Changes in Living Standards in Villages in India 1975-2004: Revisiting the ICRISAT village level studies

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Abstract

This paper examines changes in living conditions in the six villages in Andhra Pradesh and Maharashtra, initially surveyed during 1975-84. We link the original Village Level Survey (VLS) households to a new survey in the villages conducted during 2001-04 and further extensive survey work in 2005-06, including tracking survey of all individuals ever interviewed in the original VLS. Despite issues related to attrition and changes in the survey instruments, we find that monetary welfare indicators (such as incomes, assets, consumption and poverty), and non monetary indicators of well-being (such as basic literacy, education and health outcomes) have improved considerably. We find the considerable attrition rates observed can be linked to within-household relational variables such as gender, relationship to the head and birth order. Migrants have experienced faster welfare improvements than non-migrants, but more analysis is needed to confirm whether this is due to their initial characteristics or due to their migration. Finally, we explore the correlates of consumption and income growth, and changes in poverty. We find that consumption growth is linked to initial households characteristics, in particular the presence of high literacy in the household, and of young children, especially boys, in the baseline year (1983) is strongly correlated with growth. Other assets, such as land, have a negligible impact, suggesting that labour and human capital have been instrumental for growth. Poverty declined in all villages, but especially in the Mahbubnagar villages in Andhra Pradesh. Labour endowments and literacy appear to have been crucial. Surprisingly, lower caste groups have experienced faster poverty declines, although this effect is largely confined to Mahbubnagar in Andhra Pradesh.

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Contents

List of tables

List of figures

1. Introduction

The understanding of the dynamics of wealth and poverty is at the core of research in development economics. Much theoretical and empirical research is motivated by increasing our knowledge of the basic processes of enrichment and impoverishment. Nevertheless, we have surprisingly limited micro-level quantitative evidence on long-term changes in incomes and consumption, let alone its determinants. The available evidence is suggestive of much income mobility in the developing world, but most of this work, with a few notable exceptions (e.g. Rosenzweig, 2003) is based on relatively short panel data or interpretative analysis of large, repeated cross-section data sets (see Fields, 2001; Baulch and Hoddinott, 2000; Dercon and Shapiro, 2007). This paper is one of the first outputs of an ambitious project: to provide a systematic update on the ICRISAT Village Level Studies, based on much new data collection since 2001. The result is a long-term panel data set, covering 1975-2005. We ask what has happened to these well-studied households and individuals, particularly in terms of their incomes, consumption and current whereabouts?

It is hard to think of any other data set in development economics that has been as influential as the village level data collected between 1975 and 1984 in the ten villages that formed the core of the ICRISAT data set.[1] Even though only 240 households were covered by the core data set, dozens of doctoral dissertations and some of the most influential articles in empirical development microeconomics used this data set, on themes such as nutrition, technology adoption, tenancy contracts, activity choice, consumption smoothing or risk sharing. Many stylised facts about the microeconomics of development appear to stem from these villages. Take a random published empirical paper dealing with the microeconomics of development written between 1985 and the mid-1990s and the odds are that it will be a paper on these six villages.

In this paper, we use new data collected in six of the ICRISAT villages on income, consumption, assets and perceived wealth changes since 2001. We find that all indicators show a systematic and substantial increase in the standard of living. Given that the instruments are not altogether constant over this period, we conducted a series of robustness tests for these results and they confirmed the basic findings. Most available long-term panel data suffer from serious methodological problems, including those related to how split-offs and attrition linked to migration might be handled (Rosenzweig, 2003). We can nevertheless conclude that our core findings are robust for those that remained in rural settings, using findings of a detailed 2005 tracking survey of all original individuals covered by the earlier survey rounds and preliminary analysis of the post-2005 data. The available tracking information, however, shows substantial divergence between those that stayed in the community and those that left. More data analysis is currently taking place to study in more detail the individuals who left the community, and these data will allow analysis that complements the results of this paper.

2. The Data

The data collection was conducted by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), near Hyderabad. The core data are based on surveys in six villages across India's semi-arid tropics, more specifically in Andhra Pradesh and Maharashtra, with the shorter data set based on data from Madhya Pradesh and Gujarat. This paper is concerned only with the core data set on the 240 households from three districts and six villages: Aurepalle and Dokur in Mahbubnagar District in AP, and Shirapur and Kalman in Sholapur District and Kanzara and Kinkheda in Akola District, Maharashtra.

[1] The full data set contains 4 more villages, but the data collection started later in these additional villages and has not often been analysed in conjunction with the 6 other villages. In fact, many classic papers only use 3 villages, for which full consumption data were available beyond 1977.

The villages are generally poor, and their main economic activity is dryland farming, with some irrigation. Much descriptive information on these villages can be found in Walker and Ryan (1990).

During the first period of ICRISAT data collection, 1975-84, the extent of changes to livelihoods and living conditions were relatively limited, although some modest growth in incomes and consumption appears to have been present. Nevertheless, a most striking feature was the highly fluctuating nature of incomes and to a lesser extent consumption, subsequently much exploited in work on risk and fluctuations (Walker and Ryan, 1990).

By 2001, when the subsequent data collection started, the Indian economy was undergoing rapid change. Economic growth has picked up substantially, and during the 1990s, gradual but steady economic liberalisation has taken place. The national data based on the National Sample Survey (NSS) suggests substantial poverty reduction in the second half of the 1990s, although methodological concerns appear to bedevil a conclusive assessment of the poverty change in this period. Furthermore, there are concerns that many rural areas and particular groups of the poor cannot take advantage of these improved economic conditions, and indeed remain in deep destitution. Work that helps to document and interpret the changes, if any, that are taking place in vulnerable rural areas in India over the longer term are necessary to understand the possible pathways out of poverty available, and the nature of policy changes that could assist poverty reduction in such areas.

In Appendix 1 a detailed discussion is presented on the data available from 1975-84, 2001-2004, 2005 and the data collection from 2005-06. In this section, we limit ourselves to a selective discussion of two issues that are relevant for our study, but also beyond. First, the problems with a long-term panel in a rural setting, broadly speaking related to attrition. Secondly, problems related to comparability over time of the data.

In the original surveys, 40 households were interviewed per village, stratified by land holding, (including a group of landless labourers). ICRISAT aimed to study *village* economies and therefore tried to keep its sample intact and representative in terms of households from the different land size groups. The implication was that households that dropped out were replaced by households from similar land classes. Split-offs were not included in the sample, while out-migrants where simply dropped. The resulting attrition rate for the full panel was therefore 10% between 1975 and 1984 (Walker and Ryan, 1990), with the majority of the household dropouts being landless or those with a relatively high level of labour earnings (Townsend, 1994).

This clearly presents a problem for the study of wealth dynamics (Rosenzweig, 2003). However, the problems go beyond this once one aims to conduct a long-term study. Split-offs and out-migration will continue to increase, as well as drop-outs due to deaths. Over time, the notion of a 'household' as a primary unit of observation becomes increasingly problematic (Ashenfelter *et al*., 1986). A tracking survey conducted in 2005 in the villages on all individuals ever interviewed in the ICRISAT data provides illuminating evidence on this (see Table 1). We were able to collect information on the whereabouts and other indicators of 1964 individuals of the 1998 individuals in the villages between 1975 and 1984, although in some cases only via key informants, due to temporary or longer term absences.[2] Table 1 shows what happened to these individuals. By 2005, 44 percent of the individuals were left in the village, 22 percent had died, while 34 percent had out-migrated. All members of one

[2] One way of reporting this information is that we managed to collect information on 100 percent of the original households, and almost 98 percent of the individuals. Since this is the way some surveys report attrition rates, we can conclude that we have 0 percent pure attrition at the household level, and 2 percent at the individual level. Note that in a large number of cases, information had to be obtained from family or acquaintances, so not all information is available for everybody. Of course, once we need to take into account what information could be collected, from the point of view of particular analysis, these attrition rates are higher.

household had died by 2005, and the individuals still residing in the villages in 2005 were linked to 199 of the original 1976 households implying that 40 households had out-migrated in its entirety.[3]

Table 1: Tracking and attrition in the 2001-2004 survey

Status by 2005	Full sample of individuals included in 1975-1984 with tracking information in 2005	Of which: Included in the 2001 survey, i.e. in the village and in the sample in 2001	Of which: Not included in the 2001 survey.
Dead in 2005?	432	24	408
Migrated in 2005?	675	45	630
In village in 2005?	857	581	276
No information in 2005?	34	4	30
Total	1998	654	1344

Note: based on attempts to track 1998 individuals included at some point between 1975-84 in the original households of the 1975-84 sample. Not including servants.

In 2001, ICRISAT undertook to restart the village level surveys. At that time, the aim was to obtain again a sample of the village, but with as many of the original households included as possible (based on those that were still in the survey by 1984), and supplemented by others to restore representativeness of different land-holding classes. Our concern here is the extent to which the original panel households were included. Of the original individuals present between 1975 and 1984, a total of 654 individuals residing in 264 households were resurveyed (see Table 1).[4] As can be seen in this second column, between 2001 and 2005, some individuals were lost again due to migration and death. The resulting attrition rate for the full panel by 2001 at the individual level was therefore 67%. Of this attrition, 30% is due to death, 47% due to out-migration and 21% due to exclusion of households present in the village, while for two percent, no further information is available.[5] The analysis in the rest of this paper will be based on individuals with links to the 'old' VLS households. Quite obviously, in order to generalise about the findings, a careful analysis of the lost households and individuals is needed.

At the household level, these data are similar. In this case, the relevant number to compare the 2001 data with, will be the number of households that were present throughout 1975 to 1984 (i.e. excluding the households that were already dropped by then), or 214 'original' households, because these were the households that one intended to track. Of these 214 households, 186 had at least one member from the original household present in the village, 4 households had died entirely and 24 households had left the village in their entirety. Of the 186 households present in the village, 154 were picked up between 2001 and 2004.

[3] As we write this, data consistency checks are still being carried out, and the figures in Table 1, and indeed in the entire paper, may still change on the basis of further inspection and cleaning of some of the data files from pre-1984 and more recent data. The overall patterns are, however, bound to stay robustly the same.

[4] During the 1976-84 survey period, ICRISAT initially replaced some of the households that had dropped out. The replacement aimed to restore the village level representativeness in terms of land holdings. The result is that we can find individuals surveyed in the old VLS related to 264 households.

[5] These were typically individuals that resided very briefly in VLS households.

The tracking survey in 2005 allowed us to identify all the households still residing in the village that are linked to individuals originally included in the survey. Since 2005, we managed to include all households still present in the village in the survey, with only a few exceptions. In this paper, some preliminary results from data processing for 2005/06 are included, on this reconstituted sample.

This suggests that we have a number of problems to investigate later. What can the data available for 2001-2004 tell us about the wealth evolution of those individuals and households that remained in the village, since not all those in the village were covered? How do those that left compare with those that stayed? In section 4, this will be taken up further.

A second issue is comparability in the indicators used. First, for a large number of basic indicators, such as different asset variables, health, literacy and demographics, the questionnaires are virtually identical in both 1975-84 and 2001-2004 and implemented as a yearly instrument. In short, there is no problem for these indicators, so the results are comparable.

The comparability of the income and consumption aggregates over time is a more complicated issue. First, income and consumption aggregates during 1975-84 were not collected in every village in every year with the same quality (see Morduch, 2004 and the discussion in Appendix 1). We use those observations for this period others have commented on to be of sufficient quality. For 2001-2004, we have a potentially more serious problem. There are two issues. First, there is the questionnaire, and in this respect the differences are relatively small. The consumption and income data were based on a list of items, and households report the transactions using their own recall periods (day, week, month, or whatever was most convenient to the household). Second, there is the frequency of data collection. During 1975-84, the data collected were based visits every 3-4 weeks, so that for consumption and income, at least 12 observations per year were available. Yearly data are the averages of all these observations. For 2001-04, the data are only based on one observation, in which households were asked to report values relevant for the last year. Nevertheless, it was essentially based on the same questionnaire structure and reporting recall (day, week, month, or whatever was most convenient to the household), and households chose to report again using similarly short periods as in 1975-84, especially for consumption.

This suggests that, at least for consumption, the problem faced is not quite the same as the standard problem related to changes in recall periods. Research on this issue (e.g. Scott and Amenuvegbe (1990) on Ghana) has suggested that shorter recall periods increase reporting, so that the longer recall periods may provide lower bounds on outcomes.[6] Our problem may well have more to do with the frequency of observations. This may suggest that we may have less precise measures, even though it is not clear that this method should give us a systematic bias. For example, a systematic bias may occur if there is large seasonality *and* if the timing of the interview implied that reported values in 2001-04 reflected this seasonality.

We have, however, a simple means of checking to what extent it seriously affects our inference. From 2005/06 onwards, we returned not only back to the original questionnaires, but also to the procedure involving four-weekly interviews on consumption and income, to restore full comparability. As only consumption data have been fully processed thus far, we can present some provisional consistency checks for these data. All values used in the rest of the paper were deflated by a state-wise rural price deflator (CPIAL)[7], and if relevant, expressed in per capita terms. The base year is 1975. Since the sample is all individuals

[6] This problem affected Indian poverty measurement considerably after a revision of India's National Sample Survey instruments during the late 1990s. For a collection of papers on it see Deaton and Kozel, 2005.

[7] Consumer Price Index for Agricultural Labourers, constructed by the Indian Labour Bureau.

linked to 'old' VLS households, all values are effectively individual weighted, even for household level indicators.[8]

3. Trends in Asset Holdings, Income Growth and Consumption

This section examines patterns over time in household wealth and demographic characteristics. As will be shown, across different indicators, households have experienced substantial improvements in wealth and living conditions robust in many indicators, including assets, nutrition, income, consumption and consumer durables over the period. These findings are broadly consistent for all those resurveyed in 2001, regardless of initial position in the land distribution, and robust even for those indicators for which the frequency of data collection may have implied problems of comparability. The data shown compare the largest possible period of the 'old' VLS 1975-84 and the 'new' VLS (2001-04).[9] These periods may differ by indicator, due to data availability in the old VLS (see Appendix 1 for details). Given that the 'old' VLS was stratified by land holdings, data are reported by initial land holdings in the period 1975-84.

Table 2: Mean Productive Assets and Consumer Durables per Capita (in Rs, deflated by the CPIAL, 1975 prices) between 1975-84 and 2001-04

	Implements		**Durables**		**Area Owned**	
	1975-79	**2001 -04**	**1975-79**	**2001 - 04**	**1975-83**	**2001 -04**
Aggregate	167	611	66	392	0.63	0.51
Growth (annualised)		5.3		7.4		-0.93
Large landholding	346	1267	91	630	1.17	0.80
Medium landholding	205	504	82	560	0.63	0.56
Small landholding	50	347	47	154	0.37	0.36
Labourers	15	106	32	160	0.16	0.21

Observations from all 6 villages. Total Number of observations (per capita holdings by individual in household in both old VLS and new VLS): Aggregate – 332, Large – 94, Medium – 83, Small – 105 and Labourer 50, from 147 households. Implements data from 1975 to 1979, Consumer Durables from 1975 to 1979, Total area owned from 1975 to 1983. Reported growth rates are calculated on an annualised basis, and show the growth of means in the earlier period.

Table 2 details the mean levels of total area owned, farm implements and consumer durables, in per capita terms. Household holdings of consumer durables and productive capital have risen substantially over time for all households, across all households and villages, on average by about 5 to 8 percent per year. Both in absolute and relative terms, the gaps across the stratification are substantial, suggestive of general improvements in wealth, without necessarily much mobility in the wealth distribution. If anything, the original predominantly labourers group in the data has managed to increase its land holdings per capita, while large and medium households appear to have less land per capita. In aggregate in the data, whilst the area owned per capita can be seen to decrease only marginally

[8] No further stratification weights were used, simply because with the extent of attrition and split-offs, the analysis in section 4, on attrition, is bound to be more relevant at this stage.

[9] The data are collected from July to June, so '2004' is actually '2004/05'.

between the earlier and later period, area owned per household halves between periods reflecting the division of land between heirs of the original household.

Table 3: Mean Body Mass Index and Literacy Levels per Household

	BMI		Literacy	
	1976	**2005**	**1976**	**2001**
Male	18.8	19.8	0.51	0.68
Female	18.8	19.6	0.39	0.47
Of which…				
Overweight	1%	9%		
Normal	53%	51%		
Grade 1	30%	13%		
Grade 2 or 3	16%	26%		

BMI is the weight in kg squared divided by the height in cm. BMI shown is for the same 158 individuals residing in the household in both periods, above the age of 18 in 1976-77. Normal refers to a threshold BMI of 18.5, grade 1 to a threshold of 17, grade 2 to a threshold of 16 and grade 3 below 16. Overweight is defined as a BMI above 25. Literacy: Average per household in which individual resides. Observations from all 6 villages, per original VLS household. Data comes from 188 households for which data was collected in 1976 and in 2005. Literacy measures the proportion of adults (14 and above) who are able to read and write.

Table 3 contains mean BMI for panel adults and literacy for adults within the panel households. On average, adult nutritional status has improved for both men and women. The nutrition of the individuals classified as suffering from a nutritional deficiency (BMI less than 18.5) has decreased from about half in 1976/77 to about forty percent in 2005.[10] The group with BMI above 18.5 now also includes a substantial group of overweight people: the group with a BMI greater than 25 has increased from being negligible to 9 percent. Literacy for adults in the panel households has increased considerably, on average from 44 to 58 percent for those above 14 years of age. The most striking change is for average female literacy for the initially landless group, increasing from 27 to 44 percent.

Income growth was calculated for two subsamples to maximise data availability: the full sample of old and new data was used for 3 villages, Shirapur, Aurepalle and Kanzara, and a sub-sample of the old data, 1975 to 1983, was used for the six villages (see Appendix 1). Since the patterns discussed are robust for different subsamples, paucity analysis is restricted to the full village sub-sample. Figure 1 shows the path of mean income per capita between 1975 to 1983 and 2001 to 2004 for six villages; Table 4 provides a summary of movements across time, by original landholding size.[11]

[10] Some caution is required with these figures. The 1976 figures are based on the average of multiple observations over different seasons, while the 2005 figure is a single observation. A simple transition matrix analysis suggests that the largest transition is from those just malnourished (grade 1) to normal. The current grade 2 and 3 malnutrition group includes a number of observations with very large changes compared with 1976 and measurement error may be a problem in some observations.

[11] "Labour" households were defined as those who own less than 0.5 acres of land, "small" households own between 0.5 and 2 acres, "medium" own between 2 and 5 acres and "large" own more than 5 acres.

Figure 1: Cumulative Distribution of income in 1975-83 and 2001-04

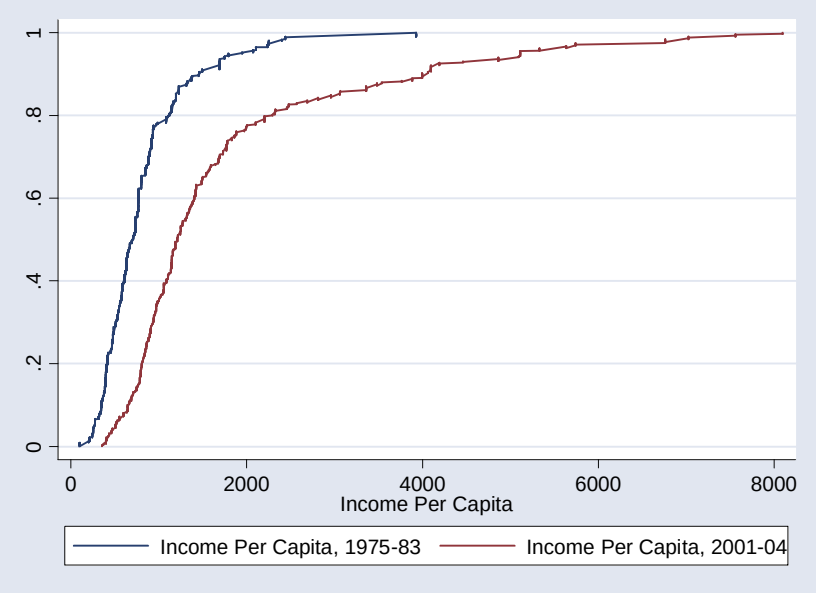

Table 4: Mean Income per Capita per year across all villages (in 1975 prices)

	AGGREGATE		LARGE		MEDIUM		SMALL		LABOUR	
	1975-83	2001-04	1975-83	2001-04	1975-83	2001-04	1975-83	2001-04	1975-83	2001-04
Total income	816	1745	1113	2409	850	1984	659	1314	560	1076
Annualised Growth		3.4		3.4		3.8		3.0		2.9
Gini Coefficient	0.33	0.39								

Total Income includes: income from crops, livestock income, transfers, income from trade, migration income and labour income. Total Observations (per capita income by individual in household in both old VLS and new VLS): 319, of which: large – 88, medium – 79, small – 103, and labour – 49.

The sample witnessed an annualised (total) income growth per capita of just over 3% (or more than doubled income); breaking this down by original landholding size we see that the average growth rate between 1976 to 1983, and 2001 to 2004 were substantial for all groups (where growth is calculated using mean level across households in each period). High variability in the individual level growth rate has meant that inequality has in fact increased, as witnessed by the Gini.[12]

Figure 1 shows the cumulative distribution function of income; at each point of the distribution, incomes are substantially higher in 2001-04 than in 1975-83. In other words,

[12] However, the nature of the data collection in 2001-04, with only one observation per year, is likely to result in higher measurement error. Even if the measurement error were random, this may still be responsible for higher variability, which could especially affect the Gini. Furthermore, since the data from 1975-83 is based on 9 years' worth of observations, while 2001-04 only on four, this is further likely to result in more smoothing in income in the earlier period, affecting the Gini comparison.

there is strict dominance so that at any arbitrary or other line (such as an income poverty line) there are fewer below a particular point; for a broad set of poverty measures, including the FGT poverty measures (Foster, Greer and Thorbecke, 1984), income poverty is lower in the latter period. The poorer tail appears to have moved somewhat less, while the top earnings also appear to have become substantially higher, which is likely to have fuelled the increased income inequality.

Table 5: Mean Consumption Levels 1976-77 to 2001/04 per capita per year in 1975 prices

	AGGREGATE			LARGE		MEDIUM		SMALL		LABOUR	
	1976-77	2001-04	Annual Growth	1976-77	2001-04	1976-77	2001-04	1976-77	2001-04	1976-77	2001-04
Food Consumption	292	514	2.2	292	569	273	541	301	447	306	532
Of which: grains/pulses	195	240	0.8	182	264	185	256	209	227	209	203
Total Non Food Consumption	120	268	3.2	136	389	114	276	116	205	109	163
Total Consumption	412	781	2.5	428	958	389	816	417	652	415	695
Consumption Gini	0.23	0.25									

"Grains and pulses" comprise: jowar, pulses, millet, bajra, wheat and rice; "Food" consists of: edible oils, vegetables, fruits, sugar, tea, milk and meat, fish and eggs, "Non-Food" consists of: education, services, utilities, clothing and narcotics (cigarettes, pan, beedi and alcohol). Total Observations (per capita consumption by individual in household in both old VLS and new VLS): 372 observations, of which: large – 108, medium – 94, small – 115, and labour – 55. 1976: Data for all six villages available, 1977: Data for Aurepalle, Shirapur, Kanzara and Dokur available.

Table 5 shows consumption levels, split into food and non-food consumption. Whilst the composition of consumption change has varied by village, we can see an unequivocal increase in the level of the mean across the board for all categories, villages and land sizes. The annual growth rate in consumption is quite similar to the growth in income in this period. It is possible to assess the robustness of these changes further by comparing the measures obtained for 2001-04 with the preliminary results of data processing of the 2005/06 data. Contrary to the 2001-04 data, the 2005/06 data were obtained using identical procedures as in 1976-84: by collecting data at regular intervals (about once a month) using the same instruments. Total consumption per capita in real terms in 2005/06 is estimated as being 803 rupees in 1976 prices, about 2.8 percent higher than the average estimated in 2001-04. Given the annual growth rate recorded in the data, this is remarkably consistent, lending credence to the contention that the main problem with the procedure used in 2001-04 was random measurement error, and not a systematic bias. The patterns across land distributions were also very similar. In short, the welfare changes observed are not an artefact of the method of data collection.[13]

[13] The consumption estimates are systematically lower than the income estimates in both periods. This difference has been widely observed in the 1975-83 (Morduch, 2004). However, the tables exaggerate the difference for the early period, as consumption is for 1976/77 only and income is for 1975 to 1983. During the period 1975-83, there was in fact considerable income growth in the data (about 40 percent between 1975 and 1983).

Table 5 also showed that expenditure on non-food items grew marginally faster than that on food, especially relative to growth in basic staples (grains and pulses).[14] Over time this is reflected in considerable changes in the composition of consumption, as Table 6 shows. The food share has declined, but especially the share of grains and pulses, from 49 to 34 percent, as would be predicted by Engel's law with rising living standards. Protein intake via meat, fish and milk has increased from 12 to 25 percent. Within grains consumption, the consumption of 'finer' grains such as rice and wheat per capita has doubled over the period whilst that of 'coarse' cereals such as sorghum and bajra has decreased for all households including the landless.

Table 6: Consumption shares per capita

As a proportion of Total Consumption	**1976-77**	**2001-05**
Grains and Pulses	0.49	0.34
Total Food	0.72	0.68
Total Non Food	0.29	0.32
As a proportion of Total Food Consumption		
Grains	0.67	0.47
Rice	0.17	0.12
Edible Oil	0.09	0.15
Meat/fish	0.03	0.06
Milk	0.09	0.19
Vegetables	0.07	0.11

"Grains and pulses" comprise: jowar, pulses, millet, bajra, wheat and rice; "Food" consists of: edible oils, vegetables, fruits, sugar, tea, milk and meat, fish and eggs, "Non-Food" consists of: education, services, utilities, clothing and narcotics (cigarettes, pan, beedi and alcohol). Total Observations (per capita consumption by individual in household in both old VLS and new VLS): 372 observations, of which: large – 108, medium – 94, small – 115, and labour – 55.1976: Data for all six villages available, 1977: Data for Aurepalle, Shirapur, Kanzara and Dokur available.

The increased consumption expenditure is noticeable across the entire distribution. Figure 2 shows the cumulative distribution of consumption, and just as with income, the distribution function in 2001-04 is well below the distribution in 1976; in other words: poverty has gone down for any poverty line for a broad set of poverty measures. It is difficult to get a reasonable poverty line for intertemporal comparison. One possibility is to use the poverty line, based on the 1993 Expert Group of the Government of India's suggesting 49 rupees per month in 1973-74 prices, which would be about 630 rupees per year per capita in 1975 prices. However, this is based on a consumption aggregate that is broader than used here (and poverty levels in 1976 would be close to 90 percent, thereby focusing much attention on groups in the villages which in the Indian local context would not be considered as 'poor'. Table 7 uses an alternative, lower poverty line as a benchmark (500 Rs) to focus on the change since 1976; in any case, given Figure 2, any poverty line would give a broadly similar pattern. This poverty line is very close to the poverty line used by Gaiha and Deolalikar

[14] The data from 2005/06 showed a somewhat larger increase in food consumption and a smaller increase in the non-food consumption data. However, the differences barely affect the respective growth rates over time.

(1993), who discussed poverty trends in the 1976-84 data based on income per capita, with a poverty line of 540 Rs per capita per year in 1975 prices.[15]

Figure 2: Cumulative distribution of total consumption, six villages 1976 and 2001- 2004

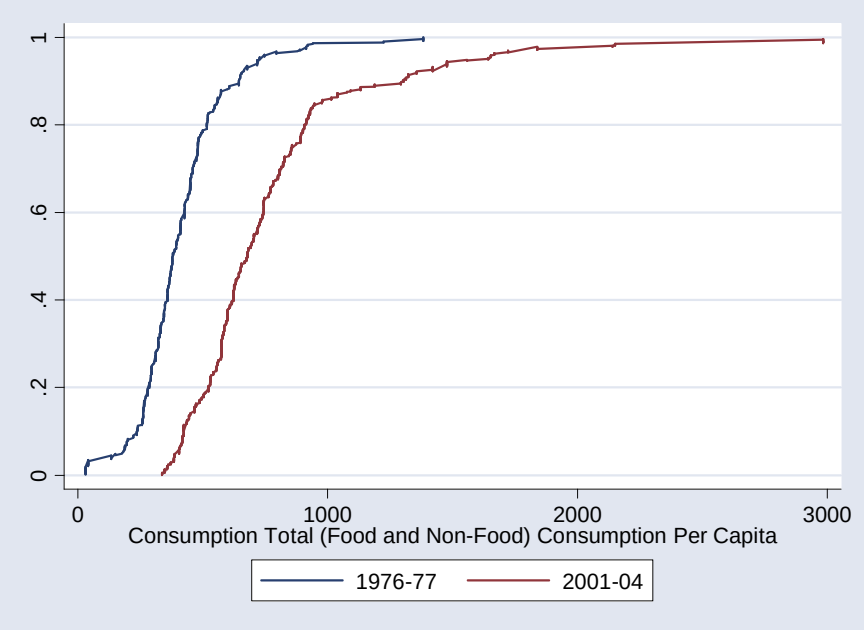

Table 7: Measures of Consumption Poverty, using 500 Rs (1975 Prices) as the benchmark

	All		Large		Medium		Small		Labour	
No of Obs	*372*		*108*		*94*		*115*		*55*	
Year	**1976-77**	**2001-05**	**1976-77**	**2001-05**	**1976-77**	**2001-05**	**1976-77**	**2001-05**	**1976-77**	**2001-05**
P0	76	22	75	9	79	17	73	27	81	44
P1	25	3	27	2	24	3	22	4	30	7
P2	12	1	14	0	11	1	9	1	15	2

Consumption includes both food and non-food consumption: "Food" includes: jowar, pulses, millet, bajra, wheat and rice, edible oils, vegetables, fruits, sugar, tea, milk and meat, fish and eggs, "Non-Food" consists of: education, services, utilities, clothing and narcotics (cigarettes, pan, beedi and alcohol).

We find a strong decrease in consumption poverty according to the headcount rate, the poverty gap ratio and the squared poverty gap ratio.[16] Table 7 gives the first three measures of the FGT class (Foster, Greene and Thorbecke, 1984), the measure of consumption used included both food and non-food items. All three measures point to very substantial

[15] Applying their poverty line to our data, we obtain poverty going down from 82 percent to 27 percent.

[16] We follow the practice in research using the ICRISAT data by using per capita values, not per adult equivalent or similarly adjusted consumption levels.

decreases in poverty and in the depth of poverty across time: for example, in terms of the head count, from 76 to 22 percent, or a 70 percent decline.[17] Looking at poverty by original landholding size, the largest changes have occurred for large households – whilst nearly 9 percent of individuals in this category are still under the poverty line, the poverty gap ratios indicate that the depth of poverty has decreased substantially, more so than for any other group. Poverty reduction according to the headcount has been least significant for 'landless' labourer households, with 44% of households still classified as living beneath this consumption poverty line, even though poverty almost halved.

These poverty changes are systematically in the direction out of poverty: while 57 percent of the village population moved out of poverty, only 3 percent moved into poverty, which, given the likelihood of some measurement error, suggests a general move upwards in the communities involved. Still, 19 percent stayed below the poverty line throughout. Table 8 offers a transition matrix, using quintiles of 1976/77, to illustrate this movement further. By 2001/04, three-quarters of the sample had moved to consumption levels equivalent to the top quintile in 1976/77 (above 520 Rs per capita). Only about 8 percent of the sample moved *down* a quintile-interval in this period.[18]

Table 8: Transition matrix using fixed quintile values 1976/77

		Consumption in 2001/04, using quintile intervals from 1976/77					
		1	2	3	4	5	Total
Consumption Quintile 1976/77	1	0%	0%	3%	2%	15%	20%
	2	0%	1%	2%	2%	15%	20%
	3	0%	1%	2%	3%	14%	20%
	4	0%	1%	3%	2%	14%	20%
	5	0%	0%	1%	2%	17%	20%
	Total	0%	2%	10%	12%	75%	100%

Based on fixed intervals as in quintiles in 1976/77

Finally, it is appropriate to briefly comment that the poverty declines vary considerably by district and region: the two villages in Mahbubnagar in Andhra Pradesh had much higher poverty in 1976 but by 2001-04 have much lower poverty than the villages in the other two districts in Maharashtra. Nevertheless, even the village with the lowest decline, Kinkheda in Akola district, saw poverty decline by more than 40 percent.

The rapid increase in incomes, assets and consumption for those households in the sample coincides with a change in the income composition of these households. This can be seen most clearly in Table 9 which shows the share of income derived from different sources and the primary income sources, respectively. Profits from crop production have diminished as a share of total income from 48 percent in the earlier period to an average of 24 percent post-2000, whilst the number of households for whom crop production is the primary source of

[17] The poverty estimates in 1976 are slightly higher than those reported in Gaiha and Deolalikar (1993). Even though they use a slightly higher poverty line (540 Rs), they use the income data which are higher than consumption in both the old and the new VLS data. They find a poverty rate in 1976/77 of 68 percent, and then gradually declining to 51 percent in 1983/84.

[18] A full transition matrix (mapping the distribution in both periods onto each other) shows far more movement up and down the distribution, but cannot account for the general increase in consumption levels, out of poverty.

income between 1975 and 1983, and 2001 and 2004 has declined from 49% to 25%.[19] Direct questioning revealed that a large number of these households do not consider themselves predominantly farmers. While in the earlier period more than 80 percent classified themselves as having farming as their main occupation, about half the households in the Andhra Pradesh villages and more than a third in the Maharasthran villages no longer consider agriculture as their primary occupation.

Table 9: Mean Income Shares per Capita

	AGGREGATE		LARGE		MEDIUM		SMALL		LABOUR	
	1975 - 83	**2001-04**	**1975 - 83**	**2001-04**	**1975 - 83**	**2001-04**	**1975 - 83**	**2001-04**	**1975 - 83**	**2001-04**
Livestock	0.16	0.09	0.22	0.10	0.14	0.11	0.13	0.08	0.05	0.05
Labour	0.29	0.34	0.12	0.29	0.30	0.29	0.38	0.39	0.62	0.58
Trade	0.06	0.24	0.05	0.22	0.05	0.26	0.12	0.29	0.02	0.15
Crops	0.50	0.24	0.63	0.28	0.52	0.27	0.36	0.18	0.28	0.15
Transfer	0.00	0.06	-0.02	0.08	-0.01	0.06	0.01	0.03	0.02	0.04
Net Migration		0.03		0.04		0.00		0.03		0.02

Total Observations (per capita income by individual in household in both old VLS and new VLS): 318, of which: large – 87, medium – 79, small – 103, and labour – 49. Migration incomes were apparently insignificant in 1975-83.

The stagnation and indeed decrease of the share of income generated through agriculture is a feature that has been seen for households of all landholding sizes, and across all villages, with the exceptions of Kinkheda and Kanzara. The drop in crop production as a share of income (from 63% of household income to 24%) is particularly large for large households, whose principal component has shifted from crop production to labour income. The share of income from trade has experienced a sharp increase across villages and for all landholding classes, reflecting a process of increased dependence on non-farm activities such as services and business. A sign and possible cause of this transformation is the strongly increased connectivity via road and other means of communication of all the villages in the sample.

Agriculture has nevertheless also been transformed in these areas (see Rao *et al.*, 2006) for more details). As Table 2 showed, land holdings have declined and this was reflected in cultivated land areas as well. The proportion of irrigable land doubled from 20 to 40 percent of the operational holding over this period. Three of the four Maharashtra villages benefited from surface irrigation projects; but the two Andhra Pradesh villages suffered from a decline of tank irrigation and drying-up of open dug wells. More farmers are investing in bore wells. Cropping patterns have generally moved away from food grains to cash crops, and to intercropping. Higher shares of food crops are being sold: for rice, wheat and vegetables, more than three quarters of output is sold, while for sorghum, it is still more than half. Overall, given the halving of the share of income from agriculture shown in Table 9, the large increases in income implied by Table 4 and the decline in operational land holdings still suggests increases in returns per hectare. They can be accounted for by the shift to high return crops, but also increased productivity.

[19] A t-test for the equality of means of income shares by household rejects the null of no difference at a 1% level; in addition, the Kolmogorov-Smirnov test for the equality of the distribution functions accepts at a 1% level that the distribution of income shares, by source, differs between the earlier and later rounds.

The conclusion is clear: we find that for a wide variety of indicators, from nutrition and literacy, consumption, budget shares, durables, incomes and assets that wealth and living standards have increased considerably in this period. Furthermore, we can see that this has coincided with a change in the income structure, with declining shares from crop incomes and increasing business income, and even the declining share of agriculture coincided with changes in cropping patterns, and increases in productivity and returns. This is not just a period of increased wealth and standard of living, but also of changes in livelihood structures.[20]

The individuals' own perceptions of their current conditions and the changes over the last 30 years reflect all these findings. The 2005 survey asked all individuals tracked in the villages for their own perceptions of their condition today, 15 years ago and 30 years ago. They were asked to report on a 7-level scale from 'very rich' to 'destitute'. The general pattern in the quantitative data is confirmed by the responses. Table 9 shows that, although few would call themselves rich or very rich, there is a noticeable increase in the number of people reporting to be 'comfortable' or 'manage to get by'. We find that 83 percent now consider that they manage to get by or do better than that, up from 60 percent 15 years ago and 44 percent 30 years ago.[21]

Table 10: Self-Assessed Welfare Positions (2005)

	2005	**15 years ago**	**30 years Ago**
Very Rich	0	0	0
Rich	2	1	4
Comfortable	36	26	16
Manage to get by	45	33	24
Never enough	15	36	35
Poor	1	3	19
Very Poor	1	0	2

Total observations: 316 observations, individuals in both old and new VLS, based on question "Just thinking about your own household circumstances [now, 15 years ago, 30 years ago], would you describe your household as…", based on a survey in 2005.

4. Assessing Attrition

These findings have to be considered in the context of the extensive attrition discussed in Table 1. In this section, we investigate this attrition, its reasons and its implications, further. Table 1 identified three different types of attrition: out-migration, death and the incomplete selection of the 2001 sample among those residing in the villages. Since our analysis of changes in welfare and assets focused on average outcomes between 1975-84 and 2001-04, we will restrict our analysis to the attrition between 1984 and 2001, excluding the

[20] Again, there are differences across the villages. In the Mahbubnagar villages, trade income increased considerably, especially in Dokur where crop income dropped to below 10 percent, linked to repeated drought. In one of the Akola villages, crop incomes did not change in importance, but this is a clear exception across the data. In the Sholapur and Akola villages, labour and trade all increased.

[21] Not only is the pattern is similar to the results discussed earlier, an ordered probit regression linking these welfare perceptions now and 30 years ago to income or consumption per capita in 2004 and 1976 showed a clear and strongly significant relationship at 1 percent.

relatively small number of individuals that left before 1984. Approximately 49% of the individuals present in the VLS by 1984 were in the village in 2005 and roughly three quarters of these were picked up in 2001. Between 1984 and 2001 a substantial proportion of the sample was lost due to out-migration – 32 percent. In addition, by 2005, 19 percent of the sample had died. This would put the rate of attrition at 51 percent.

Studying attrition is relevant for at least two reasons. First, given that some of the attrition is related to migration, it provides a glimpse of the migratory process and changes in these rural communities. Secondly, it helps to assess whether the changes we documented in the previous section have validity also for those not included in the 2001-04 sample. In other words, is there attrition bias in these results?

We use two strategies to investigate attrition bias. First, we compared observable characteristics of the different groups, using data both prior to and post attrition. Post-attrition data are based on data collected during the tracking survey of 2005 on all surviving individuals. Secondly, we explored the multivariate correlations between pre-1984 characteristics and their continued presence in the sample. We used a multinomial logit to test whether we can distinguish, on the basis of pre-attrition data, between those in the sample in 2001 and those who have migrated, died or were not included but living in the village. In the next section, focusing on determinants of income and consumption changes, these regression results form the basis for a further test of attrition, using a two-stage sample selection model of the impact of attrition or selection on income and consumption.

Attrition in this sample is thus examined in two ways. We ask whether observable characteristics differentiate the two groups. We are also able to go beyond this type of analysis and correct for selection based on unobservables (Fitzgerald *et al.*, 1998, Alderman and Behrman, 1999, Alderman *et al.*, 2001) by using a set of family relational variables and birth order as instruments in predicting attrition in this sample.

To investigate the correlates of attrition, we investigated five sub-groups among those present in 1984 in the six villages: those who were included in the new-VLS, those who were living in the village but were not picked up in the new-VLS, those who migrated for family reasons since 1984, those who migrated for other reasons and those who died since 1984.[22] By 2004, of the 1427 individuals present in 1984: 688 were in the village, 265 had died and 447 had migrated. Of those who had migrated, 225 had married away, 120 went in search of work and 75 followed their family.[23]At the household level, by 2005, of the 235 households for whom complete data is available in 1984, 98 households had at least one non-marital migrant,[24] 137 had at least one marital migrant and 170 had lost at least one individual due to death. Because households often suffer from more than one source of attrition, the following analysis is based on the individual level data.

Table 11 lists some basic socio-economic characteristics at the end of the baseline 1975-84 period as well as post-attrition for all individuals present in the sample in 1984. The reference group consists of those individuals in both the VLS samples and t-statistics for testing

[22] Familial purposes include marriage, separation/divorce and following spouse and family. Non-familial purposes includes: to work, to look for work, for government work, for education, for health, to utilise inheritance, in prison, joined the army and other.

[23]Many of these 75 will have migrated due to work reasons as well, since it includes children and other family members that left to follow parents or other family members who left for work. Migration for marriage is largely for women, who traditionally move to the husband's family's location at marriage. When looking at the timing of migration, marital migration has remained relatively constant over time in these villages, but since the 1990s, migration for work has increased rapidly and becoming a more important reason for leaving the village.

[24] Of the 98 households which had permanent migrants, 28 households had migrated away permanently (all the members had left the village) and 70 households had some members who had migrated away.

differences in the means are shown for each group relative to the reference group. Columns 1 and 2 show that the differences in assets between the two groups in the village, both in the early 1980s and currently, are relatively minor and limited to certain assets, but without a clear pattern. Household size is larger for those that were not included, which may reflect the fact that some of these are split-offs of households that are still included, and larger households have, a priori, more individuals who can potentially split-off.

Migrants for non-family reasons, predominantly migrants for work, were living in households that had significantly higher assets in the early 1980s: pre-attrition per capita values of area owned, farm implements and consumer durables are statistically higher amongst the migrants for non-family reasons compared with the reference group. A clear gender pattern can be seen amongst migrants: those for family purposes are almost exclusively female (mainly marriage), whilst migrants for non-family reasons are predominantly male. Mainly young people who were initially in the sample have left the village: the average age (in 2005) for both migrant subgroups is lower than that of the village population. Years of schooling and literacy are statistically different between all mutually exclusive subgroups; this is likely to partly reflect differences in demographic composition between groups. Dividing the sample into age groups, one finds that for all cohorts over the age of 30, migrants for non-family reasons have the highest mean number of years of education by 2005. Those that disappeared from the sample because they had died did not appear to be systematically richer or poorer in asset terms than those still left in the village. They belonged to the older cohort in the original data; their age may well be the main explanation for lower educational and literacy levels.

We can go one step further. The data collected in 2005 gives us a preliminary impression about welfare differences between those still in the village and those that left the village for family-related or other reasons, such as to work. To the extent that education is a proxy for earning power, those that have migrated for non-family reasons are clearly better educated, and as a result may well have better standards of living. We can strengthen this preliminary evidence. The perceptions on current and past household circumstances, which were introduced in Table 10, were also collected for those not present but still alive, based on key informant interviews, mainly of family members still in the village. As was reported earlier, for those still in the village and the sample, the correlation with income or consumption based indicators is strong and significant. Looking at the migrants, we find that their perceived wealth position is typically higher. Testing this using a Pearson's chi-squared test, we find that the null of a difference between those groups' distributions for all recall periods (now, 15 years ago and 30 years ago) cannot be rejected at 10%. The data is therefore suggestive of the migrants being typically better off, but whether they were better off due to migration or were better to start with cannot be directly assessed.

We can nevertheless conclude that these correlations suggest that those left in the village and in the sample during 2001-04 are not simply a random sample of those in the village in 1984. To answer questions related to intertemporal welfare changes for those in the initial ICRISAT sample, a complete picture can only be obtained by tracking and interviewing these migrants. Since these data are currently lacking, the best we can do is to try to assess this sample selection issue more thoroughly.[25]

[25] A different question, not addressed in this paper, is whether those still in the village and their households can be considered representative of the households currently in the village, so that current wealth and poverty levels reflect the village. In 2001, the sample had been expanded to ensure again representativeness across the four stratification levels (landless, small, medium and large farmers) but these data are not assessed here.

Table 11: Socio-Economic Characteristics Pre- and Post-Attrition by Subgroup, for individuals present in 1984

	In Village, both old & new VLS	In Village, in old-VLS & not new VLS	Migrant - Family reasons	Migrant – Other, e.g. work	Dead
	Mean (s.d)	Mean (s.d)	Mean (s.d)	Mean (s.d)	Mean (s.d)
No of Observations	**503**	**185/154**[26]	**303**	**147**	**269**
Pre-Attrition (1984)					
Total Area Owned Per Capita (1983)	0.57 (0.58)	0.65 (0.64)	0.63 (0.68)	0.71** (0.81)	0.57 (0.58)
Income Per Cap	906 (742.8)	1007 (960.8)	821.0 (672.8)	906.3 (804.4)	845.1 (1.12)
Total Value of Durables Per Cap (1980)	73.6 (87.2)	73.2 (63.4)	88.9* (127.4)	101.2*** (134.5)	85.2 (120.7)
Total Value of Implements Per Cap (1980)	211.5 (330.6)	153.5* (330.6)	224.0 (343.5)	278* (376.8)	185.3 (317.3)
No of Members	7.6	9***	8.3***	7.9	7.1
Post-Attrition (2005)					
No Education	44%	36%	35%	28%	44%
Primary	23%	19%	12%	11%	23%
Middle	11%	9%	18%	9%	11%
Higher and above	8%	14%	11%	25%	8%
Years of Education	4.1 (4.50)	5.3 (5.04)***	5. 7*** (4.9)	7.2*** (5.6)	1.6*** (3.1)
Literacy	0.51 (0.49)	0.59** (0.50)	0.64*** (0.56)	0.69*** (0.51)	0.27*** (0.51)
Proportion Male	0.62 (0.49)	0.62 (0.49)	0.10*** (0.29)	0.88*** (0.33)	0.52*** (0.50)
Age (in 2005)	47.4 (16)	44.5*** (15.2)	34.2*** (10.7)	41.0*** (13.0)	78.4*** (20)
Total Area Owned Per Cap (2005)	0.52 (0.71)	0.46 (0.49)			
Telephone	0.14 (0.35)	0.21** (0.41)			
Total Value of Consumer Durables Per Cap (2005)	544.0 (958.3)	501.3 (784.9)			
Adult BMI	20.4 (3.6)	20.0 (3.9)			
Farm Implements Per Cap (2005)	687.2 (1375.3)	445.9** (813.9)			
Number of Bullocks Per Cap (2005)	0.12 (0.22)	0.18*** (0.29)			

1427 individuals present in 1984, 1407 covered in tracking of which: 503 were picked up between 2001 and 2004, 185 were in the village but not picked up, 303 had migrated for familial purposes, 147 had migrated for non-familial and other reasons and 269 had died. For the sub-sample of individuals who have died, the age in 2005 is the age they would have had they survived until then.

T-statistics are reported for test comparing each group's mean with the mean of those in the 2001 sample in the village (column 1). ***=significant at 1%, **=significant at 5%, ***=significant at 10%.

[26] Between March and June 2005, 185 individuals were identified as being in the village. By the time of commencing the intensive survey in July 2005, only 154 were left in the village.

We do so by using a multivariate model in order to differentiate between the different subgroups of individuals in the original sample. We construct a multinomial logit model to investigate the correlates of individuals being in the sample, or in any of the four other subgroups (in the village but not in the sample, migrated for non-family reasons, migrated for marriage and other family reasons or dead). We only use individual and household characteristics known from 1983, the last year of complete data collection, such as for income, in all six villages.

The estimates of the determinants of the allocation to different sub-groups are reported in Table 12. We report marginal effects, evaluated at the mean of the sample for each variable. As explanatory variables we use a number of household level variables in 1983: household composition (number of male and female children below 15, and the number of males and females above this age), the sex of the head, the percentage of people in the household that are literate, land holdings per capita, the value of durables. We also control for caste, with a dummy for those belonging to the lowest castes (SC/ST). These are the same caste classifications used in earlier analyses of the ICRISAT data (see Walker and Ryan, 1990; Doherty, 1982).

We include village level fixed effects, capturing many factors, including covariate push and pull factors for migration. Finally, we include a large number of individual level variables, since much of the change in these households is linked to individuals moving out of the household, often out of the village. The variables include the age and the sex of the individual, and his or her educational level (using no education as base group, dummies for primary completed, middle school completed and high school or above). Furthermore, his or her relationship to the head in 1983 (head, spouse of head, son or daughter, using all other relatives and household members as the base), and a variable capturing the birth order of the person (relative to the number of identified siblings in the old VLS), since they may well help to identify marriage patterns and/or migration for work (e.g. of sons not eligible for inheriting land). Since birth order is likely to play out differently for a younger, unmarried cohort, an interaction effect is allowed between birth order and those below 25 years of age and unmarried.

Table 12: Understanding the current sample: multinomial logit model by source of attrition

	In Village, both old & new VLS	**In Village, in old-VLS & not new VLS**	**Migrant Non-family reasons**	**Migrant - Family reasons**	**Dead**
	-1	**-2**	**-3**	**-4**	**-5**
Area of land owned per capita 1983	-0.048	0.022	0.008	0.002	0.015
	[1.04]	[0.69]	[0.57]	[0.12]	[1.27]
Value of durable assets 1983	0.000	0.000	0.000	0.001	0.000
	[0.46]	[0.49]	[1.10]	[1.75]*	[0.18]
Number of boys up to 14 in 1984	-0.015	0.034	-0.002	0.001	-0.016
	[0.62]	[0.62]	[2.23]**	[0.28]	[0.07]
Number of male adults aged 15 plus in 1983	-0.011	0.025	-0.008	-0.020	0.014
	[0.38]	[1.06]	[0.92]	[1.90]*	[1.54]
Number of girls up to 14 in 1983	0.005	-0.001	-0.013	0.006	0.002
	[0.24]	[0.06]	[1.27]	[0.75]	[0.24]
Number of female adults aged 15 plus in 1983	-0.002	-0.014	0.006	0.001	0.008
	[0.05]	[0.67]	[0.60]	[0.13]	[0.93]
Percentage of household members above 14 that can read in 1983	0.017	-0.090	0.020	0.086	-0.032
	[0.14]	[1.00]	[0.44]	[1.62]	[0.79]

(Table 12 cont.)

	In Village, both old & new VLS	In Village, in old-VLS & not new VLS	Migrant Non-family reasons	Migrant - Family reasons	Dead
	-1	-2	-3	-4	-5
Scheduled Caste/Scheduled Tribe?	-0.238	0.059	0.074	0.065	0.041
	[2.99]***	[1.00]	[2.41]**	[1.88]*	[1.88]*
Sex of the head of the household 1984	-0.014	-0.019	0.029	0.040	-0.036
	[0.20]	[0.34]	[1.04]	[1.60]	[1.63]
Male? (yes=1)	0.088	0.040	0.066	-0.222	0.028
	[1.76]*	[1.17]	[2.40]**	[5.80]***	[0.99]
Log of age in 1984	-0.025	-0.028	-0.010	-0.019	0.081
	[0.84]	[1.22]	[0.73]	[1.32]	[3.76]***
Primary school completed highest grade?	-0.017	-0.030	0.057	-0.007	-0.002
	[0.42]	[0.81]	[2.84]***	[0.29]	[0.11]
Middle school completed highest grade?	0.031	0.034	0.023	-0.005	-0.083
	[0.49]	[0.81]	[0.74]	[0.12]	[2.25]**
High school or above is highest grade?	-0.092	0.063	0.088	0.014	-0.074
	[1.16]	[1.14]	[2.90]***	[0.28]	[1.93]*
Head of the household in 1983	0.197	-0.088	-0.077	-0.074	0.041
	[2.41]**	[1.29]	[2.13]**	[1.16]	[1.38]
Son of the head in 1983	0.155	0.022	0.018	-0.167	-0.028
	[2.72]***	[0.46]	[0.77]	[4.33]***	[0.91]
Daughter of the head in 1983	-0.320	0.080	0.041	0.102	0.097
	[3.29]***	[1.11]	[1.07]	[2.90]***	[1.97]**
Spouse of the head in 1983	0.21	-0.025	-0.061	-0.128	0.003
	[3.46]***	[0.50]	[1.28]	[3.40]***	[0.12]
Birth order rank (scaled by no of siblings) (high number is lower birth order rank)	0.151	0.026	-0.048	-0.176	0.047
	[2.24]**	[0.49]	[1.44]	[3.64]***	[1.59]
Birth order times dummy, (below age 25	-0.151	-0.121	0.020	0.295	-0.043
and unmarried)	[1.81]*	[2.00]**	[0.49]	[4.96]***	[0.90]
Dokur=1	-0.032	0.005	0.017	-0.040	0.049
	[0.30]	[0.06]	[0.62]	[1.04]	[2.05]**
Shirapur=1	0.129	0.165	-0.121	-0.043	-0.131
	[1.27]	[2.29]**	[2.99]***	[1.11]	[4.08]***
Kalman=1	0.165	0.153	-0.059	-0.039	-0.221
	[1.66]*	[2.12]**	[1.90]*	[0.95]	[5.22]***
Kanzara=1	0.022	-0.012	-0.042	0.016	0.017
	[0.19]	[0.12]	[1.47]	[0.38]	[0.58]
Kinkheda=1	-0.012	0.200	-0.017	-0.056	-0.116
	[0.10]	[2.32]**	[0.59]	[1.19]	[3.53]***
Observations	1378	1378	1378	1378	1378

Absolute value of z statistics in brackets. Standard errors are clustered at the initial household level.

* significant at 10%; ** significant at 5%; *** significant at 1%

Marginal effects: impact of change of one on probability of being in particular subgroup, evaluated at the mean. For about 12 percent of the observations, mainly those who died, we do not have the birth order information from 1984, mainly because of their age, so a dummy was created putting it at one for the missing observations, and birth order was put at zero for them. This variable was not surprisingly very significant for the group of dead. Base village: Aurepalle. Base group education: no education.

The results in Table 12 control for cluster effects in the standard errors, at the initial household level. They suggest that basic household characteristics do not matter very much, compared with the individual characteristics. Households split and some leave, but without a clear pattern related to wealth or household composition. Nevertheless, we have a significant impact of initial durable wealth on migration for family-related reasons – with increased probability of moving out of the village for marriage and other family reasons for somewhat wealthier backgrounds. Stronger effects can be seen related to caste: lower caste individuals are seen to migrate more out of the village, both for family reasons and for work and other non-family reasons (a lower caste individual is approximately 7 percent more likely to migrate for family reasons and 7 percent more likely for non-family reasons). Their mortality rates are also significantly higher – they are 4 percent more likely to have died than other individuals initially in the sample. Village level effects also suggest differential mortality, but also important differences in migration for work and other non-family related purposes, with less migration in Shirapur, Kalman and Kanzara in Maharashtra, compared with the villages in Andhra Pradesh as well as Kinkheda.

Turning to individual characteristics, and given the nature of marriage practices, a girl has a far higher probability of leaving the village for family reasons, especially marriage (a man has a 22 percent lower probability to do so). Men are more likely to migrate for work – about 7 percent more likely than girls. The probability of dying in this period is virtually entirely related to age. But note the significant impact of education: those with middle or higher education have a 7-8 percent lower probability of death controlling for age and other factors. Migration for work or other non-family purposes has significantly increased probability for men, educated persons (e.g. 9 percent higher probability for someone with high school or more), and for those who are not a household head in 1983. Finally, relational variables provide significant explanations for why individuals are still in the sample, especially compared with having migrated for family purposes, again in line with marriage practices. Daughters leave the village, as do youngsters lower in the birth order (higher rank number). Sons of the head stay in the village and remained in the sample.

The regression clearly suggests that each of these groups is different from the rest. We conducted a Cramer-Ridder test to test whether any pair of states could be pooled, i.e. whether the coefficients of any two groups are the same up to a constant. For all possible pairwise permutations, we easily reject this hypothesis at 1 percent (via a likelihood ratio test based on the Chi-squared distribution with 26 degrees of freedom).

5. Understanding Consumption and Poverty Changes

In this last section, we want to explore the correlates of changes in basic monetary welfare indicators in the data: consumption and poverty gaps. Given the data available, we can only assess this for those people that stayed in the village and were picked up in the sample. The regression in Table 12 will be used to provide the basis for controlling for sample selection related to attrition, given that we are currently lacking any further information on migrants and other groups that are not in the sample. To explain changes in these welfare indicators, we regress the difference in the logarithm of the average level in 2001-04 and 1975-83 (carefully taking into account the different years for which data are available, depending on village and time) on a number of household and individual characteristics in the baseline period 1975-83, controlling for fixed effects at the village level.[27] The variables included at the household and individual level are the same as in the multinomial logit: land, durable assets, household composition, literacy in the household, caste, sex of the head, and age, sex and schooling of the individual. We also added some shock variables, based on self-reported major reasons

[27] In this section, we focus on consumption and not income. However, the patterns and correlates are very similar when using the income data.

for substantial declines in incomes during the period 1983-2000. More specifically, we include whether a serious illness shock or a serious weather shock affected the incomes or wealth of the individuals in the sample. The best way to look at this model is as an attempt to generate careful multivariate correlations of the characteristics that explain change. The specification is motivated by work on micro-level growth dynamics, with initial levels explaining growth, but without aiming for a detailed causal explanation. More work would be needed to understand any of the mechanisms involved.

To control for sample selection, we follow a (semi-parametric) approach suggested by Dahl (2003) and further discussed by Bourguignon *et al.* (2007), providing a way of embedding a multinomial logit model into a selection bias correction model. The first stage regression is the same regression as reported in Table 12, allowing for multiple groups. This regression is identified by the relational variables: birth order and the relationship of the individual to the head. The argument for excluding them from the second stage regression is that these variables in themselves do not determine consumption or other outcomes, but rather (as was seen earlier) interact with local norms for patterns of marriage and land inheritance, determining who stays in the village (and therefore in the sample) and who migrates for work or family reasons. In the regression reported above, the joint significance of these relational variables was very high ($Chi^2(18) = 177.23$) and strongly significant, so that a 'weak instruments' problem is unlikely to be present.

Table 13 reports the results, first for consumption. We report the regression without selection correction and with correction for comparison in column (1) and (2). The joint significance of the selection terms is reported as well. In line with the results in Tables 4 and 5, average growth in consumption was 82 percent. Given that the left hand side is a percentage change, the marginal effects implied by the coefficients can be directly understood in terms of their contribution to this change. The first stage appeared well identified, and (four) selection terms using the Dahl method are jointly significant: attrition matters.[28] However, the correction also only makes a relatively small difference in the coefficients and significance. Although not shown, the results are mostly totally consistent with regressions using income as the dependent variable, suggesting relatively robust effects.[29]

Table 13 Determinants of Consumption and squared poverty gap changes between 1975-83 and 2001-04 (OLS regression, left hand side changes in logarithm). Standard errors corrected for initial household cluster effects

	Consumption growth	Consumption should have had a growth with selection	Squared Poverty Gap changes	Squared Poverty Gap changes with selection
Area of land owned per capita 1983	0.029	0.028	0.000	-0.002
	[0.34]	[0.56]	[0.01]	[0.14]
Value of durable assets 1983	0.000	0.000	0.000	0.000
	[0.62]	[0.81]	[1.12]	[1.38]
Number of boys up to 14 in 1984	0.175	0.172	-0.035	-0.034
	[2.93]***	[8.10]***	[2.25]**	[6.43]***
Number of male adults aged 15 plus in 1983	-0.016	-0.017	-0.003	-0.005
	[0.28]	[0.56]	[0.26]	[0.71]

[28] Bourguignon *et al.* (2006) discuss a further number of methods to correct for sample selection using a multinomial model, including corrections usually referred to as the Lee-correction and the Durbin-McFadden-correction. The latter may in general be superior in terms of assumptions, but in small samples such as ours, the Dahl method may be preferred. However, the coefficients of the regression are barely affected by the use of alternative methods.

[29] The sample selection terms are not significant in the income growth regressions.

(Table 13 cont.)

	Consumption growth	Consumption should have had a growth with selection	Squared Poverty Gap changes	Squared Poverty Gap changes with selection
Number of girls up to 14 in 1983	0.056	0.048	-0.033	-0.031
	[1.07]	[1.63]	[2.65]***	[4.16]***
Number of female adults aged 15 plus in 1983	0.107	0.110	-0.010	-0.011
	[1.89]*	[3.64]***	[0.58]	[1.51]
Percentage of household members above 14 that can read in 1983	0.644	0.654	-0.072	-0.074
	[2.83]***	[4.90]***	[1.34]	[2.22]**
Scheduled Caste/Scheduled Tribe?	0.062	0.076	-0.094	-0.112
	[0.35]	[0.65]	[2.28]**	[3.85]***
Sex of the head of the household 1984	0.055	-0.06	0.036	0.037
	[0.40]	[0.73]	[0.96]	[1.80]*
Male? (yes=1)	-0.032	-0.003	0.002	0.001
	[0.87]	[0.05]	[0.28]	[0.03]
Log of age in 1984	-0.004	-0.014	-0.004	0.002
	[0.17]	[0.39]	[0.77]	[0.16]
Primary school completed highest grade?	0.029	0.04	-0.017	-0.02
	[0.51]	[0.52]	[1.31]	[1.04]
Middle school completed highest grade?	0.12	0.091	0.01	0.017
	[0.83]	[0.81]	[0.46]	[0.59]
High school or above is highest grade?	0.174	0.165	-0.033	-0.036
	[0.77]	[1.23]	[0.52]	[1.07]
Serious weather shock (1985-2001)?	-0.055	-0.074	0.014	0.016
	[0.69]	[1.21]	[0.71]	[1.01]
Serious health shock (1985-2001)?	0.078	0.082	-0.018	-0.017
	[0.84]	[1.31]	[0.83]	[1.10]
Dokur=1	-0.071	-0.063	-0.015	-0.021
	[0.35]	[0.54]	[0.23]	[0.71]
Shirapur=1	-0.814	-0.884	0.199	0.224
	[5.52]***	[7.47]***	[6.09]***	[7.53]***
Kalman=1	-0.678	-0.781	0.111	0.144
	[4.69]***	[6.57]***	[2.76]***	[4.82]***
Kanzara=1	-1.007	-1.018	0.205	0.209
	[5.78]***	[8.80]***	[5.17]***	[7.20]***
Kinkheda=1	-0.864	-0.832	0.179	0.173
	[5.04]***	[6.58]***	[4.45]***	[5.45]***
Observations	481	481	481	481
Observations				
R-squared	0.46	0.48	0.44	0.45
Joint significance selection terms	F(4, 455) =4.26***		F(4, 455) =3.51***	

*Robust t statistics in brackets. Significant at 10%; ** significant at 5%; *** significant at 1%; Consumption and income defined as in table 4 and 5. Standard errors control for clustering at the initial household level.*

A number of striking results emerge. First, assets do not appear to be significant: land holdings in particular are not a significant factor. This is consistent with the findings earlier that the evidence points to the growing importance of non-agricultural activities. More work is needed to understand the relative role of agriculture versus non-agriculture in this period in this transformation. Secondly, the presence of children in 1983, especially boys, is correlated

with substantial growth: an extra boy is consistent with about 17 percent higher growth over the period. More labour in the household appears to be correlated with higher earnings potential. We note that the marginal return to a girl in the household in 1983 in this period is less than about half that of a boy, although female adults in the household by 1983 had a strong positive impact on consumption growth.

The most striking factor appears to be literacy in 1983, found to be highly correlated with growth post 1984: an illiterate household would have had 65 percentage growth lower consumption growth compared with a fully literate household. Controlling for literacy, we do not find further individual level education effects. Finally, the experience across villages is of interest. Aurepalle and Dokur in Mahbubnagar in Andhra Pradesh clearly had a superior outcome, with all other villages (all in Maharasthra in the sample) experiencing substantially lower growth in both income and consumption. The specific shocks did not seem to matter, perhaps suggesting that there are no persistent effects of particular shocks, beyond what is being picked up by the village level fixed effects.

Table 13 provides some more evidence, now focusing on the lower end of the distribution. The left hand side is the changes in the squared poverty gap, based on a poverty line of 500 Rs per capita in 1975 prices (as in table 7). The right hand side variables are as before in Table 13. We are faced with some zero changes linked to the censoring implicit in poverty measures (linked to those non-poor in both periods): i.e. those that were non-poor in both periods have zero change in this period, but the vast majority of cases, more than 80 percent of the sample, have non-zero observations.[30] We therefore simply use a linear regression model, even though the controls for sample selection are still included, and which were found to be significant.

Some interesting results emerge. The dependent variable is a simple change in the squared poverty gap, which on average was about 11 percentage points in the sample. Boys and girls in 1983 contribute similarly and significantly to future poverty declines. Initial literacy variables are again strongly significant and important. The most striking result is, however, that lower castes experienced faster poverty declines, after controlling for all the other factors: across all villages, belonging to the SC/ST category reduced the squared poverty gap for such an individual by about 11 percentage points. There is no direct explanation for this, but it should be remarked that the effect is entirely linked to the Mahbubnagar villages in Andhra Pradesh: interacting the village effects with caste suggested that in the four Maharashtra villages this is effect is *not* present. Given that poverty declined substantially more in the Andhra Pradesh villages, a hypothesis for further investigation is that lower castes managed to take advantage of opportunities in this period in these villages – but how and why remains to be explored when more data become available. Finally, the village effects are again striking: the squared poverty gap decline is considerably smaller in relative terms in all Maharasthran villages compared with the Andhra Pradesh villages.

6. Conclusions

This paper offers a first glimpse of the recent changes experienced in a set of villages that were the focus of detailed study in the period 1975-84. Using unique panel data and information tracking all individuals ever present in the original sample, we document changes in incomes, consumption, assets, poverty and other indicators. Despite issues related to attrition and changes in the survey instruments, the evidence points systematically to substantial improvements in monetary and non-monetary indicators of well-being. Exploring the correlates of some of these changes, we find that consumption is linked to initial household characteristics measured in the baseline period 1975-83, most notably literacy.

[30] A simple tobit model was run as well, without sample selection, but as the sample of zero observations is actually rather small, the model unsurprisingly did not converge.

Strong differences in the relative growth between villages are found, with the Mahbubnagar villages in Andhra Pradesh outperforming the Maharashtra villages. When we focus on poverty changes, similar patterns emerge. We also find stronger changes in poverty for lower castes, but this effect is *ceteris paribus* confined to the Andhra Pradesh villages.

We also investigate the role of attrition since it is well above half the original sample of individuals. While some individuals died, a substantial number migrated out of the village for marriage and other family reasons, and for work. In recent years, work-related migration has increased, and the evidence collected thus far suggests that this group are very different from those who remained in the six villages. To understand the overall evolution of the original ICRISAT sample, current data collection should be able to shed more light on the role of this migration in changing the fortunes of the original sample.

Appendix 1: Detailed Description of the Data Used

Income and consumption aggregates in the 1975-84 survey are based on detailed data based on 3-4 weekly visits throughout the entire year. Although the actual method used to collect these data is not currently considered best practice in data collection (e.g. compared with the LSMS suggested modules for consumption and income, see Glewwe and Grosh, 2000), both the high frequency of data collection and the fact that enumerators were present in the village throughout the year has meant that the data can be considered high quality. Nevertheless, it should be noted that despite the care taken to collect these data, the series suggested much higher income than consumption, with commentators suggesting that this is most likely related to some underestimation of the latter (Townsend, 1994, Morduch, 2004).

There were some issues with the collection of the consumption and income data. The first year of consumption data (1975) was typically ignored in analysis due to some collection problems at start-up. In addition, the sample of six villages received different data collection coverage in this period. Three villages (Kanzara, Aurepalle and Shirapur) were intensively surveyed until 1984, in terms of consumption and income. Less meticulous data collection post-1981 raised questions about the breadth and quality of consumption data during this period; most researchers ignored the consumption data from 1982 onwards. Due to strong regional profiles, it was decided to keep only one village per region, which resulted in three other villages (Kinkheda, Dokur and Kalman) being dropped for the consumption data collection from 1977 (Dokur from 1978), while income data were only collected until 1983.

Since 2001, new data collection has started covering the same households interviewed in 1984/85, based on a broadly consistent questionnaire and a sampling strategy that takes into account split-offs of the original households. The sample was further expanded using proportional sampling although the stratification was maintained. Amongst households linked to the old-VLS households, attempts were made to pick up direct continuations of the original households and male split-offs, with a preference for those with the greatest hereditary claims. The total sample consisted then of 259 households linked to 173 households from the 1984/5 sample. Approximately 100 of the households picked up were split-offs linked to male children of the 1984/85 sample households. Finally, the sample was increased to 446, divided proportionately to village size.

When the VLS were restarted in the six villages in 2001/02, cost considerations meant that only one visit per year could be done, and much longer recall was needed to collect many of the aggregates, affecting also the phrasing of some questions. Investigators and researchers from the old-VLS surveys were included in the design and implementation of the new questionnaire to minimise the disruption caused by compositional issues and to maximise comparability across time. The effect of the longer recall is minimal on some crucial sections affecting long-term dynamics, particularly land, assets, durables and other wealth positions which were collected in the earlier VLS on a yearly basis. In addition, the impact on basic

household structure and dynamics and some individual characteristics (occupational, education, etc.) is also constrained.

The issue is more complicated for income and consumption flows, where the change of recall periods may well have caused problems of comparability that cannot be easily established. Research on recall periods (e.g. Scott and Amenuvegbe (1990) in Ghana) has suggested that shorter recall periods increase reporting, so that the longer recall periods may provide lower bounds on outcome. In addition, the definition of consumption categories vary slightly by year, since goods are amalgamated into differing subcategories in different years; whilst this issue is most pertinent in 2002, the amalgamation of categories is a relatively minor matter in other years. Despite being collected on a yearly basis between 2001 and 2004, data comparability was assured by allowing respondents to base their answer on a shorter time period, which was then aggregated to give a yearly series. The majority of respondents preferred to use a shorter time frame within which to frame their answers providing further assurance that data comparability is attainable. The 2004 data was collected in two six monthly rounds, to assure full data comparability the consumption series used in the following analysis utilises only the second of these rounds, aggregated in a manner comparable with other years.

The primary incomparability between the old and new VLS data arises from the aggregation of measurement errors when deriving yearly data from the recall data. In the old-VLS framework, since recalls were collected regularly the aggregate measurement error for a household within a given year would reflect the average of measurement error across different time periods. On the other hand, in the new-VLS framework where data have been collected once a year, aggregate measurement error for a household within a given year would be a multiple of measurement error for a given observation. We would therefore expect to see greater variability of consumption across and within households post-2001.

Income from the various sources can be separated into six categories: crop, livestock, trade, transfer and labour, the same categories used between 1975 and 1984, and an additional category – income from migration sources. Income from migration between 1975 and 1984 was incorporated into labour income; since migration is now a major income activity for some households it was decided to create a new category for income generated from this source. Income data was collected using a yearly recall on all income received by the households. Alongside the income recall module, data on each individual income generating activity was collected in more detailed separate modules. Although it is possible to obtain data from these individual modules, doing so has the disadvantage of compounding measurement error from the different components of each income source. For this reason, all income used in this paper comes from the income recall module.

The consumption module asks respondents the quantity and value of food required on average for different food and non-food items in a typical day or month during the year, or during the last year. The choice of recall period was left to the respondent to decide; the majority of non-food items such as clothing and cosmetics were answered at the yearly level whilst the greater part of food items, such as vegetables and meat were answered at a monthly level. Small variations have occurred in the survey design between 2001 and 2004, most notably in the amalgamation across food categories. Whilst no major food categories were omitted from the surveys, change in the groups over which aggregation occurred may have increased noise in the data.

Asset data was collected using a yearly recall - the surveys were conducted at the end of the agricultural year but assets levels were asked for the beginning of the agricultural year. The types and qualities of farm implements and consumer durables owned by households has changed quite significantly between 1975 and 2001; the questionnaires reflect these changes, whilst maintaining comparability with the earlier surveys for those items owned by households in both periods.

In 2005, 4796 of the 4907 individuals linked to the VLS were traced, and detailed individual level surveys were conducted for all individuals. In addition, household level surveys were conducted for all households in the villages, and for a third of migrant households.[31] The surveys include recall data on shocks, family and personal circumstances, as well as sections on fertility history and health.

Since July 2005, all individuals traced and their households were included again in the sample, as long as they still resided in the village. The instruments were remodelled to allow strict comparability with the 1975-84 data, while the frequency of interviews was similarly restored to four-weekly visits. Data is still being processed for the 2005/06 round, and data collection is continuing through 2006/07. This paper only uses preliminary results from 2005/06, allowing a consistency check of the data collected in 2001-04.

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[31] Of the 4796 individuals, 3006 were living in the villages, 1292 had migrated and 498 had died. Key respondents were interviewed to gain data on migrants and the deceased, whilst 70% of adults were interviewed in person for all those residing in the village.

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