

1-3 TIME AND SPACE; INTER-VILLAGE VARIATION IN THE NORTH-ARCOT REGION AND ITS DYNAMICS, 1973-95

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Introduction

Planning based on aggregate data at the national or regional level frequently conceals important lower-level variations and underplays the complex relationships among a multitude of social, economic and political factors (Dasgupta, 1975). The factors of development identified at the macro level are of hardly any use in initiating economic change in smaller spatial units such as villages or groups of villages (Aziz, 1989).

The specific conditions of individual villages will determine how development policies are implemented. Understanding the reasons for variation among villages helps us to know more about critical variables in rural development (Chambers & Harriss, 1977), of particular importance in the context of the

decentralisation of powers through *panchayati raj* institutions.

Yet no specific theory that explains change in the *village* economy has been developed for India. The village was for years seen by many economists - erroneously, it turned out - as a closed subsistence economy. More recently, it has been analysed as a unit for the exercise of power: the power of social norms and the power of the propertied class over labour and even sometimes the power of labour over property (Jodhka, 1997). This power is mediated by information and threats and expressed in contracts and transactions at rates and prices varying drastically from village to village, such that the spatial integration of agrarian markets becomes something which cannot be assumed to exist (Rudra, 1992). Village class structure needs to be examined not just for an understanding of agricultural policy but also as an analytical category so as to understand economic behaviour. Though there is an abundance of micro level data from village level studies, higher order statements about the developmental experience of villages is notable for its absence (Dasgupta, 1975; Harriss, 1992). The major limitation of existing attempts to generalise is their inadequate theorisation of dynamics (Aziz,

1989). Yet theorising change in the rural economy through descriptive modelling could serve as a basis for planning the development of villages.

The longitudinal study reported here sprung from a need to trace the impact of the green revolution in South Asia. Eleven villages ¹ were selected by stratified random sampling according to two criteria: (a) villages with populations ranging from 50 to 5000 and (b) locations in non-hilly and non-reserved forest (RF) areas. ² Between 1993-95, the 11 villages were house-listed and subject to a detailed census which is used here. In this chapter we look critically at existing village typologies and justify this fresh enquiry. We then explore the methodological problems generated by it. This section is followed by an analysis of changes in the study region: in

¹. The villages in alphabetical order are Amudur, Duli, Kalpattu, Meppathurai, Nesal, Sirungathur, Vayalur, Veerasambanur, Vegamangalam, Vengodu and Vinayagapuram.

². See Farmer, B H (eds) 1977 for details.

demography, agriculture, employment and wages. The final section attempts a classification of villages using factor analysis and cluster analysis and makes a move towards theorising inter-village variation.

Village Typologies: A Review

Several attempts have been made to systematise the classification of villages.³ In the first survey conducted in 1973, it was found that continuity in the production process, particularly in agriculture, was the key factor accounting for inter-village variation in development (IVV) (Chambers and Harriss, 1977). Villages with better quality irrigation had continuous production, had supported an increase in population and met a higher demand for labour with higher wage rates.

³. See Chambers & Harriss, 1977, J. Harriss, 1991, and Dasgupta, 1975.

Two types of factors, causative and derivative, were identified as responsible for inter-village variation. The former included location, resources in relation to population and the nature of the production process. The latter comprised demographic trends, farming practices, aspects of labour relations and wages. Based on a classification according to such factors, the villages were grouped into three sets: (a) 'quasi-industrial' villages which showed symptoms of labour shortages, high or modest wage rates and semi-permanent contracts. The villages were Kalpattu, Nesal, Vinayagapuram and Vegamangalam; (b) 'seasonally expanding' villages. These had modest wages, with few regular labourers and continuous labour shortages (Duli and Meppathurai); (c) 'seasonal production process' villages where there were strong surpluses of labour; low wage rates; few perquisites and little opportunity of regular labour contracts: Sirungathur, Veerasambanur, Vengodu, Vayalur and Amudur.

The classification was based solely on agricultural jobs. Non-agricultural jobs which were developing slowly, were not included. Social institutions (such as caste and gender) and their influence on the village economy and rural labour

markets were peripheral to the classification. The connections between the quality of irrigation infrastructure, the continuity of demand for labour, levels of wages and the incidence of semi-permanent labour contracts were the analytical focus.

In the first resurvey in 1982-84, John Harriss (1991) tried to improve this classification. He identified the emergence of segmented labour markets owing existence to the development of labour relations in non-farm employment as a major factor in causing inter-village variation. Harriss classified the villages on the basis of irrigation facilities, availability of employment and prevailing wage rates (see Table 1).

Table 1: Intervillage Variation (J. Harriss, 1991)

Villages	Irrigation	Wage rates	Use of Labour (employment)
Nesal & Vegamangalam	Good	High	Low

Kalpattu, Meppathurai	Good	Relatively high	High
Vinayagapuram	Good	Low	High
Veerasambanur, Amudur & Meppathurai	Poor	Low	High
Vengodu, Sirungattur & Amudur	Poor	Low	Low
Vayalur & Duli	Poor	High	Low

Harriss stressed that growth linkages from agriculture were responsible for the spread of non-farm employment opportunities into the rural economy. Entry into non-farm employment was limited by discrimination against depressed classes (particularly **scheduled caste** households, which were forced to remain in the villages with agriculture as their mainstay. The production of silk sarees, a newly growing market-oriented commodity, was closed to the depressed classes.

Though it was an improvement over the first typology, Harriss did not explain why there could be radical inter-village variation in the relation between labour

use in agriculture and non-agriculture, in the casualisation of labour and in wages. Moreover, as in the previous survey, he stressed some variables and neglected others - such as demographic factors. There was no systematic enquiry taking into account a multiplicity of factors or one using statistical tools.

Biplab Dasgupta (1975) had earlier made such an effort using larger sets of variables to identify variations in the types of village. He analysed data collected from 126 villages by various Agro-Economic Research Centres between 1954-61. Using principal component analysis and discriminant analysis, he classified the villages into two types. Type A are advanced or modern villages and Type B are the obverse. Some villages, belonging to neither category or having characteristics of both, were classified as Type AB villages. One of the limitations of Dasgupta's study was the exclusive emphasis on variables relating to employment. Both the early village typologies, based on simple classification, and those using advanced statistical tools excluded institutional factors now known to be significant for development. Rising to the challenges caused by the different objectives of previous attempts, we faced major problems with data and method.

Methodological problems in the current study

The first problem concerned the boundary defining a village. Though the previous surveys used the census list of villages as the sampling frame for the study, they did not adhere strictly to the definition of a census village. More often, they used the village as a social unit ⁴, which in many cases differed from the boundaries of the census village. So we decided to adhere strictly to the revenue administration boundary of the villages, which is also comparable with census boundaries. This enabled us to include all the households within the boundary of the revenue village in our census listing. In other words, we have considered the socio-economic conditions of those households residing within the revenue boundary of the respective villages regardless of the location of their assets, both agricultural and non-agricultural. This means that the comparison of change over the years is very difficult. For instance, by 1993-4 in some villages, (in Sirungathur and

⁴. See Chambers & Harriss, 1977.

Meppathurai)⁵ the extent of absentee landownership was very high, up to 40-50 per cent of the total land holdings. By contrast, in other villages, (Vegamangalam, Vayalur and Duli) many households owned lands outside the revenue village.

For three villages (Nesal, Vinayagapuram and Veerasambanur), wages were studied in detail. For the remaining villages, wage data was collected by recall from agricultural labourers and well-informed farmers.

We also use the official census data for the study villages. The Census of India classifies workers using the duration of work into two groups: main workers and marginal workers. The 1991 census defined a main worker as 'one who has worked for the major part of the year, (183 days or more)'. Those who worked for less than 183 days were considered as marginal workers (consistent with definitions in the 1981 Census). The 'main workers' of 1981 and 1991 may not be consistent with definitions for previous decades.

⁵. Information given by village administrative officers.

Though data for main and marginal workers could in theory be combined, the occupational distributions of marginal workers is not available at the village level.

The next problem concerns categories. The 1981 Census divided the main workers into four categories: cultivators, agricultural labourers, household industry and a catch-all one of *other workers* which includes main workers in animal husbandry and plantation, mining and quarrying, non-household industry and service, construction, trade and commerce, transport, storage and communication and other services. Censuses prior to and after 1981 provide a nine-category data of workers, including those in services. For 1981, such data is available for districts alone. For this reason, a comparison of nine categories of workers is not possible for all the three census years, 1971, 1981 and 1991. This restricted our analyses to three categories.

The 1991 census data on villages of Kalpattu, Vayalur and Veerasambanur provide us with such exorbitantly high or low figures, that they raise suspicion about the Official Census data. Only for two years, 1971 and 1981, can the

data be compared across all the villages. Similarly, official Census data on literacy in 1981 for Vengodu seem anomalous. Due to such problems, we were unable to do a complete analysis of Census data for all the 11 villages over the years.

Demographic Trends

Generally, it appears that population in our sample villages grew slowly in the first decade, 1973-1983 and faster in the second decade, 1983-93. When population grew slowly, it was at lower rates than the state and national trend and when it grew faster, its rate was higher than the state and national trend (Table 2). The average size of the sample villages has increased from 895 in 1973 and 959 in 1983 to 1195 in 1995. Census figures for our villages in 1971, 1981 and 1991 are not only higher than those from our surveys, but their growth trends are also quite the opposite of those from our surveys.

From the **latter** in 1973-83, Meppathurai was growing very rapidly, followed by Duli and Vengodu (see Table 2). During this decade, Kalpattu had a negative growth rate of 0.94 per cent. In the second decade, Veerasambanur however

was the only village where the population showed a negative growth rate (-0.56%). Two villages, Sirungattur and Nesal, showed positive but declining trends. The other villages increased their population, Kalpattu in particular had an extraordinarily high growth of 5.25 percent in this period followed by Duli and Vinayagapuram. Over two decades, Duli was the fastest growing village, followed by Meppathurai, Kalpattu and Vinayagapuram. Villages like Vegamangalam and Amudur were stagnating or showed sluggish growth. It is difficult to explain the wide variation between growth trends of sample villages from the official Census data and our surveys.

What could be the reasons for the growing population? Can field observation explain these changes and identify factors causing or hindering growth? Our experience in the villages suggests the following comments on the trends in population growth.

In-migration is one of the major reasons for the expansion of the populations of Kalpattu and Duli. By 1995, new hamlets had been founded in both villages. Kalpattu is located on the flank of the hills bounding the region. A nearby village, Keelarasampattu, is developing as an agricultural market

place. A few years ago, homeless wage labourers in Keelarasampattu squatted on government land in Kalpattu and so formed a hamlet. A similar process has enlarged Duli, located near Cheyyar. Carpenters and other artisan families from surrounding villages who had lost their jobs migrated to Duli's new hamlet where they eke out their livelihoods.

Human Development: According to the Official Census, literacy increased from 26.3 percent (11 villages) in 1971 to 35.3 per cent (11 villages) in 1981 and 43.2 percent (8 villages) in 1991 (Table 3). The growth was even throughout both decades. **Surprisingly, literacy rates have grown much faster for females than for males.**

In the period in which we conducted our re-survey (1993-95), literacy rates were higher than the census figures for the year 1991. Among the villages, Vegamangalam (71.9), Duli (63.2), Kalpattu (60.7) and Vayalur had literacy rates much higher than region's average of 56.8 percent. Generally, male literacy exceeded its female counterpart by about 50 percent. The highest gender differences were found in Vinayagapuram (where male literacy

exceeded female literacy by 84.4%) and Veerasambanur (82.6%). The least gender differences were found in Vegamangalam ⁶ (34.8%) and Vayalur (37.9%). Similar data are not available for previous surveys.

⁶. This village revealed higher literacy rates among all the other villages from both census and survey. It has a higher proportion of scheduled castes than other villages and is located remote from the nearby urban centre (Kaveripakkam). It has two primary schools - one for scheduled castes and the other for non-scheduled castes, which may be the reason for higher literacy. Having separate schools for SCs, undisturbed by the caste-hindu local elite might have contributed to higher literacy rates. In Tamil Nadu prior to the late 1980s, primary schools were functioning under local panchayats which were under the control of local elites. However this is not to argue that there should be two schools to improve literacy (see Chapter 3-5).

When we correlated literacy with the sex ratio (SR), fertility and infant mortality rates (IMR) for all the villages, we found some interesting trends (Tables 4 and 5): **Villages with high infant mortality rates tend to have relatively low levels of literacy and highly male biased sex ratios.** Variations in the village level child sex ratios (under 6 years) are closely associated with literacy in both genders, infant mortality and fertility. **Where girls are being culled, IMR is relatively high, fertility is high and literacy is low.** Although no generalisation outside this region is warranted from these results, the correlations confirm the findings of others. Sabu George and colleagues (1992), in their study of 12 villages in western North Arcot district, found that in six villages female infanticide was practised, a major cause of the decline in the sex ratio. These villages were generally remote and poorly supplied with education. Moreover, female infanticide was widely practised by **Vanniars**, an upwardly mobile agricultural caste (though classified by the state as 'Most Backward'). Another study using 1991 Census data, found a positive relation between literacy and the sex ratio (Sargent et al, 1996). By using data from the Sample Registration and Census for the 1980s and 1990s, Basu (1999) concludes that gender inequality has been increasing in the southern states

of India particularly in Tamil Nadu, with its lead in lower fertility. Though she argued that increasing female infanticide results in such a trend, elsewhere in India sex-selective abortion is practised and in many of the villages we took for case study the mechanism of culling is neglect in health care during infancy and childhood (see chapter 3-2).

Variation in Agriculture

Earlier studies examined the impact of the green revolution on the agrarian economy and used the aspects of the agricultural economy to classify the villages. Chambers and Harriss (1977) observed change in the following factors: (i) the scale neutrality of the area under high yielding varieties among various classes of farmers (which was increasing); (ii) crop diversification (c) the extent of exploitation of groundwater for irrigation purposes (iv) the impact of high-yielding varieties and (v) trends in non-farm employment.

Trends in Agrarian Class Composition: The North Arcot region was originally selected for its high proportion of small farmers. By 1993-95 we find: (a) an increase in the proportion of landless labourers accompanied by increasing

members of absentee land owners and a decline in tenancies and (b) an increase in non-agricultural employment (Table 6) (developed by Jayaraj in chapter 1-6). **But neither trend is visible at the level of the household**, when it is classified by the main source of income and ownership of assets. Both proletarianisation and economic diversification are processes which take shape inside households, through individual members, as components of the household's income stream.

In 1993-95, landless households accounted for 38 percent of households in the region. They were 36 per cent in 1973. However, **there are dramatic IVV in trends in landlessness**. For instance, while in 1973 in Vinayagapuram, 16 percent of total households were landless agricultural labourers, they were 37.23 per cent in 1993-95. Amudur increased its share of landless households from 24 per cent to 37 per cent. However, in four villages (Vendogu, Vegamangalam, Veerasambanur, and Kalpattu) the proportion of landless households was **reduced** overtime.

The proportion of non-cultivating owners increased from 1.6 percent in 1973 to 3 percent in 1993-95. Amudur and Nesal had about 5 per cent of

households in this category. In Sirungathur, no such households were found.⁷

Due to the absence of village land data on tenancy from previous surveys, we can make no conclusions about historical trends.

Though we will analyse the changing dynamics of non-farm employment in the study region later, we note here that households depending on non-agriculture as their main source of income increased from 9.6 per cent in 1973 to 15.85 in 1993-95.

⁷. In Vayalur as many as 7.7 per cent of households were tenant cultivators.

Since 1973, farming households have been classified into two categories, (a) small farmers – those who own less than one hectare (or 2.47 acres) and (b) big farmers – those who own more than one hectare (Hazell and Ramasamy, 1991). Despite the crudity of such a classification, we have followed it in order to trace the changes over the years. Table 7 shows that there has been an increase in the proportion of small farmers from 52 per cent in 1973 to 58 per cent in 1982 and further to 64 per cent in 1993-95. Except for Duli (41.35%), Meppathurai (45.53%) and Vengodu (57.58%), the villages have always had proportions of small farmers higher than the region's average. Small farmers account for more than three-quarters of the farm households in Kalpattu and Sirungathur. **The distribution of ownership of land is increasingly unequal.** Small farmers (64% households) owned only 29 percent of the total lands in the study region. Against this, large farmers who account for 36 per cent total households owned 71 per cent of the total lands. Land ownership was most unequal in Nesal, Sirungathur and Vegamangalam (see Table 6). Whilst the average land holding size was 2.52 acres in 1993-95, Duli and Nesal, had average holdings of 3.97 and 3.24 acres respectively. Average land holdings were lowest in Kalpattu, Sirungathur and Veerasambanur.

Cropping Intensities: There are two types of indicator of cropping intensity.

The first is normal cropping intensity (NCI) defined as the proportion of total area under various crops to total operational holdings. The higher the NCI, the more intensively land is being cultivated. However, one of the limitations of this method is that it gives equal weights to all crops - irrespective of how many seasons it takes to produce. So sugarcane, a one-year crop, is given equal weight as groundnut, which needs a maximum of five months. In order to overcome this problem, we estimated adjusted cropping intensity (ACI) defined as the proportion of total area under all crops (area under long term crops times 2 or 3 + area under other crops) to total operational holdings. Among the villages, the average NCI was 117 per cent. Vegamangalam had a higher NCI (Table 8); Meppathurai had lowest (79%) followed by Sirungathur. Using the ACI, we observed that the cropping intensity improved from 117 to 142. Except Duli, **all the villages have improved their cropping intensities**. In Duli, farmers cannot cultivate long-term crops such as sugarcane due to the unsuitable quality of the soil. The difference between

the two cropping intensities exposed a set of villages (Kalpattu, Nesal and Vegamangalam) in which long term crops are now cultivated. The prosperity of agriculture can also be seen in the variation of cropping intensity according to the two definitions (Table 8). Using formula of simple growth rates - the difference between ACI and NCI in percentage terms is $(ACI-NCI)/NCI*100$, Kalpattu, Nesal and Vegamangalam are the villages in which the difference in measures greatly exceeds the average of 21.66 per cent. Kalpattu's is 67.33 per cent, and Vegamangalam's 32.44 per cent. Kalpattu is surrounded by hills collecting rain that recharge the ground water table, so that farmers are able to cultivate over the entire agricultural year. Due to the construction of a big overhead tank to supply water to Kancheepuram (the town near to Vegamangalam village) the natural spring which supplied water to this village in 1970s and 1980s now dries up frequently. Previously, it used to get water for irrigation for 9-10 months a year. While earlier paddy was cultivated three times a year, now a single crop is grown. There are no ground water resources in the village, and the terrain below is impermeable. When multiple-cropping stopped being possible, land where water was available was purchased outside their village for the cultivation of perennial and annual

crops. Nearly 30 per cent of the land owned by Vegamangalam farmers is outside the village (Table 7).

Irrigation Intensity:

The cropping intensity is determined by the irrigation potential of the area. Changes in irrigation infrastructure underlie changes in the agricultural economy. **Irrigation infrastructure has stagnated over the years** (Table 9).

The 10-year growth rate of the number of wells (in use) fell from 8.4 per cent in 1973-83 to 1.34 per cent in 1983-93. The growth of electrified pump sets also declined in similar fashion.⁸ In 1973-83, the absolute number of wells

⁸. From the late 1980s, the Government of Tamil Nadu provided power to farmers virtually free of cost. This led to sudden increase in applications for power connections. In some areas, farmers waited for more than 10 years to get them. Recently the state government announced immediate power supply to those who pay a deposit of Rs. 10,000. But political and technical turmoil over this issue prevented the implementation of this scheme.

increased in all villages but Amudur and Sirungathur. During this period, Duli and Nesal trebled their wells.

In 1983-95, in four villages, (Duli, Nesal, Sirungathur, Veerasambanur), growth had become negative. **Many wells have been abandoned.** The irrigation intensity defined as the proportion of total area irrigated to total cropped area tells us about IVV in the intensity of current irrigation sources. It reveals that Vegamangalam, Meppathurai and Amudur have a high irrigation potential with around 90 percent of the gross cropped area irrigated. Kalpattu and Vayalur had an intensity of around 80 per cent.

Cropping Pattern:

Paddy remains the predominant crop, covering 47.01 per cent of the total cropped area in the region on average (Table 10). It was 74.24 per cent in Amudur, 58.72 per cent in Meppathurai and 50.36 per cent in Veerasambanur, while it was considerably lower in Kalpattu (31.81 per cent) and Vayalur (36.75 per cent) where non-staple commercial crops are cultivated. The former is a dry-land village where there is insufficient water

and the latter is an irrigation-rich village where a particular variety of cotton suited for both dry-land and wet-land farming is being cultivated. By contrast, plantain, turmeric and Indian kale (yam) were commercial crops cultivated in Kalpattu from as early as 1973. The second major crop in the region, groundnut, is cultivated mostly on unirrigated lands. In Duli and Vinayagapuram nearly half the total cropped area is put to groundnut. Sugarcane, recently introduced in the region, occupies third place. It is cultivated mainly in three villages – Vegamangalam, Vengodu and Meppathurai. The first two villages sell cane to new sugar mills nearby, whereas Meppathurai, which does not have a surfaced road facilities is prevented from milling sugar. Instead, farmers manufacture **jaggery** and export it to Andhra Pradesh where it is used in the rural distillation of arrack liquor.

Employment Patterns

Earlier studies found that the use of High Yielding Varieties (HYVs) of paddy had increased employment in the study region on a seasonal-basis - during harvesting and threshing. Among the conclusions for policy were widening

the irrigation potential and bringing more land under cultivation (Hazell and Ramasamy, 1991). However, the development of non-farm employment has changed the set of livelihood possibilities in nearby towns and distant cities (particularly Chennai/Madras and Bangalore). These non-farm jobs have not benefited all castes. **The labour markets in nearby urban areas where non-farm jobs are available and expanding are highly segmented and discriminate particularly against scheduled castes and women.** (See chapters 1-5 and 1-6).

Over the years, the proportion of households doing agricultural labour has fluctuated. It was 21.8 per cent of the total population in 1973; it increased to 23.77 per cent in 1983 and then declined to 18.71 per cent in 1993-95 (Table 11). In Amudur, the proportion of agricultural labourers was highest. **Agricultural wage work appears a highly unstable process.** Other villages have seen fluctuations and have changed their rankings considerably. For instance, Vinayagapuram employed the lowest proportion of agricultural labourers in 1973. It suddenly jumped to second rank in 1983, and then again declined to fifth position. In Nesal and Veerasambanur, the proportion

of households working as agricultural labourers has declined over the years. Some villages increased in the first decade and declined in the second decade (Amudur, Duli, Vegamangalam and Vinayagapuram) or vice versa (Kalpattu and Vayalur). Meppathurai was the only village where the proportion of agricultural labourers grew positively but with a declining rate.

Due to differences in the methodology of classification the Official Census revealed a different picture (Table 12). The proportion of agricultural labourers was increasing as that of direct producers declined and non-farm employment hardly rose. Non farm-employment stagnated at 10 percent in 1971 and 1981 increasing to 18 per cent in 1991. Vinayagapuram, with only 3.83 percent of non-farm jobs in 1971, increased its share to 39.25 percent in 1991. The development of artisan - silk saree weaving and related activities was responsible for the trend. Other villages (Nesal, Vayalur, Vegamangalam and Vengodu) have been industrialised. However, due to inconsistencies in data availability, we found it difficult to come to any definite conclusion, except on the two following points: (a) **agricultural livelihoods have been transformed progressively into wage labour** on farm and non-farm jobs and (b) **the growth of non-farm employment has profoundly affected the rural economy.**

Changes in the agricultural labour force may be the product of diversification to less labour intensive crops. Amudur has the highest cropped area under paddy, which may be the reason for the higher proportion of the labour force in agriculture. Here, male agricultural labourers also get seasonal employment in sugarcane fields, migrating to Andhra Pradesh every October / November and returning in June/July. In the case of Kalpattu, commercial crops are grown more extensively both on a long-term and short-term basis, requiring a continuous supply of labour. Our house-listing survey did not allow us to probe further on the issues, except in the three villages taken for detailed study (see Janakarajan, S., 1996).

By 1993-95, while villages far removed from urban centres (such as Amudur, Kalpattu, Vegamangalam, Vengodu and Meppathurai), have less than one - fifth of their total workforce in non-farm jobs (Tables 13 and 14), more than one-third in all the other villages worked outside agriculture. Silk saree weaving has entered Sirungathur, Duli, Amudur, Meppathurai, Veerasambanur, Vinayagapuram and Nesal. Due to their proximity to towns,

employment in Duli, Nesal, Sirungattur⁹ and Vayalur includes a considerable proportion in trade and services. Other linkages to agriculture also play a considerable role in employment generation. For instance, animal husbandry gave employment to 11 percent of the work force in Nesal (in milk cooperatives and other related activities).

With regard to gender differences in the workforce distribution, the proportion of women in employment was 29.5% in Amudur, 30.7% in Vegamangalam and 24.4% in Vayalur (see Table 14). Female participation was lowest in Vinayagapuram and Veerasambanur. The proportion of women in agriculture (as labourers) exceeds that of men everywhere.

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. We found that a few public works contractors from Cheyyar, engage workers from Sirungattur colony on a long-term basis. In the same manner, owners of brick-kilns in Vegamangalam employ local labourers on regular basis. This could be one of the reasons the workforce trends towards non farm jobs there.

Trends in wages and earnings

In the early 70s, the introduction of HYVs in North Arcot villages increased employment, which it also widened income inequality. The income of cultivators of HYVs increased by 75 per cent over producers of traditional varieties whereas that of agricultural labourers increased by only 33 per cent. Moreover, this employment was not sufficient to absorb the total underemployment in the area (Nanjamma et al., 1977, p. 216). However, it was optimistically predicted that better irrigation endowments would lead to more intensive cultivation, generate a higher and more continuous demand for labour and thereby higher wage rates. However, John Harriss (1991) found in 1983 that labour markets were not strictly market-driven, as hypothesised earlier, but were instead significantly influenced by institutional factors, notably caste. He argued that one vector of IVV involved wages and labour use.

In 1993-95, **wages prevailing in the study villages were far from homogeneous for all operations** (Table 15). For instance, though an agricultural labourer ploughing a farmer's land and providing labour services

alone, was paid Rs.10 per day, if he went with plough and bullocks, he got Rs.30 per day in Duli, Rs.25 in Vegamangalam and Rs.50 in Kalpattu. The agricultural labourer does not always need equipment to earn a reasonable wage. For instance, in the harvesting and threshing of paddy, the labourer works with her bare hands.

Wages varied by operation, gender and working hours (Table 15). In some villages, work started in the early morning, in others not until 9 or 10 am. Wages were not fixed, but varied with the size of specific land holdings, hours of work and season. The perquisites provided during the work were also not standardised, but were determined mainly by the distance of the work from the houses of the labourers and by the labourers' preferences. For example, in Kalpattu, labourers preferred to have a meal from the house of their employer because their own houses were located in the main village, whereas in Vayalur, labourers preferred to be paid extra wages instead of food. Wages are still paid in kind for all harvesting operations, except those for commercial crops such as plantain, cotton, turmeric and sugarcane (Table 16). For these crops, labourers are paid either on a fixed contract basis or via

piece rate wages in cash along with perquisites. Detailed research in three of the 11 villages found that besides gender discrimination against women in the growth of real wages, most of the earnings of women goes to household income, unlike that of men which is for private consumption (see Chapter 1-5).

Gender discrimination in wages is severest in commercial crop cultivation, particularly sugarcane. Though it provides higher wages for both genders, it fails to give employment throughout the year. Wages are generally fixed on a contract basis (Rs.65 - 100 per tonne) along with food expenses. During the harvest season, women worked alongside men in bundling sugarcane and carrying it from the field to the main roads from where it would be transported to the sugar mills by lorries or tractors. While all male labourers shared the income from the contract payment for the harvest, fixed wages were given to women labourers (along with perquisites). The share of male labourers was 2 to 2½ times higher than that of female labourers. This was not so in other crops, such as paddy, where women workers predominate and male labourers are paid the same rates as women.

The real wages for women in Vengodu are low and have been declining over the years, (Table 17). In this village, family labour is involved in operations like transplantation and harvesting. Certain tasks are also performed through mutual 'exchange of labour'. It appears that frequent caste conflicts between two dominant middle castes, **Vanniyars** and **Yadavas**, is the reason why the exchange labour system is sustained among their kith and kin. During the peak seasons, it was difficult to find sufficient willing labourers, the number of scheduled caste agricultural labour households being minimal. Thus, limited dependence on scheduled caste landless agricultural labourers kept wages low over the years.

Wages for the harvesting and threshing of paddy were unexpectedly high in Veerasambanur and Vinayagapuram, but the wages for other operations compensated by being relatively low. Over the period 1973-95, the real wages for harvesting declined in Vengodu and Amudur. In Amudur, the decline of area under paddy probably accounts for this disaster for agricultural labourers.

The wages for threshing were double or treble the wages for harvesting. Working hours for this operation ranged within and between villages from 8 to 16 hours per day without a break. In some villages, agricultural labourers were tied to work for farmers who gave them credit, as a result of which they received wages which were less than 'market' rates. Normally peak season wages would be slightly higher than those during the rest of the year. Farmers give interest-free loans to some labourers, to tie them to work for lower wages regardless of the season. Indebted labourers are not exactly at the beck and call of their employer-creditors. They may work for others when there is no work in their fields. Certain farmers kept labourers under an implicit contract whereby they are given less than the going wage but are employed more frequently. When compared with the Minimum Wages fixed by the state government, men, except for ploughmen, were earning above the statutory minimum wage but women earned below it.¹⁰

¹⁰. See Srinivasan, M V 1997 for details on Agricultural Minimum Wages in Tamil Nadu.

Per capita Income and Liabilities

An approximate per capita income per annum was calculated on the basis of the complete census enumeration of households. The average annual per capita income was Rs.2,742. The top ranking three villages (Vegamangalam, Amudur and Kalpattu) had an average of Rs.3,506, nearly 60% greater than the average for the lowest three (Veerasambanur, Meppathurai and Sirungattur) at Rs.2,228 (Table 18).

Cultivators everywhere had higher incomes on the average than agricultural labourers and non-farm households. Non-agricultural households have higher average earnings than landless agricultural labourer (LAL) households.

Landless agricultural labouring households earned only 37.3 per cent of the average income of cultivators whereas non-farm household members earned 62 per cent of those cultivators. Cultivators in Nesal and Vegamangalam earned a higher per capita income than those elsewhere. Sirungattur and Veerasambanur's cultivators earned lowest incomes. In case of agricultural labourers within their respective villages, those in Nesal, Meppathurai and Vegamangalam earned between 23-27 per cent of income earned by

cultivators. In Vinayagapuram and Sirungattur, agricultural labourers earned more than 50 per cent of the cultivators in their villages. In four villages, they earned more than 75 per cent of cultivators' incomes (Veerasambanur, Sirungathur, Vinayagapuram and Amudur).

If we presume that sources of liabilities signify sources of credit, we find that many of these villages depend little on formal sources of credit (see chapter 2-5). Less than one-third of the reported liabilities are from such sources (Table 19). When we compared this trend with the previous decade for which we have data for four villages, we find that **the role of the formal sector is not only low but also declining** (from 44.75 to 33.19 per cent). While 47.45 per cent of the total liabilities of landed households in the 11 villages was from formal sources, only 33% of landless agricultural labourers' debt was from the banks and in non-agricultural households, it was down to a quarter.

Formal credit ranged in penetration : from Vengodu where 61 per cent of total debt was owed to formal sources to Kalpattu, Veerasambanur, Sirungathur and Vinayagapuram (only 20-30 per cent).

What is the reason for IVV in types of credit? We can answer using examples. Due to the prevalence of local chit fund savings, borrowers in Kalpattu depended more on informal sources. Most of the households were involved in at least one chit fund. Chit fund organisers were either wealthy, educated farmers or government employees. There was fierce competition among the members who bid for the chit at each auction, a process by which bidders they can find themselves further indebted. In Duli, non-agricultural households did not have any institutional liabilities due to lack of access to institutional credit and sufficient regular income from service jobs (carting and loading) to depress demand for consumption loans. Most scheduled caste labourers could in principle gain access to institutional credit, especially that of the Integrated Rural Development Programme. Yet despite repeated loans, they were able neither to generate assets (Table 20) nor to improve their standards of consumption.¹¹

¹¹. But see chapter 2-5 where barriers to their access are revealed.

Identifying Dimensions of Inter-village Variation and Classification of Villages

Factor Analysis: So far we have analysed IVV in terms of trajectories of change over two decades:- in demographic factors, agriculture, employment and earnings. We have not looked into the relationships between these dimensions. There are evidently intractable difficulties in identifying factors causing inter-village variation. We can however use statistical tools - in particular factor analysis - to identify variables or groups of variables which cause inter-village variation.

This technique has been used widely by social and behavioural scientists to identify a relatively small number of factors that could be used to represent relationships among bundles of many inter-related variables. Here, from the set of different methods of factor analysis, we selected principal component analysis because components or factors loaded using this method can explain greater variations than other methods.

Apart from our Census of households, the information given by village administrative officers has also been used. To start with, a correlation matrix was constructed for 42 variables with the objective of removing some variables in order to avoid multicollinearity. We have used two criteria for removing variables: (a) the smallness of correlation coefficients and (b) variables with abnormally high negative coefficients. Low correlations make it unlikely that variables share common features. The second criterion is used to take one variable to represent the set of two variables in which one would be the residual of the other. In our model, only one variable (Normal Cropping Intensity (NCI)) had low or zero coefficients with all the other variables and four variables (the proportion of large farmer households, the land owned by large farmers, the percentage of other-backward classes and the percentage of non-agricultural assets including gold and savings) had high negative correlations. So, we removed five variables and extracted factor loadings. The missing values for two variables (the fertility ratio and wells per acre) were replaced with mean values to avoid the total cases being reduced to seven.

Four factors exhibit similar kinds of correlations in the model. The number of factors was determined as the minimum which could explain the larger part of the variations in the sector of villages. In our case, the first four factors explained nearly 72 per cent of the variation. Another six factors explained only 28 per cent of the total variation.

Though the factor matrix indicated some relation between variables and factors, the next analytical stage - providing an explanation for the factors - was difficult. If several factors have high loadings on the same variables, it is difficult to ascertain how the factors differ. In our model, seven variables have had high loadings on three factors.

Using the varimax method of orthogonal rotation, we derived a rotated factor matrix. The varimax method is most commonly used and can minimise the number of variables that have high loadings on a factor, which helps the interpretation of the factors.¹² In this process, two commonalities and the

¹². The interpretation for the factor matrix or factor loadings is similar to that

total variance did not change but there was a slight change in the distribution of variance accounted for by each of the factors.

It appears that the first factor represents the variables relating to **wet and dry agriculture and the development of non-farm employment**. This factor relates positively with i) the area under groundnut, the principal dry land crop in the region; ii) non-farm employment for males; iii) the per capita income of landless agricultural labourers; iv) work participation rates; v) the sex ratio; vi)

for standardised regression coefficient in the multiple regression equation with the original variable as the dependent variable and the factors as the independent variables. If the factors are not correlated, the values of the coefficients are not dependent on each other. In short, the factor loadings represent the unique contribution of each factor, and are the correlations between the factors and the variables. When we judged how well the four-factor model described the original variables, the table revealed that all the variables were explained by more than 30 per cent. Except six variables, the model explains all the other variables by more than 50-99 per cent.

the work participation of women and female cultivators; vii) male landless agricultural labourers; viii) irrigation intensity; ix) the area under paddy, x) female landless agricultural labourers, xi) population per acre and xii) the fertility ratio.¹³ In this factor non-farm linkages are associated with wet and dry agriculture. More males were engaged in non-agricultural activities, fewer women were engaged in agriculture as their main occupation, economic participation rates were higher and fertility rates were lower and sex ratios higher.

¹³. Though many variables other than non-farm employment are influenced by this factor, it influenced positively the area under groundnut, and negatively male agricultural labourers and male non-farm male workers.

The second factor reflects **backwardness**. Though having a high positive correlation with the incomes of non-farm households, variables such as female literacy, male literacy, the sex ratio of children below the age of 6 and income earned by cultivators correlated negatively in this factor. The extent of work participation of females, the dependence on a few wells, the ownership of lands outside the village are characteristics of villages which have scored positively on this factor. Lower rates of literacy, a sex ratio biased against women, which could be due to excess female infant mortality and low incomes from agriculture feature in this factor.

The role of social and institutional factors has not been studied in earlier attempts to typologise villages. They are difficult to quantify. We collected information on caste in the study villages and included it in the model. The proportion of **Scheduled Castes** (SCs) is important to the third factor. The characteristics of villages which scored positively on this factor are: a high proportion of female non-agricultural labour, a low proportion of cultivators, a high proportion of SCs, proximity to urban locations, lower acreage under crops other than paddy and groundnut, lower dependence on informal

sources of credit and higher involvement in agricultural allied activities such as animal husbandry. We call this factor **Gender and Caste Sensitivity** due to the fact that the variables with the highest coefficients related to gender and caste. Among non-farm workers and cultivators, it was women who had higher coefficients than men.

The fourth factor clearly identifies the **Distribution of Means of Production and Liabilities**. All the factors have shown the relative poverty of a subset of villages. This factor is construed by the proportion of small farmers, the area owned and cultivated by small farmers, informal sector liabilities of landless agricultural labourers and cultivators, and the cultivation of crops other than groundnut and paddy. Two variables, agricultural assets and male cultivators, had negative relationships.

The relationship among the variables causing inter-village variation is highly complex. However, their influence in the form of different factors is evident. One factor, non-farm linkages with dry-land farming, affected inter-village

variation very strongly. The first two factors also were strong in demographic and human capital variables.

Hierarchical Cluster Analysis: Though we have identified four factors, which account for the bulk of variation in the village economy, the work of classifying these villages remains. Due to the inter-relationship of many variables, the factor scores of villages is inadequate for a classification of villages. For instance, the village of Duli scored positively on one factor but negatively on another. Since the factors can also be used as variables representing the set of other inter-related variables, by using these factors it is possible to classify the villages using another multivariate technique - hierarchical cluster analysis (See Appendix).

In order to combine clusters, we use the 'average linkage between groups' method (in which the distance between two clusters as the average of the distances between all pairs of villages in which one member of the pair is from each of the clusters). Once the distance matrix is calculated, clusters

can be computed. Table 21 summarises clusters, using the method of average links between groups

From the clustering co-efficients, it appears that a five-cluster solution is appropriate for explaining the inter-village variation of the study region (see Table 22).

Table 21: Village Classification, 1993-95.

Cluster Number	Villages	Type
Cluster 1	Amadur, Meppathurai and Vengodu	ag. underdevd
Cluster 2	Duli	suburban
Cluster 3	Kalpattu	remote, ag., commercialised
Cluster 4	Nesal, Vayalur and Vegamangalam	developed
Cluster 5	Sirungathur, Veerasambanur and Vinayagapuram	SC, poor, socially embedded

The clustering of villages is based on the factor scores of each village. Villages in **Cluster 1** have higher proportion of agricultural assets with moderate cropping intensity and higher irrigation intensity. They are generally far from towns, with lower economic participation rates. Their sex ratios are highly biased against women in general and children in particular, accompanied by higher fertility. Nearly three-quarters of the population are from depressed communities (SCs). Over half the farmers are small farmers, and owned only 23 per cent of the total land.

Duli is an isolated village represented by **cluster 2**. As mentioned earlier, this village has a dry agriculture and is being suburbanised. Kalpattu (**cluster 3**) is also a unique and advanced agricultural village. It is far from urban centres and all the variables relating to agriculture show prosperity, including per-capita income. In terms of demographic indicators, we observe a perplexing trend. Both of the unique villages have strongly anti female sex ratios, though that of children for Kalpattu is higher than in Duli.

Villages in **cluster 4** are ahead of other villages in providing more literacy to women, having a low fertility rate, less biased sex ratios for general population as well as children. They are close to towns (the average distance being 10 kms.). In agriculture they have a higher irrigation intensity and cropping intensity with more small farmers. **Cluster 5** represents villages where social institutions such as gender and caste are reflected most strongly in the economy. The villages are on average 15 kilometres away from town. More than 43 per cent of male workers are engaged in non-agriculture employment. Yet they have low levels of female literacy. However their work-participation rates are highest. The sex ratio remains biased against women but less so than in other clusters with the exception of cluster 4. Work participation is also high. We found the highest proportion of SCs residing in this cluster, accounting for 46 per cent of the total population.

Conclusion:

In what way is this classification superior to previous typologies? Is it possible to theorise from the above analysis? Or is it simply another five-fold classification similar to the three-fold classification of 1973 and six-fold classification of the 1983 surveys?

Given the increasing complexity of the rural economy, we attempted a fresh typology which takes into account other characteristics of villages than considered in the 1970s. This typology enables the analysis of the relations of each factor with others.

Methodologically the present study suffers from intractable difficulties if used for the tracking of **trends**. However, we can summarise broad changes in the region from this detailed analysis of the censuses of 11 villages.

Population growth has accelerated not only through high fertility, but also through selective in-migration. Female literacy has increased over both the decades, but this has not improved the survival chances of girls. The sex ratio in general and for children aged below six in particular has moved against females (see Chapter 3-2).

There has been a general feminisation of agricultural employment. But this has not improved female earnings. The pattern of ownership of land reveals a rapid increase in petty holdings and in the casualisation of the workforce. Crop diversification has further intensified with an increase in the seasonal demand for labourers for less water-sparing crops. Diversification is mainly due to a decline in the growth of irrigation infrastructure, dating from the second decade of the study period.

Agricultural employment has declined while non-farm jobs have increased. In 1993-95, nearly one-quarter of the economically active population was engaged in non-farm activity. When compared with state and national trends, this is quite striking. However, this growth is still structured by proximity to urban locations and other social factors, like caste.

Wage determination in the region is a complex phenomenon influenced by many institutional factors. Gender discrimination prevails with denial of statutory minimum wages to women workers. Earning differences across different classes vary substantially. Those households depending on non-farm employment are better off than the agricultural labouring classes. The dependence on informal sources of credit has increased over the years. On the one hand, new forms of informal credit have evolved. On the other hand state-directed credit institutions are on the retreat.

Multivariate analyses of the village level data reduced variables into four factors, and grouped the villages into five types. The present typology is not based on any of the other preconceived classifications but on the careful measurement of relationships among the major variables causing inter-village variation in levels of productive and human development. The factors influence the variables relating to non-farm employment, irrigation infrastructure, proximity to urban locations, demographic factors and distribution of the means of production. However, a major feature of this venture is the close relations between the variables which render the classification of villages watertight. **Key variables such as the sex-ratio, female literacy, the intensity of irrigation, the proportion of small farmers, the**

extent of non-farm employment for males and proximity to urban locations are the main dimensions of inter-village variation and need to be investigated further in future.

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