultural surplus, nationalised bank credit and state-funded rural electrification had enabled these wells to be expanded in number, electrified and deepened. Maddumma Bandara (1977, p. 325) writes of there already being 229, 394

wells in the North Arcot district in 1971. This was among the highest density of wells in Tamil Nadu, which in turn had the highest density of open wells in India. Most of the army of electrified open wells was sited in the wetland but the stark contrast in soils between the dark, sticky, anaerobic **seru** of the predominantly tank and well-irrigated wetland, and the lighter red alfisols of the predominantly rainfed dryland, was beginning to be blurred as a result of the dispersion of pumpsets out onto rainfed watersheds.

Nevertheless, in the early seventies agriculture was still quite highly seasonal, with production concentrated in the rainy **samba** season (plantings in July/August; harvestings in December/January) and with the most rapid adoption of early high yielding varieties of rice in the well-irrigated, hot and dry **navarai** season (plantings in December/January; harvestings in May). The third season, **sornavari,** with plantings in May/June and harvests in September under the less reliable rainfall distributions of the fading south-west monsoon, was of lesser importance (Table 1).

In other agrarian respects, the region was not very distinguished. Though land holdings were very far from being equal, North Arcot has always been known as a region of smallholder agriculture. In 1973, the average landholding in the plains region was 1.43 ha. Tenancy was rare, at 5 per cent of holdings. The rural population depended overwhelmingly on agriculture. Fifty per cent of rural households were

small-scale landed cultivators and 80 per cent of these cultivated two crops, paddy and groundnuts, paddy for subsistence - mainly on the wetland - and groundnuts as the cash crop - mainly on the dryland. A further thirty-five per cent of rural households had agricultural labour as their primary occupation (Chinnappa, 1977, p. 93). So the fortunes of 85% of rural households were bound up with agriculture.

The region provided 10 per cent of Tamil Nadu's rice : half a million tonnes. Yields were comparatively low. The agricultural economy was simple: rice was grown on 32 per cent of the total cropped area and groundnut on 32 per cent. The main objective of the first phase of this long term research project was to investigate the rate - and the socio-economic context- of adoption of the generation of high yielding varieties of rice which emanated from IRRI in the Philippines. [5] The rate of adoption was revealed to be low (covering 13 % of cropped area), much lower than suggested by official estimates (39%). The reasons were not to do with yields and returns, for HYV yields, though low compared with their apparent potential, were higher than those of local varieties, as were their financial returns. The main constraints on adoption were rather - at the 'meso' level - the non-availability of varieties appropriate to the rainy and pesty conditions of the **samba** season when there post-harvest prices were lower (because the **samba** harvest provides the main marketing glut); and - at the micro level - the non-availability of assured water and fertiliser supplies.

Paddy yields in 1973-4 are found in Table 2, which shows that the average weighed in at 2.7 tonnes per hectare. [6] HYV yields were 45 per cent greater than those of local varieties, and average yields even for the **navarai** and **sornavari** seasons were 10 per cent greater than the three-season, all-variety average. 1973-4 had a rainfall of 732 mm: 35 per cent below average, a serious drought in fact.

As early as 1976 both of the technical constraints identified in 1973-4 had been relaxed. The short supply phase of the fertiliser 'hog cycle' was over and a set of IRRI rices (IR 8 and 20) was found appropriate to the **samba** season (J. Harriss, 1977). By the time of the second survey in 1982-4 there had been a rapid rise in fertiliser use, particularly on HYVs and in the **navarai** season. New IRRI varieties had been adopted: IR36 and 50 and a generation of IRRI/TNAU crosses were widely available. Adoption had spread to small producers and the social extent of HYV adoption was no longer an interesting question. Over the decade 1973-4 to 83-4 rice production had increased by 38 per cent (Hazell and Ramasamy, op.cit. p. 14).

For the most part this was due to yields, which appeared to have increased by 30 per cent (Table 3). While Chinnappa disaggregated yields by season, Hazell and Ramasamy disaggregated yield by farm size, distinguishing those under and over one hectare (1991, p. 32). Their findings are very interesting. While the yields of small farmers had increased by 43 per cent from 2.1 to 3.04 tonnes per hectare (tph) in the 9 years

from 1973-4 to 1982-3, those of producers with more than one ha increased only by 7 per cent, bringing them up to the same average level. Indeed the aggregate increase recorded by Hazell and Ramasamy may be misleadingly large because 1982-3 was the third year of another notorious drought (with 751 mms in 1982-3), such that paddy production was confined to well irrigated land and the two highest-yielding minor seasons. In the following year, when rainfall (1272mm) was above the average, another survey of a subset of the five villages most affected by drought showed much lower paddy yields - 2.7 tph for small farmers and 2.2 tph for those over one hectare (ibid and p. 26).

Hazell and Ramasamy also recorded groundnut yields in the same way (ibid). Groundnuts were still overwhelmingly rainfed in the early eighties. Unsurprisingly Hazell and Ramasamy found that there were small class differences in the yields in 1973-4 (favouring those operating with wage labour on a larger scale). These differences were maintained nine years' later, but yields in 1982-3 were substantially lower. By contrast, in the recovery year on smallholdings they showed a 38 per cent expansion over the decade but on larger farms a 13 per cent *decline*.

The themes of mediocre, 'unrevolutionary' growth [7] and instability were confirmed by the analysis of growth rates over the 23 years period from 1961/2 which showed a yield-driven growth of 1.5 per cent per year in production of paddy and an area driven

growth of 1.04 per cent per year in groundnut production (op.cit. pp.13-18). Paddy production had declined between 1973-4 and 1982-3 (by 5 per cent on small holdings and 33 per cent on larger farms). At the district level there was a 42 per cent decline, caused by drought, which made evaluation of the medium term trends in production difficult. If the data are compared over the decade from 1973-4, then smallholder production had increased by 82 per cent (due mainly to yield) while larger farm production had increased by 143 per cent, due to area expansion. What the drought of the early 80s highlighted was first an instability in production and second, the brisk substitution of paddy for groundnuts production and vice versa according to rainfall conditions (op. cit. pp. 31-35). But Hazell and Ramasamy conclude that paddy and groundnut still, on trend, occupied a third of total cropped area each (op.cit. p. 13).

In the village agrarian economy of the early eighties, 58 per cent of gross cultivated area was irrigated. 71,722 wells had been dug between 1971 and 1982, bringing the number for the North Arcot District to 301,116. These were increasingly greedy of electricity as well-depth extended downwards, bringing electricity into sharp focus in agrarian politics; yet they demonstrably could not protect production against drought. Significantly, the average holding size had declined to 1 ha (though mobility matrices revealed contradictory upward and downward trends in land holdings and indicated a combination of both concentration and pauperisation (J. Harriss, 1982, 1991).

The regional accounts showed 'manufacturing' at 20 per cent of net domestic regional product, while agriculture registered 40 per cent. While the ratio of agricultural labourers to cultivators in the villages had risen (from 7 to 10 in the seventies to 9.5 to 10 in the eighties (33 per cent being landless labourers and 35 per cent of households being cultivators in 1982-3), 10 per cent of rural households had manufacturing as their primary occupation. This rural region was witnessing expansion in agro-processing, leather tanneries, silk and cotton textiles and metal working. To analyse the technologies and social relations of the agricultural sector alone risks giving an increasingly incomplete and arbitrary account of the region's development.

From Green Revolution to Rural Reaction: 1984-94 [8]

The decade from 1983-4 to 1993-4 was alarming on many fronts in the former North Arcot District. Instead of expanding, and despite heavy subsidies, local rice production fluctuated wildly (varying between 280,000 and 658,000 tonnes of paddy) but was generally stagnant in terms of trend. [9] The same was true of yields, which varied between 1.5 and 3.9 tonnes; [10] the number of wells was virtually static at between 297,000 and 303,000. The energisation of open wells continued apace (at between 5,000 and 7,000 per year) which meant that the expansion of lift irrigation was roughly counterbalanced by well fatigue and abandonment (see Janakarajan, Chapter 1-2 here). The state and collective management of tanks and canals, and the sharing of their water, both definitively collapsed because of the consequences for collective obligations

of the changes in the caste-ownership of land from upper to lower castes, and because of the evolving domination of private incentives as groundwater went critical for production. [11] Tank irrigation water was often polluted by agro-chemical effluents and tanks came to serve the residual purposes of water table recharge and dry-season drinking water and sites for defecation (see chapter 2-3). Tank beds also provided silt deposits for brickmaking.

Agriculture became heavily dependent on private lift irrigation. Competitive deepening (with prevalent violation of spacing norms) led to a well failure rate of 20-30 per cent. On village wetland, well depths increased on average 6.5 metres (and on dryland 9.5 metres) from their average original depth. The impact of the secular lowering of the water table is far-reaching. It includes the irremediable drying of drinking water wells and rising investment in wells both for drinking and for irrigation, together with increases in operating costs. According to the **Report of the Working Group on Major and Medium Irrigation Programme for the Eighth Plan** [12] surface irrigation investment during the Seventh Plan period (1985-90) was computed at Rs 36,240 per hectare irrigated, whereas field data pertaining to well investment suggested that Rs 80,500 was required per net hectare irrigated on either wet or dry land. The latter is about 2.25 times the amount spent to create one hectare of surface irrigation potential. [13]

Then the electricity consumed per pumpset increased by 73 per cent between 1982-3 and 1992-3 (see Table 4) and is reputed to have doubled by 1996. As a result, there was increased waste of water and electricity, a decline in HYV paddy yields, increased indebtedness, the emergence of water market monopolies, conflicts over shared well water, pauperisation, landlessness and agrarian differentiation, irreversible changes in private irrigation technology and unknown costs to future generations (due to saline incursion risks) (Janakarajan, chapter 1-2 here).Virtually free agricultural electricity from 1990 (only partly cross-subsidised) accentuated rationing and supervision failures. The governments of Tamil Nadu resisted (and to this day resist) strong aid-donor and loaner pressure to re-introduce volumetric pricing.

The region now produced only 5 per cent of Tamil Nadu's rice (Govt of Tamil Nadu, 1994 Table 3.39 , p. 379), half its contribution of two decades earlier. Production, averaging 450,000 tonnes per annum over the decade, became increasingly unstable from year to year. The exception to this picture of stagnation concerns the provision of nitrogenous fertiliser, the use of which expanded between 1986-7 and 1991-2 from 29,500 to 39,022 tonnes, after which the rate of growth slackened. But use of the other two major nutrients (phosphorus and potash) contracted after 1991, when subsidies were lifted. The elasticity of yield to fertiliser varied from 0.07 for phosphorus to 0.36 for nitrogen and was greater for small peasants than for the larger enterprises which suppled the bulk of the marketed surplus (Chapter 2-6). On

aggregate, and despite the trumpeted potential of HYVs for the minor seasons, the relative importance of the seasons remained much as it was two decades earlier (Table 1) - though there was extreme inter-village variation. [14] The two more developed villages - Nesal (big, differentiated, accessible and diversified) and Vinayagapuram, (remote, least unequal, agrarian) - were expanding production based upon groundwater in the two dry seasons, which between them accounted for 70% of the gross cropped area. By contrast in Veerasambanur (small, poor, differentiated, remote) dry season cultivation amounted to only 45%.

Trends in Land Concentration: By the early nineties a combination of sale and partition had halved average landholdings to 0.7 ha. The proportion of farm households cultivating less than 1 ha had increased from 58 per cent in 1973 to 72 per cent in 1993-5. The average holding sizes of those working under and over one hectare were 0.45 and 2.03 respectively (see Appendix 3 , Table 3).

Land has been and continues to be considered as one of, if not the most, important productive assets, accounting for between 43% and 55% of the total value of assets in the three villages (Table 5). This alone would be a natural reason to analyse how land is distributed in the villages. But there is more. The distribution of land ownership amongst households of the same communities was investigated in earlier projects (J. Harriss, 1977, 1982, 1991; Chambers and Harriss, 1977). To a certain extent it is

possible to make comparisons with those results and to look at changes in the three villages over the last twenty years.

Table 5: Assets by village (Rs), 1993

ASSETS		VILLAGE Nesal		Vinayagapuram		Veerasambanur	
All Assets		**66071**	*100%*	**83104**	*100%*	**50016**	*100%*
	Std Dev.	150370		118072		63156	
Land		**28375**	*43%*	**45595**	*55%*	**25236**	*50%*
	Std Dev.	81450		74806		37238	
Other agricultural assets		**16090**	*24%*	**21285**	*26%*	**12680**	*25%*
	Std Dev.	43804		35641		18480	
Non agricultural assets		**21606**	*33%*	**16224**	*20%*	**12099**	*24%*
	Std Dev.	46502		21398		18452	

The inequality of distribution of assets is chiefly a question of land distribution_____.[15] Table 6 presents gini co-efficients for the distributions of the total value of assets, land, other agricultural assets and non agricultural assets. For all three villages, the distribution of land (whether in quantity or in value terms) and other agricultural assets is more unequal than the distribution of non agricultural assets, and most unequal in Nesal. [16]

Table 6: Gini coefficients for the ownership of land and the value of assets

Gini Coefficients	VILLAGE Nesal	Vinayagapuram	Veerasambanur

			including zero values		including zero values		including zero values
Land ownership		**0.51**	**0.81**	**0.46**	**0.62**	**0.46**	**0.66**
	nos.	208		79		51	
Assets value		**0.75**	**0.76**	**0.63**	**0.63**	**0.62**	**0.63**
	nos.	11				4	
Land		**0.61**	**0.85**	**0.55**	**0.69**	**0.53**	**0.71**
	nos.	208		79		52	
Other agricultural		**0.81**	**0.84**	**0.71**	**0.72**	**0.66**	**0.71**
	nos.	48		15		18	
Non agricultural assets		**0.67**	**0.70**	**0.55**	**0.55**	**0.59**	**0.61**
	nos.	24		4		7	

Note: zero values correspond to landless and/or assetless household observations.

Gini ratios for land in standard acres for households with land in the other 8 villages censused in 1995 are as follows: Amudur 0.49, Duli 0.45, Kalpattu 0.43, Meppathurai 0.44, Sirungathur 0.58, Vayalur 0.58, Vengodu 0.49 and Vegamangalam 0.54.

Gini coefficients for land ownership were calculated by Hazell and Ramasamy (1991, p. 55) for the years 1973 and 1983, and presented after having classified villages into rich and poor. Their conclusions were of a "clear worsening - albeit a modest one - in the equity of the distribution of land in the poor villages that is not evident in the rich villages", also confirmed by Gini coefficients declining modestly in the rich villages from 0.697 to 0.663 but increasing in the poor villages from 0.652 to 0.665 (Hazell and Ramasamy, 1991, p. 53). However, both the trend and the conclusion differ if we consider our (reduced) 1993 data. It is not clear whether the distribution of land worsened or not in the rich villages, because it is not known whether landless

households were included in the computation for 1983_____.

[17] However, a Gini coefficient of 0.81 in Nesal not only contradicts the declining trend for 1973-83 but also is highly inequitable. In our one 'poor village' (including the landless) the long term trend at worst is static; at best (excluding them) landholding has become more equitable.

But when they produce interesting findings, summary statistics like the Gini still need to be interpreted with caution, for they conceal a great deal of detail (Bliss and Stern, 1982); so it is then worth looking at the size distribution of land holding for the three villages, and trying to make some comparisons with more disaggregated data.

The distribution of land ownership in the three villages can be found in Table 7. In Nesal while 75% of households are either landless or own less than 0.4ha (1 acre), the top 16 households (5%) with over 2.25 ha own 43% of total land. In Vinayagapuram 61% of the village - landless or with less than 0.4 ha - own 14.5 % of land while those with holdings larger than 2.25 ha control almost a third of the land owned in the village. In Veerasambanur, 65% of households have less than 0.4 ha while the 6% which owns over 2.25 ha controls 28% of total land.

Table 7: Size distributions of land ownership (acres)

	VILLAGE		
	Nesal	***Vinayagapuram***	***Veerasambanur***

Size Category (acres)	No. of house-holds	% of total	Extent of land (acres)	% of land	No. of house-holds	% of total	Extent of land (acres)	% of land	No. of house-holds	% of total	Extent of land (acres)	% of land
Landless	20	61.3	0.0	0.0	79	30.	0.0	0.0	51	37.	0.0	0.0
0.01-0.5	16	4.72	5.1	1.4	23	8.8	8.4	2.2	22	16.	6.2	4.0
0.51-1.00	36	10.6	31.	9.2	54	20.	48.	12.	15	11.	12.	7.9
1.01-1.50	14	4.13	18.	5.5	26	10.	35.	9.3	8	5.8	11.	7.2
1.51-2.00	24	7.08	47.	13.	18	6.9	33.	8.8	12	8.8	21.	14.
2.01-2.50	2	0.59	4.8	1.4	10	3.8	23.	6.0	6	4.4	14.	9.5
2.51-3.00	7	2.06	20.	5.8	14	5.4	40.	10.	8	5.8	23.	15.
3.01-4.00	8	2.36	32.	9.2	15	5.7	56.	14.	6	4.4	21.	14.
4.01-5.00	8	2.36	37.	10.	5	1.9	23.	6.1	6	4.4	28.	18.
5.01-7.00	6	1.77	38.	11.	8	3.0	48.	12.	1	0.7	6.0	3.9
7.01-10.00	6	1.77	54.	15.	5	1.9	41.	10.	1	0.7	7.5	4.9
10.01-12.50	2	0.59	22.	6.5				0.0				
12.5-15.00	1	0.29	15.	4.3	2	0.7	24.	6.2				
>15.00	1	0.29	17.	4.9				0.0				
Total	33		344		259		384		136		152	
Gini			0.5	0.8			0.4	0.6			0.4	0.6

*Landless households are excluded from the Gini coefficients calculation.

The highly skewed distribution of land in Nesal had been already stressed by John Harriss in 1982_____. [18] What is new, however, is the "clear worsening in the equity of the distribution of land" in this rich village which was not evident from the previous studies (Hazell and Ramasamy, 1991). From Table 8, we see that landlessness has increased considerably in all the three villages, and that the total extent of land owned by the top decile of households has also increased in Nesal and Veerasambanur.

Table 8: Changes in distribution of land ownership

	VILLAGE								
	Nesal			Vinayagapuram			Veerasambanur		
	1973	1984	1993	1973	1984	1993	1973	1984	1993
Landless households (% total	41.00	44.00	61.36	11.00	11.00	30.50	23.00	21.00	37.50
Percentage of total land area owned by:									
Lower half	1.70	1.20	0.00	3.40	10.40	7.76	11.00	12.80	2.56
Top size decile	55.20	51.70	64.53	54.00	49.00	42.07	32.30	30.70	40.49

The size distribution includes the landless

Source: J.Harriss (1991, p. 68), and census data 1993

If we then analyse the land ownership distribution of landed households (Table 9), we find that the average farm size declined in Nesal and Veerasambanur, but remained the same as in 1983 in Vinayagapuram. In the first two villages, ***the*** *average farm size declined in all quartiles.* But while in Nesal it declined most in the largest two quartiles, in Veerasambanur the greatest reduction occurred in the two quartiles of smallest holdings. In Vinayagapuram, the average farm size only decreases for the bottom quartile. Whilst stressing a considerable variations in the changes over time by village, Table 9 also shows that *the average area owned per farm by quartile, in 1993, is much closer than it was ten and twenty years before. Concentration and convergence co-exist.* [19]

Table 9: Average land area owned by quartile of landed households (ha) (from smallest at top to largest at foot of table)

	VILLAGE														
	Nesal					Vinayagapuram					Veerasambanur				
	1973	1982	1993	% Change		1973	1982	1993	% Change		1973	1982	1993	% Change	
				73-81	82-92				73-81	82-92				73-81	82-92
1st Quartile	0.30	0.26	0.21	*-13.3*	*-19.2*	0.22	0.23	0.22	*4.5*	*-4.3*	0.26	0.30	0.11	*15.4*	*-62.4*
2nd Quartile	0.64	0.58	0.45	*-9.4*	*-21.8*	0.54	0.42	0.43	*-22.2*	*2.4*	0.74	0.67	0.38	*-9.5*	*-42.8*
3rd Quartile	1.54	1.25	0.86	*-18.8*	*-31.2*	0.97	0.79	0.79	*-18.6*	*0.0*	1.24	1.00	0.79	*-19.4*	*-20.8*
4th Quartile	5.23	3.50	2.66	*-33.1*	*-24.1*	2.27	1.96	1.99	*-13.7*	*1.5*	2.19	2.03	1.60	*-7.3*	*-20.9*
All Farmers	1.98	1.40	1.05	*-29.3*	*-25.0*	1.00	0.86	0.86	*-14.0*	*0.0*	1.09	1.01	0.72	*-7.3*	*-28.7*

The size distribution excludes landless households

Source: Hazell and Ramasamy (1991, p. 50), and census data 1993.

The economic significance of land is affected by both its type and its quality. In these villages, land is classified into the three categories of 'wet', 'dry' and '**punjai** (dryland) with wells'. [20]

The 1993 census found the total area owned by the households of Nesal to be 154.9 hectares (see Table 10). The proportions of wet and dry land are quite similar (29.8%

wet and 31.7% dry), while the extent of **punjai** land with wells is comparatively higher (38.5%). Over the latest decade, well-digging allowed the relative extent of wet and specially garden land to increase considerably at the expense of dry land_____. [21] In Vinayagapuram, 157.7 ha acres of land are owned by the villagers. There are 41 ha of wet land, 45.3 ha of dry land and 71.5 ha of punjai land irrigated with wells. In Veerasambanur, the total land ownership amounts to 62.4 ha, 37.6% of which is wet land while dry land counts for another 36%. The proportion of punjai land irrigated with wells is only 26.40% of total land, which is much lower than in the other two villages. Considering all the households in the village, land ownership per household is lowest in Nesal (0.42 ha/1.02 acres) and highest in Vinayagapuram (0.61 ha/1.49 acres). However, because more households are landless in Nesal the average extent landholding is greater there (1.08 ha/2.63 acres).

Table 10. Land classification (acres)

	VILLAGE					
	Nesal		Vinayagapuram		Veerasambanur	
Total Land	344.42	100%	384.70	100%	152.2	100%
per householdhs	1.02		1.49		1.12	
per landed household	2.63		2.14		1.79	
no. of landed households	131		180		85	
Wet	102.60	29.8%	99.93	26.0%	57.23	37.6%
per householdhs	0.30		0.39		0.42	
per landed household	0.78		0.56		0.67	
Punjai with wells	132.73	38.5%	174.27	45.3%	40.18	26.4%
per householdhs	0.39		0.67		0.30	

Dry	**109.09**	***31.7%***	**110.50**	***28.7%***	**54.79**	***36.0%***
per householdhs	***0.32***		***0.43***		***0.40***	
per landed household	***0.83***		***0.61***		***0.64***	

Note: 1 acre = 0.41 ha; 1ha = 2.45 acres

Diversification of Crop Varieties: Whereas early HYVs maximised environment-genotype interaction and were designed to be appropriate for a wide range of paddy growing conditions, the next generation of so-called high yielding varieties sought to minimise environment-genotype interaction i.e. to specialise for particular agro-ecological niches. Other varieties were bred so as to substitute for commercial input requirements such as water and pesticides by plant architecture and physiology. In the nineties, there were more new varieties and their rate of obsolescence increased. Table 11 lists 23 HYVs according to their precise season of cultivation for the specific conditions of northern Tamil Nadu, and Appendix 3, Table 1 displays their use. In the **samba** season new varieties have higher yields than older ones, and 75% of the land is cropped with newer varieties. In **navarai**, the older varieties have higher yields and 50% of the land down to paddy grows older varieties. The three paddy varieties from IRRI (IR20, IR36 and IR50) have been proved very robust, had already been introduced in the mid seventies and were widely adopted by the early eighties. Thirteen recommended varieties are local/IRRI crosses and 7 are entirely the results of local seed breeding. On aggregate the newer HYVs averaged 3.6 tonnes per hectare while *older HYVs did much better* - at 4.7 tonnes per ha (Table 12).

Diversification of Cropping Patterns: With respect to agricultural diversification, the theory of growth linkages which informed the research in 1982-4 (in which the consumption linkages from agricultural production fed back through higher incomes and demand - for income elastic food and other agricultural products - to agricultural production) is but one among several well theorised pathways. Von Thunen argued that the diversity of land-use would be maximised in peri-urban rings and would give way to mono-cropping and then livestock rearing with increasing distance from a town (see Haggett, 1965). The expansion of towns (and a real reduction in transport costs) would therefore lead to a linear expansion of the width of the zone of diversified land-use and an exponential expansion of its production. Further causes of crop diversification, inter-cropping, a wide range of varieties of a given crop, agro-pastoral mixes, crop diversity and farm/non-farm activity mixes are all long standing responses to environmental hazards, particularly to high variances in the annual and/or monthly distribution of rainfall such as characterise the semi-arid tropics (Chapman and Harriss, 1984). A change in the vector of agricultural hazards in a semi-subsistent agricultural economy could thus lead to diversification.

While paddy is still grown on 51% of the total cropped area and groundnuts are grown on 37%, there is no doubt that land use has diversified over the last forty years,

though finding data is very difficult. The Nesal village **karnam's** (accountant's) records show that the category of 'other' uses of land increased from 3 to 10 per cent of cultivated area between 1959-60 and 1972-3 (Harriss, 1977, p. 126), but the landholding distribution was not given. Hazell and Ramasamy's project survey data reveals that a good proportion of 'other' is rainfed sorghum and millets, and that whereas 'other' doubled between 1973-4 and 1982-3 as a proportion of the cultivated lands of smallholders, it increased by a factor of five on the land of those owning more than one hectare (Hazell et al, 1991, p. 34) - see Table 13. Their findings are certainly consistent with the working hypotheses, though we still do not know whether the residual 'other' in 1982-3 included income-elastic, high-value products. By 1993-4 the picture is clearer: there had been widespread land-use diversification with crops other than rice and groundnuts occupying 30 per cent of cultivated land. In the poor village of Veerasambanur the major change was the arrival of sugar cane, a high-income agro-industrial product, no respecter of rural classes, occupying about 40 per cent of the standard cropped acres. Water-sparing sorghum and millet occupied about 5 per cent of land. In Vinayagapuram, only 4% of standard acres had come under crops other than paddy and groundnuts, but the crops in question illustrated a range of reasons for diversification. Some crops were income elastic, as predicted by the TNAU/IFPRI project (vegetables and chilli), some were water-sparing (grams and ragi) and some were labour cost-minimising (casuarina) - see Table 14. Nesal also had a diverse cropping pattern, with sugarcane, banana and coarse grains occupying roughly 40% of cropped land. All agrarian classes practised crop diversification, but it

was most advanced among the elite households and remarkably so in the village nearest town.

Yields: Paddy yields were analysed for the three seasons between **samba** 1993-4 and **sornavari** 1994. If the results for the three villages in 1993-4 are compared with those for 11 villages twenty years earlier, HYV paddy yields remained virtually static (averaging 3.6 tonnes twenty years ago and 3.9 tonnes in the later period - an increase of only 8%). **Navarai** season had much the highest yields (28% above those of **samba**, which is the season watered by both the southwest monsoon and pumpsets) see Table 12. In 1993-4, yields on dryland with wells were higher than those on traditional **seru** paddy land - wetland with surface water. As in 1973-4 but unlike the eighties *there was a strong positive relationship between size and productivity*. While producers operating below one hectare had yields 7% below the weighted mean, larger producers had yields 10% above it (Table 12).

Turning to groundnuts, *yields declined*, fluctuating from 1.4 tonnes per hectare in 1973-4 to 1 tph in 1981-2, 1.5 tph in the recovery year of 1983-4 but only 0.994 tph in 1993-4 (Tables 3 and 15). Traditional groundnuts varieties still dominated production and it was only in one developed village (Nesal, where groundnuts were grown under

irrigated conditions) that new varieties were adopted, that too on only 8% of the land down to groundnuts. The 'new' varieties of groundnut grown were not up-to-date and did not appear among those officially recommended. [22] While the difference in groundnut yields between farm size categories is statistically significant, if yield is controlled for type of land, irrigation status and variety then *the relationship between size and productivity becomes insignificant.*

Production: As with yields, there is *persistent, consistent and often statistically significant variation between the poor peasants and elite agricultural households in factor use and costs as well as in the prices received for their products.* While the real rupees intensity of fertiliser and agrochemicals was static for poor producers, for rich agricultural households it has increased by a factor of 3 over twenty years. Groundnuts prices were some 43 per cent higher for elite households than they were for poor producers, although the class difference in prices quoted was much less - 6% - for paddy sales. Returns to both paddy and groundnut production were thus differentiated in favour of nascent capitalist households (Harriss-White, Crowe and Janakarajan, 1996). Significant inter-village variations accentuated class-specific differentiation in production conditions (chapter 1-3). For comparison, we keep to the size classification of Hazell and Ramasamy, though it masks some of these differences.

Details of production are given in Table 15. Some 76% of landed households produced paddy, while 67% produced groundnuts. However while during the seventies about 80% of cultivators grew both crops, by 1993-4, the proportion growing both crops had dropped to 43%. [23] Hazell and Ramasamy's costs of production for 1972-3 through to 1982-3 (Table 16) are not for the sample villages at all and are also not disaggregated in the way ours are for 1993-4 (Tables 17 to 19). [24]

Average real costs per hectare have more than doubled since 1973-4. *The real costs of paddy per unit output have also increased by 63%.* Furthermore the ratio of gross to net returns, *the profitability index, has dropped* from the ranges of 3.2 to 5 in the early seventies to 1.9 by 1993-4 (Table 19). By contrast, *the cost structure has been remarkably stable*, labour amounting to just under half of all paid-out costs and fertiliser a quarter (Tables 17 and 18). *The biggest change over the period is the share of costs taken by pesticides* - up from 1% to 11%. The structure of labour and employment costs are summarised later. With respect to agrochemical inputs (Table 18), fertiliser is used with equal intensity by small and large farmers - but most intensively on wetland. It is pesticides which are used disproportionately by large farmers - not only on wetland but equally through all seasons. Organic manure is spread for preference on rainfed land. Groundnuts have a similar intensity of application of organic manure but fertiliser and

pesticides are used at a mere 14% of the intensity of paddy and intensely focussed on HYVs. [25]

Credit: Partially deregulated institutional credit, with an average interest rate of 12.2 per cent, was almost entirely captured by the most propertied classes; the excluded mass of poor producers relied on non-institutional sources (where interest rates averaged 28 per cent) (Chapter 2-5). *The twenty five per cent of households with total assets in excess of Rs 1 lakh ($3,000) borrowed 85 per cent of formal credit*, but 48 per cent of informal credit. The bottom third of households with assets under Rs 15,000 ($450) had 5 per cent of formal debt and 11 per cent of informal debt. Of the latter, there was a great variety , access to which was highly segmented by caste and kinship, by purpose and by social class. Specialised chit funds (rotating credit groups) had proliferated for scheduled caste people, women and agricultural labourers. Women took semi-secret loans from the wives of money-lending farmers and traders. Traders' credit persisted as the most quantitatively important. Institutional credit had not cracked the prevalent interlocked contracts of the informal sector. However, *whereas two decades earlier it had been agricultural traders' credit which exercised an indirect control over petty production and market supplies, by the 1990s it was a combination of agricultural and non-agricultural commercial credit which played this role with respect to the more diversified agricultural and non-agricultural base of petty production.*

Marketed Surplus: The marketed surplus (as a weighed aggregate proportion of paddy output) has increased by a third over the last twenty years from 33% to 44 %, testifying to the persistence of subsistence production (Table 19). Large farms [26] had a marketed surplus one third greater than did small farms. The **samba** season and old HYVs dominate supplies to market. The per hectare net profitability of the paddy surpluses of large farms exceeded those for small farm sales by 18%.

The marketed surplus of groundnuts, an inedible agro-industrial oilseed, at 60%, was low due to the fact that quality on the open market for groundnut oil was so unreliable that producers made their own. One third was kept for seed and for custom-milling for home consumption where quality and non-adulteration could be assured.

For the vast majority of the population who were small cultivators and landless agricultural labourers, more of their consumption consisted of products received as wages in kind than of crops they themselves grew. In contrast, in the minority of elite households, the grain payments they received from others for water supplied by them and the produce from their own land, constitute their grain stock, a small proportion of which needed to be retained for consumption while the rest was marketed. While what poor households consume is the residual after meeting their immediate cash

payments and settling loans, for the elite, what is sold in the market is the residual above seed and consumption needs. The marketed surplus thus has two components, the former price unresponsive and a function of debt and the latter price responsive and a function of scale and of distance from market (Harriss-White, Crowe and Janakarajan, 1996).

Agricultural Employment: While two thirds of the total rural workforce remained in agriculture, over the twenty years the ratio of cultivators to agricultural labourers had reversed itself to stand at 10 to 10.5. *Agricultural labour increased by 50 per cent over the two decades*. Yet the growth rate of the agricultural labour force and the labour-absorptive capacity of agriculture slackened (Table 20). Total labour inputs on small paddy farms was to all intents and purposes unchanged from 1973 - up from 295 to 306 days. By contrast on large farms - accounting for most of the area and most of the output dominating the marketed surplus - *in the nineties there was a 20 % decline in the average labour inputs of the eighties and seventies*. Per hectare, as noted in the eighties, small farms remained some 15% more labour intensive than large ones [27] but over the two decades, *total labour per hectare had dropped by 15% on small farms and 12 % on large farms*. The continued mechanisation of ploughing, irrigation and threshing accounts for this process of labour shedding.

It is not only the total quantity and intensity of 'labour' in the abstract which varies over time, it is also the labour process. Its components have changed remarkably over time. While in 1993-4, the *exchange of labour* had been all but obliterated from production, what is left of it is every bit as female as it had been in the seventies - when it was more important (though less noticed in the literature) than attached/permanent labour. On small farms, *attached contracts* had accounted for 2 % of labour-days in 1973-4 but were negligible in the nineties. [28] But on large farms they were virtually unchanged, at 6%, down from 7% two decades earlier. The most striking long-term trend, however, is the *substitution of casual labour for family labour*, both on small farms (where family labour was down 14% from 1973 levels) and on large ones (down by 30% - mostly accounted for by the withdrawal of male family labour) most dramatically on the large farms in Nesal, the most developed village. [29] On small farms the casual labour component had increased by 38% - a significant trend in the miniaturisation of the wage-labour form of production. If on large farms *casual labour* was static in terms of the absolute number of days, put another way it *rose by 22% to two thirds of all labour*. In Table 20,data for the period of drought and recovery in the eighties shows that labour contracts can be quite contingent on circumstance. While during the extreme drought there was a marked drop in all forms of labour, the period of recovery in the truncated set of villages was marked by dependence on male labour forced into attached contracts.

In the exceptional circumstances of the eighties Hazell and Ramasamy observed a marked masculinistion of labour, but the long term relation over the two decades 1973-93 is in the opposite direction: from equal inputs of male and female labour regardless of farm size in 1973 to a situation in 1993 when women worked 57% of the total days worked on small farms, and 60% on large ones. Some 80% of this female labour is casual wage work, an increase of 15% over the two decades. On small farms 72% of female labour is casual, an 11 % increase. Table 20 also reveals that while on small farms the component of family labour is being masculinised, on large farms even family labour is being feminised. So although per hectare employment and livelihoods declined, *agricultural production depended increasingly on female and casual labour* (see also chapter 1-5).

Trends in real casual wages are found in Table 21, showing that the 'labour market' is a spread of rates specific to gender, task and village. Though real pay for all tasks has risen, there is no obvious trend towards convergence. Rates have tightened most in Vinayagapuram and least in Nesal; most for men ploughing, least for women harvesting; in general, more for men and less for women. Male wages are at least twice and in some instances three times greater than female wages (Table 17). In two villages

where women formed three quarters of the agricultural labour force, their real wages actually declined over the last 20 years.

Rates, terms and conditions, contractual forms, and tasks and trends vary from village to village, according to production technology and the size of land holdings of employers, and by caste, gender and the availability of seasonally specific nonfarm employment alternatives for labour (Chapter 1-5). *On the average in 1993-4, paddy required 450 labour days per hectare*. There were marked seasonal variations in labour requirements; other things being equal the rainy season required 30 % fewer days' work. Massive inputs of family labour were necessary for the small area of unirrigated land down to paddy. Newer HYVs are 50 % more labour intensive for - as seen earlier - lower yields than older HYVs (Table 17). By contrast *groundnuts required 150 labour days per hectare*. Fluctuations in labour demand according to season or irrigation status were of much lower amplitude than for paddy. HYVs required 33% more labour than traditional varieties. There were markedly different tendencies in the organisation of labour by village: while the labour process in Nesal was dominated by female casual labour, in Vinayagapuram, female family labour was the biggest single component.

At this stage, our conclusions are sobering. Despite the developmental effort put into agriculture, before, during and since the first generation green revolution, the impact on yields is disappointing. Agricultural production remains extremely vulnerable to its physical environment

and its trend is flat. The farm size/productivity relationship is positive. Despite the universal adoption of new varieties, it is the larger land-holdings on which the highest yields are obtained. The agricultural population is increasingly differentiated and its factor environment persistently unequal in class terms. In this region of India the 'green revolution' has dissipated into a not particularly 'green' reaction.

(2) Trends in Real Incomes and Poverty

Table 22 summarises income, expenditure and poverty in the three villages. Between 20 to 30% of households throughout the income distribution declared total expenditure in excess of income. In such households expenditure therefore relied on debt. Another subset of households - around a third - were still under the Planning Commission's Poverty Line for an average sized household. A weighted average of 60 per cent of 'indebted' households were under the poverty line. One in ten households had *food* expenditure which exceed their stated income - all being below the Poverty Line.

A very major developmental achievement, however, is that between 1973 and1994, *average real expenditure* increased by a factor of 6 for elite producers, 4.5 for poor

producers and 2.8 for landless agricultural labourers (Chapter 3-4). The sixfold increase in the spending of the agrarian elite masks its internal differentiation, the top of the elite in terms of the assets distribution achieving much higher real increases in income than its base.

In part this increase in real incomes is due to the state. The achievement of a threefold increase in the real incomes of wage labourers had more to do with the controlled prices of wage goods under the Essential Commodities Acts and nutrition interventions than it had to do with minimum wages legislation which is not enforced. Table 23 shows that in these villages *open market coarse rice prices have been held roughly constant in real terms over the two decades* while male wages have more than doubled and female wages almost doubled. *Furthermore, the casual wage can purchase from the Fair Price Shop (which issues rice from the Public Distribution Syste, more than twice the amount of rice it will buy on the open market.*

While the proportion of households in nutritional stress had halved over the last two decades, it averaged 26 per cent of the households of poor peasants and landless agricultural labourers. Calorie consumption had remained stable over the 20 year span at 1,900 calories per adult equivalent. Meanwhile, the diet of the elite had diversified to a high income, 'metropolitan' nutritional pattern. Access to the public distribution scheme, making rice available at controlled prices, and to the noon meals scheme

(providing one third of daily calorie requirements to pre-school and school-aged children) both proved to be socially redistributive and, despite leakages and high inter-village variation, these two schemes protected the nutritional security and enhanced the real incomes of the poorest households. [30]

Drowning the effect of direct state welfare interventions, however, was the tightening impact on agricultural wages of the increased spatial mobility of labour, in particular daily commuting and both seasonal and permanent outmigration of male labour, which increasingly avoided agricultural work, and of the in-migration of investment in the non-farm rural economy (which, in three out of the eleven villages amounted to 'suburbanisation'). This process of reorientation of livelihoods, physical work and the economic structuring of space has been termed 'de-agrarianisation'. Calls have been made to reformulate the agrarian question (by which is meant the relation of agrarian classes to national capitalist development) in order to encompass the ubiquitous expansion of non-agricultural economic activity under a variety of forms of production relations (Bryceson, 1995). The main features of the way this change affected the villages we studied are outlined in the following section.

(3) From Green Revolution to Rural Industrialisation

Historically, agriculture has declined in relative importance over time, containing, as it does, the components of its own decline: capital, labour, wage goods and raw materials. All of these need to be shed in order for the non-agricultural sectors of an economy to grow. It has been an important planning objective since Indian independence to hasten this process (Visaria, 1995). Rural economies are expected to *diversify* as agriculture *grows* in absolute terms but declines in relative terms (Mellor, 1976). Increased real agricultural incomes consequent to the green revolution will in turn create increased demand for income-elastic goods and services. [31] Such incremental demand will be met by small-scale, local, labour-intensive non-agricultural production which will mop up surplus labour from the agricultural sector (Mellor, 1976; Bell et al 1982; Hazell and Ramsamy, 1991). It will be the *cause* of such industrialisation. And, rural non-farm employment in India did indeed expand at the rate of 4.6 per cent over the period 1972-3 to 1987- 88 (Visaria,1995, pp. 402-3). The argument about inter-sectoral resource transfers by means of agricultural growth linkages has been conducted without reference to spatial factors and the presumption is that local diversification is rural. [32]

Others, however, have argued that the evolution of the non-farm economy is a function of changing production conditions and the forms in which surplus is generated and redistributed. It might be the product of agrarian pauperisation and of

a deterioration in the terms and conditions of work of the rising share of the workforce which is not self employed (Vaidyanathan, 1986; Bhalla, 1987; Jayaraj,1996). It could be a long-standing, risk-minimising response to economic and/or environmental hazards in agricultural production conditions (Harriss et al,1984); or a more recent response to non-local demand (whether agrarian or non agrarian), to (more or less targeted) state-led employment creation (Harriss, 1987a [33]), state-subsidised and/or regulated (foreign) investment (Hart,1996), or even to industrial downsizing (Jayaraj,1996).

Given the sparse nature of the existing data base on non-farm assets and employment, Visaria commented: 'we need to understand the pace and processes of growth or decay of different activities in our villages and towns, with due account taken of the place of usual residence as well as place of work of workers. Such mundane research, which may not offer scope for the use of sophisticated quantitative techniques, is imperative to validate, document and analyse the ongoing changes suggested by macro-data provided by the censuses and national surveys' (1995, p. 408). What light do our data shed on this issue?

Employment: The debate about the dynamics of rural diversification can be illuminated by empirical material from the three villages which were subject to intensive study. While only 10 per cent of households gave 'manufacturing' as their primary occupation, apparently disposing of the idea that the non-farm economy has expanded, this figure conceals what we believe to be *a significant change over the previous decade*. For 41 per cent of male labour and 8 per cent of female labour were employed in the rural non-farm economy, *and half the landed agricultural households reported at least one adult in non-agricultural activity* (Jayaraj here, Chapter 1-6, Table 9). And, when we look at individuals rather than households, we find not only the agricultural proletarianisation of women, and the emergence of weaving as a major form of rural livelihood but a massive increase in yet another miscellaneous category of 'other' activity (from 20 per cent in 1982-4 (gender unspecified) to 36 per cent for men and 18 per cent for women in 1993-4). 'Other' activity includes petty or household manufacturing, construction, trade, transport, storage and 'other services' which is itself a quite large, unspecified category. Caste and gender are strong filters of entry into, and stratifiers of returns from, this non-farm sector. *Scheduled caste workers tend to be screened out of the activities with the highest returns* and are thus restricted to agriculture, to mud and construction work and to work outside the locality of their settlement. In this process, and subject to the market-mediated screening of caste, women are also at a distinct disadvantage compared with men. Women gained but 8 per cent of all non-agricultural earnings and earned less than men per unit of time even when tasks were not gender-specific. *In*

silk weaving, womens' average daily earnings were Rs 6.5, contrasted with Rs 34 for men. Girl assistants were paid nothing while boys got Rs 5 a day. [34] Silk weaving takes a putting-out, household form based upon a technologically retrogressive shift (from fly to throw shuttle and using child labour) that is unlikely to develop into factory industry. [35] From our evidence, the evolution of the rural non-farm economy is clearly a function of changing village-specific production conditions and the forms in which agricultural surplus is generated and redistributed. It may equally be the product of relative agrarian pauperisation - and of the rising share of the workforce which is not self employed - as it is the product of the process of rural accumulation. At the same time the poorest people are excluded.

Assets: For employment to be created either in agriculture or the rural non-farm economy, investment is a prior requirement. From the patterns of assets distribution and from the nature of these investments it is then possible to comment on the assumption that (local) agricultural growth linkages were their cause. Assets are the 'fossils' of investment histories. In 1993-4 inequality in assets was impressive. Table 24 which shows the detailed disaggregations of means and standard deviations of total assets for the three intensively-studied villages, suggests not only the extent of inter-village variation but also that assets ownership is highly socially differentiated in village-specific, fractal patterns. [36]

At the same time the composition of these assets was overwhelmingly agricultural, throughout the rural class structure. Land still accounted for the largest share among the different components that make up the asset structure - 40% of total assets and 56% of productive ones. Agricultural assets ranged from 74 per cent of total assets in the poorest village to 65 per cent in the richest one. Among the class of poor households (with an average of Rs 60,000 of assets) two thirds of total assets were in land, a quarter in buildings and transport and the rest took the form of jewellery and informal finance. The village elites had very highly capitalised land of the best quality, farm machinery and livestock, rice mills and informal sector financial investments. Even so, finance was but 7 per cent, buildings and transport 20 per cent and rice mills, looms etc. 15 per cent. *The entire local non-farm economy* (including construction and transport) *appears to have been generated from one third of total rural assets and one tenth of total productive assets.*

While 29 per cent of the households in our sample were without land, no landless household was without assets. [37] The total assets of landless households varied from a mean of Rs 2,665 in Veerasambanur through Rs 14,408 in Vinayagapuram to Rs 21,093 in Nesal. Being landless in a village is no longer to be associated with the most dire poverty, although the poorest are certainly landless. Non-land assets mitigate agricultural poverty just as non-agricultural salaried employment

differentiates wage labour. Non land assets mainly take the form of dwellings. In Veerasambanur, the non-building, non-transport, non-agricultural assets of the landless are tiny : up to Rs 25 for farm tools, up to Rs 150 for artisanal tools, up to Rs 350 in non-institutional credit and the same in jewellery, Rs 5 in livestock.. In Vinayagapuram, there are some significant differences: up to Rs 1,315 in handlooms, up to Rs 2,500 in non-institutional finance, the same in jewellery and up to Rs 1,000 in livestock. In Nesal, financial assets substitute for looms, otherwise the pattern is similar.

The difference between the total assets of the richest household (with approx Rs 43 lakhs) and the five poorest households in our rural sample (each with total assets under Rs 2,000) is a factor of 2,150.

The narrow base of non-agricultural investment may have resulted from the mediocre performance of agriculture; in other words there may be a simple explanation that there are few growth linkages from agriculture. Non-farm assets tended to be highly socially restricted (though not as socially restricted and concentrated as land). The classes with the greatest agricultural assets were precisely those with the greatest non-

agricultural assets. The link between the sectors was direct, by means of household accumulation. But this was not the whole story.

Non-agricultural investment was highly socially concentrated, while non-farm employment was far less socially restricted. Productive investment in the non-farm economy shows far more inter-village variation than does employment in the non farm economy. The latter took the labour of 41 per cent of men but only 8 per cent of women - for whom agricultural wage work was the fall-back. Either men commuted away from the locality or they worked inside these villages using assets which were not theirs. [38] For this to have occurred when there is so little evidence for assets-holding in such sectors we must be observing *contraflows of capital*. [39] *Capital is emigrating from - and at the same time a certain amount is migrating into - these rural sites*. We have little exact data, but we used reasonable assumptions to make a conservative estimate of capital emigration. [40] While 1 to 2 per cent of two villages' assets were outside the village, the proportion of Nesal's assets that is invested outside was a striking 54.5 per cent.

Theories of labour migration can be adapted to apply to capital migration. Hart has talked of urban push and rural pull (1996), arguing with empirical evidence from Malaysia and Taiwan that, rather than rural industrialisation's being an immediate

local response to agricultural growth linkages (which she calls rural pull), it is rural-urban differentials in rents, infrastructure and the existence of dispersed and cheap labour that repell industries from urban locations into rural ones (which she calls 'urban push'). Our field research would lead us to add to this list of forces the better opportunities for tax evasion in rural locations, and for the exploitation of unwaged female and child labour (Nagaraj et al, 1996, follow this argument in relation to the diffusion into villages of silk handloom weaving). But whereas Hart's analysis focuses on export-led rural industrialisation, what we observed in the villages we studied is a production process for a rapidly emerging national market. Some of this market is rural (a little local, but *most non local*) but the vast bulk is *urban/metropolitan* in origin. It is evident that capital is far from fungible, that those exporting assets from villages and investing in land, rice mills, trade and finance are unable to finance much of the non-farm employment growing within these villages because of factors connected to the social profile of capital ownership - most notably restrictions on entry due to caste. Those exporting capital from *urban* sites to these villages and investing in silk weaving are unwilling or unable for the same reason to invest in the activities of *rural* capital exporters. While the ownership of assets is increasingly concentrated, the locations of the propertied elite is increasingly dispersed, and the village increasingly a unit of residence and less and less one of production and consumption.

We would expect that increasing rural economic diversity - whatever the causes - would mean that agricultural and non-agricultural diversification would take shape

according to locale, caste, class and gender. Households' responses to changes in the balance between the different economic and ecological forces they confront would also be facilitated and constrained by these factors. This in turn means - contrary to the assumptions of the liberal reform agenda - that the power of agricultural prices **per se** to explain and elicit supply is considerably qualified.

(4) The Indian Reforms and Rural Development

For structural adjustment to accelerate diversification by reducing barriers to mobility and relaxing regulations which previously inhibited rural non-farm productive activity (Ellis, 2001, pp. 160-78), markets must be capable of wrenching capital from its social moorings. This is not what is taking place in the area we studied. Market exchange, while increasingly dominant, is heavily embedded in, and constitutive of, relations of class, caste, locality and gender; as is the local state. The modalities by which the combined activities of state and market might dissolve the social foundations of accumulation are not well understood. Education is often cited as a dissolving force. While Jayaraj (1996) shows that higher education is associated with greater diversity of , and higher returns to, employment, we have yet to understand how education might challenge the distribution, composition and location of assets holding and every reason to suppose that it currently reinforces it. [41]

The trends we found in two-way, urban-rural, farm-nonfarm, capital migration may be observed throughout Tamil Nadu, not merely in the trade and services, the agroprocessing and construction activities which are to be found everywhere, but in the regional specialities: matches around Sivakasi, korai and gem cutting around Tiruchirapalli, cotton textiles diffusing out from Tiruppur, leather tanning in and around the Palar basin, [42] metalwork and engineering in rural settlements around Coimbatore. The non-agricultural rural economy is no longer marginal, it is of central importance to the reproduction of rural society. In the region we have studied, the new wave of capitalist development is sucking certain castes which are preponderant in marginal peasant production and in agricultural labour, into dependent, small-scale commodity production controlled by non-agricultural merchants' capital, deploying household labour (including children withdrawn from school) under conditions of technological retrogression. The macro economic policies creating and skewing consumer demand are encouraging urban capital 'flight' to these rural sites. The stage being observed in northern Tamil Nadu could be a precondition to a phase of export production, not necessarily by foreign capital, but by local or national capital. *Diversity is the hall-mark of the expansion of rural capitalism here*. It is agrarian households with the larger land holdings and hired labour forces which not only diversify into both income-elastic and water-sparing agricultural products but also (because of the ceiling on the absorptive capacity of agriculture and because of higher rates of return) into the non-

farm economy. Such assets accumulation both within the village economy and directly and indirectly outside it renders these households doubly diversified. When combined with salaried employment in the state or the urban economy (as happens in these households), they are trebly diversified. Such diversification is a close associate of contemporary agrarian differentiation. At the micro-economic scale it enables the capital accumulating class to manage a uniquely varied portfolio using the joint family form of household. In turn, this class is endowed with a risk-resisting economic plasticity.

In sum: The green revolution has succeeded in keeping rice production at a medium term constant while a third of cultivated area has been diverted to other crops. This has been achieved at the cost of increasing instability of output, stagnant yields and plunder of the water table. It relies on an increasingly feminised casual labour force. It is evidently now the non-agricultural economy which is providing developmental dynamism to the region - drawing in capital, shifting capital inter-sectorally and providing employment (but in a way that is biased against women, against the lowest castes and the poorest classes). While the food needs of the local population and the agro-industrial raw materials can both be (and increasingly are) supplied from elsewhere in a lengthening and thickening mesh of interregional trade flows, the process of capital formation and the private intersectoral transfer of capital are still

intensely localised. Yet agricultural production has reached the stage of severely diminishing marginal returns among the most landed class which has historically controlled the shedding of capital and labour. This is an unprecedentedly grim scenario. *With local per caput consumption of rice stagnant and food scarcity still affecting 26 per cent of poor households, with production stagnant and (despite a rapid fertility decline) population still growing, the roles of the local and central state in guaranteeing the transfer of low price grain from long distant or local grain bowls to regions such as this is of enduring importance to peoples' welfare.*

By 2001 agriculture contributed only 17% of state domestic product. The rice economy was growing at 0.8% p.a. [43] Little more can now be expected of this highly differentiated agriculture in the absence of a new wave of agricultural research and development and in the absence of the public provision of physical infrastructure which is known to work in sync with private capital formation and agricultural production. In the further very hostile policy context of i) a mediocre record from the 1980s of research and infrastructural investment in the agricultural sector, of ii) pressing requirements (moving from the phase of the rhetorical to that of the actual) for public expenditure to be cut, and of iii) the funding cuts to the CGIAR system of international seed breeding institutions for foodgrains (which is the only one the world has (Lipton, 1994)), such investments are no longer on the horizon. The local

developmental baton has been seized by rural industrialisation. But to assume that 'de-agrarianisation' or rural industrialisation can answer the agrarian question or solve the many, persistent, technical and social problems of agriculture would be, from our evidence, to err.

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ENDNOTES

1. Palmer-Jones and Sen (2001), however have recently shown that in half the agro-climatic regions of India, agro-ecological conditions have played a more important role than has development expenditure, irrigation infrastructure or technology in determining the level of rural poverty in India. It is interesting to note that in their analysis, the state of Kerala (considered to be so highly distinctive as to constitute a development model) is seamlessly part of a west coast zone.

2. For later events, see Swaminathan, 2000.

3. These involve free electricity to producers, a minimally targetted public distribution system, a comprehensive school meals nutrition scheme, a social security system for poor people and the most inclusive reservations system for backward and scheduled castes and scheduled tribes.

4. (ed.) B. H. Farmer, 1977, and Hazell and C. Ramasamy, 1991. Three of these villages have been taken for intensive study in 1993-5. They are Veerasambanur, Vinayagapuram and Nesal.

5. Though these had sometimes, as is the case of IR20, been based on S. Indian genetic material.

6. For the rice equivalent a rule of thumb is to multiply by 0.66.

7. A revolutionary change in agricultural production should be marked not only by changes in growth but also by lower per unit costs of production but real, per unit

weight, costs of production have increased by 63% - see forward to the section on 'production' in this chapter.

8. In the current period we sumarise accounts given in detail elsewhere in this book and present in fuller detail the elements of the story not appearing later. The 1996 Workshop papers are available from Queen Elizabeth House, Oxford.

9. This statement is based mostly on data in the Tamil Nadu Economic Appraisal. It has to be said in certain years the published data is greatly at variance with that available locally in the Dept. of Statistics, Tiruvannamalai (the district's Headquarters) and the Regulated Market Annual Report at Arni (the local administrative centre). It is possible that the declining quality of public service has resulted in a deterioration of data quality. However official data on agricultural production twenty years' ago was also of low quality (Chinnappa, 1977, pp. 93-100). We have to take it at face value.

10. While the potential is 7 tph.

11. This is in fact a long historical process, noted by Chen Hang Sen in the early 1930s (in (ed.) Thorner, 1996, p. 139). See also Janakarajan (1993 and Chapter 1-2 here) for more evidence concerning the Palar basin.

12. Govt. Of India, 1989.

13. These data are not for the region surveyed in our project but from 7 villages in the

Vaigai basin in southern Tamil Nadu (Janakarajan, 1998).

14. From this point onwards in this account, 'survey data' for 1993-4 refers to that for Nesal, Vinayagapuram and Veerasambanur villages. Census data refers to the - recensused 11 villages.

15. *Ineqfac*, the STATA ado-file used for the analysis, provides an exact decomposition of the inequality of total assets value into inequality contributions from each of the factor components of total asstes: value of land, value of other agricultural assets, and value of non agricultural assets (see S.P. Jenkins @ http://ideas.uqam.ca/ideas/data/Softwares/bocbocodeS366003.html).

16. So the trend of greatest concentration in poorest villages between 1973 and 1983 is the opposite of what is seen in this truncated sample of villages (see J. Harriss, 1991a)

17. Nesal and Vinayagapuram had been both classified as rich villages by Hazell and Ramasamy (1991). Although Gini coefficients by village had not been reported by the previous research, we can nevertheless compare the coefficients computed with 1993 data with those calculated for 1973 and 1983 for the rich villages. The zero values in Table 6 refer to landless and assetless households. In Nesal 208 households are landless, 11 of which do not own any other asset. The first columns under each village report Gini coefficients for land and asset value distributions only for landed households and those owning some asset. Second columns, instead, refers to Gini coefficients for all households.

18. Using the distribution of land ownership amongst Nesal farmers by size categories reported in J. Harriss (1991, p. 116), a Gini coefficient is computed of 0.75.

19. In the remaining 8 villages which were re-censured the proportion of farmers with less than one hectare increased from 52% in 1982-3 to 64% in 1995 (Srinivasan, here, chapter 1-3).

20. A similar classification where 'punjai with wells' is replaced by garden land was used by John Harriss is a detailed analysis of Nesal. In his categorisation of the land of 'Randam' (Nesal), John Harriss (1982) adopted the classification used by the revenue authorities for *wetland* (or *nanjai*), as the "…low-lying areas commanded by tanks" and for *dryland* as the area above and between the tanks. He also recognised the existence of a third category of land use. This is the "…garden land irrigated from wells, though is not distinguished in the revenue classification because of the policy…..of exempting private land improvement from additional taxation".

21. John Harriss (1982) reported the following percentages: wet land 21.8%, dry land 62% and garden land 16.2%. However, we should take account of the fact that 36.5% of the total land reported in that period was dry land owned outside the village. Although a great amount of this land has been sold to a prominent family of Muslim sweet sellers in Arni over the years, the problem of under-reporting, specially for land owned outside the village, make comparisons difficult. Nevertheless, changes in the proportions of land types, and specially an increase of garden land at the expense of

dry land, do also appear when we concentrate the analysis to the land owned inside the village. From J. Harriss's data: wet 26.8%, dry 50.3%, garden 22.9%. Form 1992-93 census data: wet 29.3%, dry 32.5%, punjai with wells 38.2%.

22. Of course local farmers may have better knowledge about varieties than agriculture department officials and may have good reasons for rejecting official advice, but we have no evidence about this.

23. Appendix 3 Table 2.

24. The cost of production has been calculated, comparably to Hazell and Ramasamy's set as the total paid-out costs for seed, manure, fertiliser, pesticides and seed treatment, hired labour including payment for the animals that accompany ploughing labour) and other costs. The latter include diesel/electricity (the latter being free in 1993-4), other hired-in equipment, fodder and veterinary expenses and costs of maintenance of other implements. Left out of the calculation were the depreciation of arm implements, land rent, interest on loans and any imputed cost of family labour. Prices are at the 'farm gate' and returns exclude those from by-products.

25. If electricity were charged, it is estimated to amount to 18% of the costs of production (Chapter 2-4).

26. The Hazell and Ramasamy classification, proxying for class, is being used for

consistency: small farms are below 1 ha , 'large' farms above 1 ha.

27. In 1973, small farms were 25 % more labour intensive than large ones.

28. Attached labour is permanently employed by one particular farmer, therefore doing all kinds of work and paid partly in kind. Attachment ranges from bondage to seasonal contracts.

29. See back to Tables 17 and 20 on costs of production.

30. Marked gender bias in access to the Noon Meals Scheme has appeared in the last decade (Table 2 in Chapter 3-4).

31. In Mellor's original formulation, it does not matter how this increased income is distributed, but later on Mellor used the argument to justify a post-green revolution income distribution more biased than before towards large farmers (see Harriss, 1987a and Hart,1996 for critical treatments of this justification).

32. We offered a critique of this part of the argument with reference to the development of the regional rural **and urban** economy of North Arcot over the decade from 1973-4 in Harriss 1987b.

33. The most dynamic growth of non-farm employment in India, 1972-3 to 1987-88 was in public utilities, with construction next (Visaria , 1995, pp. 404-5).

34. 1994 data; Harriss-White, Janakarajan and Legassick, 1996

35. See Nagaraj et al, 1996, for evidence and discussion.

36. At the base of each village is a cluster (varying between 5-12 per cent of households) with less than Rs 10,000 assets. Much above this, in two of the three villages is the mass (60-80 per cent) of households averaging Rs 60,000. But in one village, this mass is twice as wealthy. In two villages, the small elite, which dominates the village economy does so with assets worth Rs 3-6 lakhs. But in Nesal this wealth category denotes an intermediate elite comprising a third of households. The latter's elite is five times wealthier. The wealthiest and poorest household studied differ by a factor of 2250; see Chapter 1-4.

37. The sample survey did not pick up beggars, who comprise about 3 per cent of the original village census.

38. The 43rd NSS round for 1987-8 estimated that 2.4 m male workers and 151,000 female workers residing in rural locations commute to work, **but also** that 590,000 male and 109,000 female workers commuted from urban locations to rural ones for work (Visaria, 1995, p. 399).

39. There is no implication that these dual flows of investment have to be equal.

40. We assume that institutional finance either is sited or flows outside villages, that the samples' rice mills are outside (which we know is the case); and we include the land and irrigation investments which we know lie in village territories outside those

studied.

41. Harriss-White, Janakarajan and Gold, 1996.

42. Piece work glove sewing had spread 30 kms south of its epicentre to reach a young, homebound, female **agamudaiyar mudaliar** labour force in Arni in 1994. Also see Kennedy, 1999.

43. www.tn.gov.in/economy/eco-sep-b,2000 and www.tn.gov.in/economy/eco-band.htm, 2001.