

ON THE PROLIFERATION OF SMALL FARMS AND
LABOUR ABSORPTION IN INDIAN AGRICULTURE¹

Sheila Bhalla

¹ This is a revised version of a paper presented at the Indo-USSR seminar on 'Social Factors and their Influence on Agricultural Productivity' held on November 2-3 1988 in New Delhi.

Discussed comprehensively in G.S. Bhalla & D.S. Tyagi Patterns in Indian Agricultural Development: A District Level Study, Institute for Studies in Industrial Development, Narendra Niketan, I.P. Estate, New Delhi, 1989.

Introduction

In importance next only to the regional problems of widening disparities in land and labour productivity in Indian agriculture, are the two related problems which are the subject of this paper. The first is the growing incidence of excessively small holding size, and the second, the scarcity of productive employment opportunities both within as well as outside agriculture.

In India we have not found a method of dealing effectively with the problem of proliferation of small and uneconomic holdings - holdings with little or no capacity to invest or to take risk - holdings which are commonly unable to support even their existing household members, who have, perforce, to seek supplementary employment and income, in addition to their earnings from their family-operated holdings.

Closely linked with the inadequacy of policy on the small farm front, is the unresolved employment question. Both problems are linked to a common factor - demographic pressure on land associated with the failure of non-farm employment opportunities to grow fast enough to absorb the surplus labour now engaged in agriculture.

The inadequacy of the land base, and the shortfall in employment opportunities within agriculture are also linked to questions of land productivity and technological change in agriculture, in ways which are discussed in this paper.

The net effect of the set of forces at work in Independent India has been to ensure the persistence of the small, and commonly sub-marginal, family labour based farm as the typical unit of production in Indian agriculture. Declining average farm size and the marked rise in the share, (and absolute numbers), of households operating small and sub-marginal holdings, have been combined in the most recent decade, with the adoption of labour-displacing technologies² in field crop production, especially in those technologically advanced regions which follow a crop cycle dominated by wheat.

One result has been the emergence of a significant duality in the economic system. In the farm sector, where the share of Gross Domestic Product is falling while the share of the work force remains much the same as it has been for generations³, family labour based

^{2.} The terms 'technologies' and 'technological change' are used here loosely. What is observed is the choice of a yield-improving package of inputs commonly involving changes in pre-existing factor proportions, in which both relative price considerations and technological possibilities have played a role.

^{3.} The Changing shares of agriculture in male workers and in GDP are given below:

| | Description | 1961 | 1971 | 1981 |
|----|---|-------|-------|-------|
| 1. | Share of male agricultural workers in all male workers | 64.70 | 67.44 | 63.54 |
| 2. | Share of agriculture and allied sectors (excluding mining and quarrying) in GDP | 54.2 | 47.43 | 40.40 |

economic activity continues, although, in other sectors of the economy, self-employment is on the way out, and petty commodity production is rapidly giving way to modern organisations operating with hired labour.

By 'family labour based farm' I mean one that is mainly or solely operated by family labour. The land may be partly or wholly leased in; or wholly owned, but the producing household is not separated from the means of production. Indeed, in the typical case, the family owns some, if not all, of the land it operates.

There may be, as indeed there is, the simultaneous extension of hired labour and landlessness among agricultural workers⁴ but the *character* of the agricultural production process remains, to a very high degree, pre-capitalist, notwithstanding what has been described as the process of 'successful capitalist industrialisation'⁵ and the emergence of an overall social formation 'dominated by industry and by the urban bourgeoisie'.

The purpose of this paper is to examine some of the evidence which suggests that petty commodity production and the family labour based farm are likely to persist in Indian agriculture. *Part I* documents the trends in operational and ownership holding size, in particular the marked shift in favour of marginal and sub-marginal holdings, and the decline in tenancy. *Part II* focuses on related trends in labour absorption generally, and on changes in its structure (as between family labour, and hired casual and attached labour). The discussion is confined to 13 states in the plains of India, for which appropriate data on labour use was available.

4. It is estimated that the proportion of the landless in the rural work force has increased from 9.6 per cent in 1971 to 11.3 per cent in 1982. See: page 30, Seventh Five Year Plan 1985-90 - Mid Term Appraisal. G.O.I. P.C., New Delhi.

5. See T.S. Byers (1986), *The Agrarian Question, Forms of Capitalist Agrarian Transition, and the State: An Essay with reference to Asia* (mimeo), pages 31, 32. Paper read at the International Workshop on Rural Transformation in Asia, New Delhi.

Part I

Land Status and the Reproduction of Small-Scale, Owner-Cultivator Based Production Processes

The first table presents evidence that the concentration process⁶ is being swamped in India, by population pressure, given the inadequate outlets into non-farming activities and occupations. Although in the most recent decade the share of agricultural workers in the total workforce in percentage terms has at last started moving down, the absolute numbers in agricultural occupations continues to rise. The result is that the total number of separate operational holdings has grown from roughly 50.77 million in 1961-62 to more than 71 million⁷ in 1981-82 while the holding size is shrinking. In 1982, 56 per cent of all operational holdings were below one hectare. In 1961, the figure was only 39 per cent. To make matters worse there is an absurd degree of parcellisation in a number of states which are also characterised by exceptionally small holdings. This creates the situation where the typical 'parcel' is less than one-third of a hectare in four out of the 13 states covered in the study. Details are given in Table 1.

A distinctive feature of the land status situation in India is that the number of ownership holdings has been consistently more than 20 per cent *above* the number of operational holdings, although the gap (in percentage terms) has tended to narrow somewhat over time. In general, the number (and percentage share) of marginal *ownership* holding has remained far above the corresponding figures for *operational holdings* as is evident from the bottom line of Table 2. Evidently, a large number of 'marginal' owners are leasing out to households whose operational holdings come above the one hectare cut-off line.

Secondary data tells us that about two-thirds of the leased-out area come from households which are not themselves self-employed in agriculture. They are *either* agricultural labour households, or 'others'. The 'others' category includes households self-employed in non-agricultural occupations, labour households having wage-paid non-manual employment and all other households. At the all-India level they accounted for 46 per cent of all land leased out. As and when owners of small, non-viable holdings succeed in getting more productive non-agricultural jobs, the relative importance of this group, as a transitional category

⁶. The process whereby small holders lease out and sell out to large-scale operators, with the eventual result that the share of ownership and operational holdings in the upper size groups rises.

⁷. National Sample Survey estimates. See Page 14 of NSS Report number 331. There is reason to think that the 1981-82 figure is an underestimate.

Table 1
Average Area of Operational Holdings (ha) by State: 1971-72 and 1981-82
and Degree of Fragmentation 1981-82

| State | Average Area | | Fragmentation | |
|-------------------|--------------------------|--------------------------|--|------------------------------------|
| | 1971-72 Rural (ha) | 1981-82 Rural (ha) | Average Number of Parcels 1981-82 (number) | Average area per parcel (ha) |
| 1. Punjab | 4.05 | 1.81 | 2.38 | 0.76 |
| 2. Haryana | 3.87 | 2.50 | 3.43 | 0.73 |
| 3. Uttar Pradesh | 1.55 | 1.28 | 4.17 | 0.31 |
| 4. Andhra Pradesh | 2.30 | 2.00 | 3.53 | 0.57 |
| 5. Gujarat | 3.67 | 2.59 | 2.94 | 0.88 |
| 6. Maharashtra | 3.84 | 2.97 | 3.04 | 0.98 |
| 7. Karnataka | 3.19 | 2.47 | 3.07 | 0.80 |
| 8. Rajasthan | 4.17 | 3.75 | 4.71 | 0.78 |
| 9. Madhya Pradesh | 3.47 | 2.70 | 3.92 | 0.69 |
| 10. Orissa | 1.38 | 1.45 | 5.02 | 0.29 |
| 11. Tamil Nadu | 1.32 | 0.88 | 2.52 | 0.35 |
| 12. West Bengal | 1.12 | 0.77 | 5.38 | 0.14 |
| 13. Bihar | 1.25 | 1.00 | 6.27 | 0.16 |

Data Source: (1) NSS: (i) National Sample Survey, 26th round, Report Number 215 Tables in the Land Holdings at state level Vol. 1 (table 19 + 20) NSSO, Dept. of Statistics, Ministry of Planning GOI.
(ii) National Sample Survey 37th round, Number 331 Report on Land Holding Some Aspects of Operational Holdings, State and All India Estimates.
(2) Fragmentation: NSS report 331 Table (V).

might be expected to increase. At the same time primary data reveals⁸ that the 'others' subset is the main source of land for sale. Thus the fact that the numbers of marginal owners and farm operators are proliferating does not mean that the concentration process is not going on at all. What it does mean is that the forces working in the opposite direction are swamping the effects of transactions in the land-lease and land-sale markets which, taken alone, are increasingly transferring land from small owners to large-scale operators. As a result the average area per operating household is substantially above the average owned area per household -- in 1981-82, 1.70 hectares per operating household as compared with 1.28 hectares per land owning household in rural areas.

⁸. See, for example, Sheila Bhalla (1983) 'Tenancy Today: New Factors in the Determination of the Mode and Level of Rent Payments for Agricultural Land', E.P.W.

Table 2

Size Structure of Ownership and Operational Holdings by State: 1961-62, 1971-72, 1982

| | Ownership Holdings | | | | | | | | | Operational Holdings | | | | | | | | |
|-------------------|-------------------------|-------|-------|--------------------|-------|-------|---------------------|-------|-------|-------------------------|-------|-------|--------------------|-------|-------|---------------------|-------|-------|
| | Less than 1.01 hectares | | | 1 to 2.02 hectares | | | Above 2.02 hectares | | | Less than 1.01 hectares | | | 1 to 2.02 hectares | | | Above 2.02 hectares | | |
| | 61-62 | 71-72 | 82 | 61-62 | 71-72 | 82 | 61-62 | 71-72 | 82 | 61-62 | 71-72 | 82 | 61-62 | 71-72 | 82 | 61-62 | 71-72 | 82 |
| 1. Punjab* | 61.43 | 67.50 | 66.87 | 9.22 | 8.37 | 10.08 | 29.35 | 24.13 | 23.05 | 23.42 | 11.71 | 59.02 | 14.20 | 19.06 | 10.39 | 62.38 | 69.23 | 30.59 |
| 2. Haryana* | - | 63.90 | 56.84 | - | 8.95 | 15.49 | - | 27.15 | 27.67 | - | 17.48 | 42.22 | - | 17.54 | 12.74 | - | 64.98 | 45.04 |
| 3. Uttar Pradesh | 57.47 | 65.58 | 67.96 | 21.39 | 18.60 | 17.38 | 21.14 | 15.82 | 14.66 | 43.33 | 49.78 | 59.60 | 26.54 | 26.92 | 21.58 | 30.13 | 23.30 | 18.82 |
| 4. Andhra Pradesh | 66.32 | 65.30 | 67.49 | 11.46 | 13.65 | 14.03 | 22.22 | 13.65 | 18.48 | 41.90 | 47.29 | 48.64 | 18.59 | 19.14 | 22.13 | 39.51 | 33.57 | 29.23 |
| 5. Gujarat | 48.81 | 52.25 | 57.25 | 11.05 | 15.24 | 13.61 | 40.14 | 31.51 | 29.14 | 19.76 | 27.19 | 38.63 | 15.80 | 20.70 | 20.38 | 64.44 | 52.11 | 40.90 |
| 6. Maharashtra | 50.26 | 48.36 | 54.89 | 11.41 | 14.94 | 14.96 | 38.33 | 36.70 | 30.15 | 23.56 | 23.71 | 35.26 | 18.04 | 21.74 | 19.47 | 58.40 | 54.55 | 45.27 |
| 7. Karnataka | 46.54 | 50.94 | 54.41 | 12.92 | 16.27 | 16.82 | 40.54 | 32.79 | 28.77 | 20.55 | 28.76 | 38.90 | 17.45 | 22.81 | 22.53 | 62.00 | 48.43 | 39.07 |
| 8. Rajasthan | 29.26 | 26.96 | 37.08 | 15.46 | 19.87 | 16.23 | 55.28 | 53.17 | 46.69 | 16.03 | 31.00 | 30.53 | 17.71 | 16.40 | 17.48 | 66.26 | 52.60 | 51.99 |
| 9. Madhya Pradesh | 40.42 | 40.26 | 48.77 | 15.42 | 16.96 | 16.24 | 44.16 | 42.78 | 34.99 | 21.72 | 26.11 | 32.94 | 19.34 | 20.29 | 22.51 | 58.94 | 53.60 | 44.55 |
| 10. Orissa | 62.67 | 68.94 | 66.06 | 17.24 | 18.08 | 20.84 | 20.09 | 12.98 | 13.10 | 39.35 | 54.52 | 54.45 | 28.80 | 25.78 | 26.11 | 31.85 | 19.70 | 19.44 |
| 11. Tamil Nadu | 78.42 | 73.13 | 81.85 | 11.07 | 11.39 | 10.89 | 10.51 | 15.48 | 7.26 | 52.44 | 60.06 | 71.37 | 24.47 | 21.26 | 16.72 | 23.09 | 18.68 | 11.91 |
| 12. West Bengal | 69.25 | 77.62 | 81.60 | 16.81 | 12.64 | 11.50 | 13.94 | 9.74 | 6.90 | 44.98 | 61.21 | 74.34 | 29.73 | 22.80 | 15.83 | 25.29 | 15.99 | 9.83 |
| 13. Bihar | 68.08 | 71.71 | 76.65 | 15.83 | 15.11 | 12.42 | 16.09 | 13.18 | 10.93 | 54.38 | 58.86 | 68.70 | 22.89 | 23.32 | 17.61 | 22.23 | 17.82 | 13.69 |
| 14. All India | 60.06 | 62.62 | 66.64 | 15.16 | 15.49 | 14.70 | 24.78 | 21.89 | 18.66 | 39.07 | 45.77 | 56.00 | 22.62 | 23.38 | 19.32 | 38.31 | 31.85 | 24.68 |

* Punjab includes Haryana in 1961-62.

Source: Table VII pp. 25-25 NSS Report 330, and Table VI pp. 24-25 NSS Report 331.

Table 3**Who Leases Out, Who Leases In, by Household Type: India - 1981**

| Household Type owned | Per cent of Households | Per cent of area owned | Per cent of area leased out | Per cent of area leased in |
|---------------------------------|------------------------|------------------------|-----------------------------|----------------------------|
| 1. Self employed in agriculture | 48.81 | 86.24 | 34.35 | 88.37 |
| 2. Agricultural Labour | 24.60 | 5.01 | 19.39 | 5.92 |
| 3. Others | 26.58 | 8.74 | 46.26 | 5.71 |
| 4. All HH Types | 100.00 | 100.00 | 100.00 | 100.00 |

Source: NSS Report No. 330 Page 28.

Recent changes in tenure status are likely to reinforce the position of the self-cultivating owner-operated family farm. That the vast majority of operational holdings include at least some owned area is evident from the figures in Table-4. What is more important, however, is the fact that the proportion which operates any leased-in area at all, has gone down in the recent decade, in every state without exception. In terms of area as well, the incidence of tenancy is declining. The figures in Table 4 also indicate that tenancy is most prevalent in the high-growth regions where economies of scale have emerged, (Punjab, Haryana and U.P.) and in the low-growth regions characterised by unproductive labour absorption, at the other end of the scale (Orissa, Tamil Nadu, West Bengal and Bihar).

At least two further points of interest emerge from the data in Table 5. One is the fact that both leasing out and leasing in appear to be on the decline in almost all States. The other is that the proportion of households leasing in is generally a multiple of the proportion which leases out. This is because the bulk of the land leased-in is coming from non-cultivating households. (See Table 3).

Detailed size class breakdowns indicate that in Punjab and Haryana, owner-cum-tenant holdings account for a substantial and even a dominant share in all operational holdings in the medium and large size categories. There are relatively fewer in the marginal, small and `semi-medium'⁹ size classes in these two states, and less common also in the bigger size classes in other states. This

⁹. The NSS (as of 1981-82) defines as:

- i. `Marginal holding', all those under 1.01 hec.
- ii. `Small holdings', those from 1.01-2.02 hec.
- iii. `Semi-medium', those from 2.3 to 4.04 hec.
- iv. `Medium', those from 4.04 to 10.12 hec.
- v. `Large', those of 10.13 hec and above.

Table 4
Per cent of Rural Operational Holdings having Owned and Leased-in Area, and
Per cent of Operated Area Owned and Leased-in, by State: 1971 and 1981

| State | Per cent of Holdings having | | | | Per cent of Operated Area | | | |
|-------------------|-----------------------------|-------|----------------|-------|---------------------------|-------|----------------|-------|
| | Owned Area | | Leased-in Area | | Owned Area | | Leased-in Area | |
| | 1971 | 1981 | 1971 | 1981 | 1971 | 1981 | 1971 | 1981 |
| 1. Punjab | 95.22 | 97.89 | 52.99 | 21.29 | 71.99 | 82.21 | 28.01 | 16.07 |
| 2. Haryana | 96.38 | 97.80 | 37.35 | 25.89 | 76.74 | 77.44 | 23.26 | 18.22 |
| 3. Uttar Pradesh | 98.64 | 99.14 | 27.84 | 20.45 | 86.99 | 88.05 | 13.01 | 10.24 |
| 4. Andhra Pradesh | 99.29 | 98.54 | 21.66 | 13.76 | 90.90 | 92.98 | 9.01 | 6.23 |
| 5. Gujarat | 99.31 | 98.38 | 9.32 | 4.85 | 96.09 | 97.80 | 3.99 | 1.95 |
| 6. Maharashtra | 99.23 | 96.42 | 11.93 | 10.59 | 93.85 | 94.21 | 6.15 | 5.20 |
| 7. Karnataka | 94.02 | 97.70 | 28.81 | 10.73 | 84.10 | 92.10 | 15.90 | 6.04 |
| 8. Rajasthan | 99.38 | 98.03 | 8.93 | 7.14 | 94.74 | 94.47 | 5.26 | 4.31 |
| 9. Madhya Pradesh | 94.69 | 96.00 | 21.05 | 7.98 | 92.54 | 92.65 | 7.46 | 3.56 |
| 10. Orissa | 91.24 | 98.16 | 27.95 | 18.19 | 86.60 | 83.97 | 13.40 | 9.92 |
| 11. Tamil Nadu | 95.70 | 89.62 | 31.67 | 24.66 | 86.93 | 87.37 | 13.07 | 10.92 |
| 12. West Bengal | 96.72 | 90.78 | 34.56 | 25.08 | 81.27 | 86.18 | 18.73 | 12.34 |
| 13. Bihar | 99.27 | 98.39 | 39.78 | 19.73 | 85.50 | 88.68 | 14.50 | 10.27 |

Source: Per cent of Holdings: NSS 215, table 19 for 1971, and NSS 331 table 5 for 1981. Per cent of Operated Area: NSS 215, Table 19 for 1971, and NSS 331 table V (or table 6) for 1981.

Table 5
Per cent of Rural Households Leasing Out Land, per cent of Owned Area Leased
Out, and per cent of households Leasing in Land, by state 1971-72 and 1981-82

| State | Per cent of HH Leasing out | | Per cent of Owned Area Leased out | | Per cent of households Leasing in | |
|-------------------|----------------------------|---------|-----------------------------------|---------|-----------------------------------|---------|
| | 1971-72 | 1981-82 | 1971-72 | 1981-82 | 1971-72 | 1981-82 |
| 1. Punjab | 13.67 | 8.36 | 17.69 | 11.07 | 27.52 | 23.03 |
| 2. Haryana | 11.48 | 9.40 | 8.06 | 10.64 | 29.41 | 22.28 |
| 3. Uttar Pradesh | 10.06 | 6.70 | 6.41 | 4.80 | 24.96 | 21.27 |
| 4. Andhra Pradesh | 12.05 | 6.15 | 8.93 | 6.30 | 20.95 | 19.74 |
| 5. Gujarat | 3.79 | 2.31 | 2.29 | 1.67 | 13.74 | 9.01 |
| 6. Maharashtra | 4.72 | 3.09 | 3.28 | 2.70 | 14.69 | 16.70 |
| 7. Karnataka | 11.05 | 5.81 | 7.90 | 5.01 | 27.68 | 16.95 |
| 8. Rajasthan | 5.78 | 5.49 | 4.09 | 3.14 | 14.81 | 9.70 |
| 9. Madhya Pradesh | 7.68 | 3.18 | 3.62 | 3.28 | 23.26 | 12.29 |
| 10. Orissa | 13.11 | 6.71 | 7.04 | 5.45 | 29.28 | 16.81 |
| 11. Tamil Nadu | 8.44 | 7.78 | 8.88 | 5.89 | 31.16 | 29.22 |
| 12. West Bengal | 9.40 | 3.68 | 8.95 | 2.48 | 30.63 | 27.09 |
| 13. Bihar | 15.80 | 7.43 | 6.78 | 4.95 | 33.48 | 17.22 |

Sources: Leasing Out: - NSS No. 215 Vol. I, Table 3 for 1971-72 NSS No. 330 Table 3 for 1981-82.
Leasing in: NSS: No. 215 Vol. I, Table 4 Col. 8 for 1971-72, for 1981-82, NSS 330 Compiled from Table 7, aggregating across cols 2 to 5.

kind of 'leasing up' is consistent with operated area adjustments aimed at taking advantage of economies of scale in production, and in the use of the more costly types of farm equipment. In West Bengal, Orissa, Bihar and Tamil Nadu, it is the marginal, small and semi-medium operational holdings which report the highest incidence of owner-cum-tenant holdings.

Pure tenants generally belong to the bottom size categories of operational holdings and in the 'agricultural involution'¹⁰ states -- West Bengal, Orissa, Bihar and Tamil Nadu the bottom four states in all the tables -- they account for a substantial proportion of very small operational holdings.

In short it appears that mixed tenancy is becoming pre-eminently a medium and large farm phenomenon in the most advanced agricultural regions of the country, while 'pure' tenancy appears most importantly among very small operators in the relatively backward agricultural regions.

The main lesson to be drawn from the recent land status data is that the marginal and small farm operation is not on its way out in India. Given present trends in labour absorption both in agriculture and in non-agriculture, the small farm operation is going to be with us for a long time, and we know that such farms operate mainly on the strength of family labour. This is the case *even in* states noted for the emergence of capitalist farmers at the upper end of the land size class hierarchy, and within these states, *even in* districts where the relative importance of hired labour rose sharply during the 'expansionary phase'¹¹ in demand for field crop labour.

The secondary message of this data is that even minimal improvements in land and labour productivity have tended to reduce the incidence of tenancy, especially pure tenancy, in the Indian context. This development has tended to reinforce the owner-operated or owner-cum-tenant, character of the typical family farm enterprise.

^{10.} Where labour inputs per hectare increase significantly over time despite long-term stagnation in yields, this can be treated as evidence of 'agricultural involution' in over-populated agriculture. The term was first applied to this kind of situation by Clifford Geertz. See C. Geertz, 'Agricultural Involution, the Process of Ecological Changes in Indonesia' in (eds) Richard Jolly et al Third World Employment: Problems and Strategy, Penguin, 1973.

^{11.} See Part II of this paper for a discussion of this aspect. The 'expansionary phase' ended in the second half of the 1970s.

Part II

Trends in Labour Absorption in Indian Agriculture and Changes in its Structure

The analysis of this section is carried out within the framework of at least two kinds of propositions.

First: The link between farm size and the relative importance of hired *versus* family labour is known. Other things remaining the same, a downward shift of households in the operated acreage class structure will tend to reduce the relative importance of hired labour, and to increase reliance on unpaid family workers. The illustrative case of Haryana, (as at 1972-73) is presented as table 6 below. Clearly a decline in the relative importance of the really big farm operators (in this case, those above 15 acres), would sharply reduce the demand for hired workers, and by implication would serve to entrench further the family labour based farm as the unit of production in Indian agriculture.

Table 6

Share of Family and Hired in Labour by Acreage Class: Haryana 1972-73

| Acreage class | Family (%) | Hired in (%) |
|---------------|------------|--------------|
| 0 - 2.5 | 95.0 | 5.0 |
| 2.5 - 5.0 | 89.5 | 10.5 |
| 5.0 - 10.0 | 88.3 | 11.7 |
| 10 - 15 | 80.5 | 19.5 |
| 15 or more | 45.2 | 54.8 |
| All acreage | 64.4 | 35.6 |

Source: Author's field survey of 153 Haryana villages covering more than 1,100 households in 1972-73.

However, other things do not remain the same, either in cross-section, or over time, which brings us to proposition two. In all cases where paddy dominates decisively in the production profile, it is found that labour absorption per hectare for 'all crops' is high. Low labour absorption per hectare, on the other hand, is peculiarly associated with crop cycles in which irrigated wheat is sown in the *Rabi* season. Other things remaining the same, a shift in the cropping pattern in favour of paddy, sugarcane, cotton, jute, and groundnut tends to enhance the demand for labour. on the other hand, the introduction of HYV wheat, in the

long run, may tend to depress overall labour requirements. These broad features are also known. Some of the evidence is presented in Table 7.

Table 7
Labour Absorption (Mandays per Hectare) by Broad Crop Group, by
State: Triennial averages for 1971-72 to 1973-74 and 1981-82 to 1983-84

| S. No. | State | Triennium Ending | Cereals | Pulses & Barely | Oilseeds | Others | All crops |
|--------|----------------|------------------|---------|-----------------|----------|--------|-----------|
| 1. | Punjab | 1973-74 | 71.13 | 37.01 | 46.12 | 106.57 | 70.76 |
| | | 1983-84 | 61.90 | 35.44 | 48.18 | 99.59 | 65.02 |
| 2. | Haryana | 1973-74 | 60.03 | 34.66 | 40.36 | 115.68 | 57.26 |
| | | 1983-84 | 54.98 | 27.73 | 34.94 | 104.92 | 54.82 |
| 3. | Uttar Pradesh | 1973-74 | 92.36 | 66.13 | 60.13 | 153.21 | 88.00 |
| | | 1983-84 | 87.72 | 61.51 | 67.51 | 138.65 | 86.06 |
| 4. | Andhra Pradesh | 1973-74 | 78.45 | 47.35 | 77.58 | 223.60 | 85.84 |
| | | 1983-84 | 115.49 | 55.05 | 87.79 | 214.87 | 112.83 |
| 5. | Gujarat | 1973-74 | 61.20 | 62.25 | 52.03 | 73.80 | 62.22 |
| | | 1983-84 | 79.78 | 72.32 | 66.76 | 133.55 | 86.16 |
| 6. | Maharashtra | 1973-74 | 68.52 | 48.67 | 51.98 | 98.40 | 70.57 |
| | | 1983-84 | 80.54 | 55.78 | 61.96 | 127.32 | 84.51 |
| 7. | Karnataka | 1973-74 | 76.03 | 40.36 | 76.97 | 69.53 | 72.11 |
| | | 1983-84 | 80.14 | 46.78 | 70.56 | 135.08 | 83.67 |
| 8. | Rajasthan | 1973-74 | 44.87 | 48.31 | 45.60 | 86.97 | 46.78 |
| | | 1983-84 | 49.99 | 41.37 | 50.71 | 102.77 | 50.22 |
| 9. | Madhya Pradesh | 1973-74 | 66.95 | 52.86 | 47.48 | 89.41 | 64.17 |
| | | 1983-84 | 60.09 | 53.06 | 54.34 | 66.15 | 58.37 |
| 10. | Orissa | 1973-74 | 106.41 | 47.01 | 70.09 | 212.93 | 103.23 |
| | | 1983-84 | 123.01 | 46.33 | 80.99 | 216.15 | 111.45 |
| 11. | Tamil Nadu | 1973-74 | 109.38 | 55.30 | 105.55 | 210.03 | 113.40 |
| | | 1983-84 | 125.89 | 55.58 | 103.82 | 248.15 | 124.94 |
| 12. | West Bengal | 1973-74 | 111.25 | 54.43 | 60.59 | 198.56 | 112.99 |
| | | 1983-84 | 142.75 | 53.03 | 79.00 | 199.38 | 141.67 |
| 13. | Bihar | 1973-74 | 95.77 | 56.96 | 61.65 | 131.57 | 93.04 |
| | | 1983-84 | 109.46 | 55.45 | 79.27 | 108.77 | 104.54 |

- Notes: 1. Cereals include: paddy, jowar, maize and wheat. Pulses & barley include barley, tur (arhar), moong, urad and gram. Oilseeds covered are: groundnut, soyabean, sunflower, rapeseed and mustard. 'Others' include: cotton, jute, sugarcane and, in Andhra Pradesh only, V.F.C tobacco.
2. Where mandays per hectare data were not available for any of the first triennium years, (1971-72, 1972-73 and 1974-75) values are estimated for these years, provided that data were available for the crop in the specified state, in Estimates of Area and Production of Principal Crops (Directorate of Economics and Statistics, Ministry of Agriculture, Government of India).
3. 'All crops' means all of the 18 crops listed in note 1 above for which mandays per hectare data were available or could be estimated as in note 2.

The inter-state contrasts in table 7 are undoubtedly also the product, in part, of

differing soil-climatic conditions, and in part the outcome of contrasts in yield-levels for specific crops. But this is not at all the whole story. Contrasts in labour-intensity at any one point in time are also very much the cumulated product of the technological changes that have taken place over long, or even not so long, periods. The new technologies in varying degrees have been either labour-using or labour-saving, sometimes altering the relative positions of the two states within the span of a single decade. These time profiles are the substance of the next subsection. The evidence is reviewed in a series of related tables on output growth rates, changes in labour-productivity, and labour-absorption: Tables 8, 9 and 10.

Table 8
Trends Rates of Growth in Production, Labour Productivity
and Employment, by State: 1971-72 to 1983-84

| | | Trends Rates of Growth in: | | | |
|-------------------|--------------------------|----------------------------|---------------------------|--------------------|-----|
| State | Production (49 crops) | Labour Productivity | Employment per hectare | (Mandays) Total | |
| | | (1) | (2) | (3) | (4) |
| 1. Punjab | 3.92 | 2.63 | -0.887* | 1.079* | |
| 2. Haryana | 3.31 | 1.47 | -0.357 | 0.230 | |
| 3. Uttar Pradesh | 3.09 | 1.72 | -0.145 | 0.598 | |
| 4. Andhra Pradesh | 3.81 | 1.78 | 2.779*** | 3.663*** | |
| 5. Gujarat | 3.92 | 2.38 | 3.191*** | 3.574*** | |
| 6. Maharashtra | 5.60 | 4.44 | 1.730*** | 3.435*** | |
| 7. Karnataka | 2.44 | 0.75 | 1.483*** | 2.614*** | |
| 8. Rajasthan | 2.47 | 0.97 | 0.737 | 1.393 | |
| 9. Madhya Pradesh | 1.65 | 0.03 | -0.976* | -0.014 | |
| 10. Orissa | 2.28 | 1.15 | 0.795 | 0.331** | |
| 11. Tamil Nadu | 1.12 | 0.26 | 0.960* | -0.510 | |
| 12. West Bengal | 0.91 | -0.59 | 2.096** | 2.037* | |
| 13. Bihar | 0.49 | -0.68 | 1.037 | 0.074 | |

- Sources Notes: (1) Col. 1: Trend growth rates in production for 49 crops were computed using indices of agricultural production for each state. The indices were prepared by the Commission for Agricultural Costs and Prices, and the data presented in G.S. Bhalla 'Some Issues in Agricultural Development in India': An Overview, Table 3 in P.R. Brahmananda & V.R. Panchamukhi (eds.): The Development Process and the Indian Economy, Himalaya Publishing House, Bombay 1987.
- (2) Col. 2: Derived from data presented in G.S. Bhalla, op cit. Table 5 page 248.
- (3) Col. 3 & 4: Computed from data gathered under the Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops, for 18 crops, or fewer where data were available for a smaller number of crops only.
- (4) Stars (*) in columns 3 and 4 indicate T-Values significant at the following levels:
* 95 per cent, ** 98 per cent, *** 99 per cent.

Table 9

Identification of states where days work available pr worker has gone down: Cost of production data and National Sample Survey Estimates

| State | | States where days work per male worker has gone down (1970-71 to 1983-84) | Per cent change in person days employment (1977-78 to 1972-73) |
|-------|----------------|---|--|
| (1) | (2) | (3) | (4) |
| 1. | Punjab | X | -2 |
| 2. | Haryana | X | -6 |
| 3. | Uttar Pradesh | X | -11 |
| 4. | Andhra Pradesh | | 12 |
| 5. | Gujarat | | 14 |
| 6. | Maharashtra | | 13 |
| 7. | Karnataka | | 9 |
| 8. | Rajasthan | X | -9 |
| 9. | Madhya Pradesh | X | -1 |
| 10. | Orissa | | 4 |
| 11. | Tamil Nadu | X | -13 |
| 12. | West Bengal | | 10 |
| 13. | Bihar | X | 8 |

Source: Col. 1 based on Cost of Production data presented in table 1 page 545, of Sheila Bhalla 'Trends in Employment in Indian Agriculture, Land and Asset Distribution', Indian Journal of Agricultural Economics Oct.-Dec. -- 1987.

Col. 2 based on N.S.S. data presented in table 12, p A-141, in A. Vaidyanathan 'Labour Use in Rural India - A Study of Spatial and Temporal Variations', Economic and Political Weekly, 27 Dec. 1986.

Table 10

Per Hectare Employment Elasticities with respect to yield for Paddy and Wheat by State 1971-72 to 1983-84. (Trend Growth Rate in man days per hectare:- trend growth rate in yield)

| Crop | Ranked Negative Elasticities | | Low Positive Elasticities | | High Positive Elasticities | | Involution Elasticities | |
|----------|------------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------|--------------------------------|-------------------------|--------------------------------|
| | State Elasticity | Elasticity (Yield growth rate) | State | Elasticity (Yield growth rate) | State | Elasticity (Yield growth rate) | State | Elasticity (Yield growth rate) |
| 1. Paddy | Haryana | -0.393 (5.04) | Karnataka | 0.251 (1.14) | Tamil-Nadu | 0.904 (1.73) | West Bengal | 5.599 (0.47) |
| | Punjab | -0.390 (6.04) | Gujarat | 0.273 (4.63) | Andhra | 1.310 (2.60) | Orissa | 23.722 (0.09) |
| | Uttar Pradesh | -0.368 (2.23) | Maha-rashtra | 0.329 (3.84) | | | Bihar | 28.049 (0.04) |
| 2. Wheat | Rajasthan | -1.194 (2.78) | None | None | Bihar | 0.809 (1.89) | West | 1.372 (0.33) |
| | Haryana | -0.953 (1.97) | | | | | | |
| | Punjab | -0.890 (2.50) | | | | | | |
| | Madhya Pradesh | -0.592 (1.97) | | | | | | |
| | Uttar Pradesh | -0.488 (2.42) | | | | | | |
| | Gujarat | -0.431 (3.04) | | | | | | |

It is evident from these tables that a conspicuous feature of some of the high growth states is the adoption of labour-displacing technology. Of the six states which have enjoyed production growth rates above three per cent over the past ten to fifteen years, three have now clearly shifted over to 'labour-saving' technologies to increase yields and output, while three others have been adopting 'labour-using' technologies (See Table 8).

The first set consists of Punjab, Haryana, and Uttar Pradesh -- the pioneers in the adoption of the 'Green Revolution' technology in India. The second set includes Andhra Pradesh, Gujarat and Maharashtra which are relative new comers to the 'high-growth' club. These six high-growth states, it is worth noting, are the only states which have enjoyed substantial improvements in per worker productivity. The outcome is marked inter-regional contrasts in growth rates of labour productivity which introduce a new dimension into the character of inter-regional inequalities in India.

Time series data reveal that in the first three states, labour absorption in fact

followed an inverted U shaped path. The initial response to the 'Green Revolution' technology was a sustained rise in labour-use per hectare. This trend characteristically peaked in the mid-seventies or shortly afterwards, and subsequent increases in yield were associated with a contraction in mandays employment per hectare, in the case of most crops.

Nevertheless, in Punjab, Haryana and Uttar Pradesh, it has been possible to sustain or enhance existing levels of total employment in field crop agriculture because of the expansion of gross cropped area, together with shifts of area in favour of relatively more labour-intensive crops. Since the technological changes which have taken place in these three states have made it possible to improve both labour and land productivity substantially they must be counted as part of a set of positively constructive developments.

In the second set of high output growth states, labour absorption graphs follow a distinctive, and apparently continuous upward trend, generating very high rates of growth in both employment and labour productivity--for the time being at least, the best of all possible worlds.

The remaining seven states are all characterised by relatively low levels of output growth, together with slow or no growth in labour productivity. In Bihar and West Bengal, in fact, the rate of growth in labour productivity is negative.

When this evidence is combined with state-level data on employment elasticities and yield growth rates for ten major crops, a clear basis emerges for identifying the four states at the bottom of the table, as areas of 'agricultural involution'. For the country as a whole, the position is that, notwithstanding favourable shifts in cropping patterns, and the extension of Gross Cropped Area, (an especially important factor in Punjab), the elasticity of employment with respect to production has been falling during the past 10 to 15 years. This presents a very difficult set of economic and social problems within the economy and polity as a whole.

What are the long term implications of all this for the place of the family labour based farm in Indian agriculture? On the face of it, it appears that the introduction of labour displacing technologies in field crop production in the wheat dominated regions, would tend to retard the development of hired labour based production units. To the extent that this is the case, the family labour based farm is likely to persist *despite* the emergence of economies of scale in field crop production in these regions.

A preliminary exercise was done, using this same 'Cost of Production' data, to determine what in fact has been happening to the shares of family and hired labour over time, in three prototype states: Haryana, Andhra Pradesh and Bihar. The results are presented in Tables 11, 12 and 13.

Table 11

Trends in the Share of Family Labour in Total Labour 'Costs' (%)
Share of Family Labour in Total Labour Costs (%)

| Year | Haryana | Andhra Pradesh | Bihar |
|---------|---------|----------------|-------|
| 1971-72 | 69.67 | 24.60 | 41.50 |
| 1972-73 | 67.50 | 26.70 | 36.07 |
| 1973-74 | 64.03 | 26.34 | 37.61 |
| 1974-75 | 65.41 | 23.10 | 51.35 |
| 1975-76 | 63.63 | 22.87 | 38.40 |
| 1976-77 | 70.45 | 21.65 | 40.45 |
| 1977-78 | 63.50 | 19.86 | 35.42 |
| 1978-79 | 58.05 | 24.17 | 37.86 |
| 1979-80 | 56.49 | 21.50 | 37.68 |
| 1980-81 | 59.21 | 17.90 | 36.24 |
| 1981-82 | 64.11 | 21.46 | 50.70 |
| 1982-83 | 57.29 | 23.05 | 52.15 |
| 1983-84 | 60.09 | 20.15 | 50.62 |

- Notes: (1) Family labour costs are imputed as in the cost of production data.
(2) Source: As in table 8, column 3 + 4. Based on (weighted) data for seven crops only.

Table 12

Trends in the Share of Casual and Attached Labour
in Total Labour Costs (%)

| Year | Share of Casual Labour in Total Labour Costs | | | Share of Attached Labour in Total Labour Costs | | |
|---------|---|----------------|-------|---|----------------|-------|
| | Haryana | Andhra Pradesh | Bihar | Haryana | Andhra Pradesh | Bihar |
| 1971-72 | 16.39 | 64.71 | 48.37 | 13.91 | 10.69 | 10.13 |
| 1972-73 | 16.07 | 61.28 | 56.13 | 16.43 | 12.02 | 7.80 |
| 1973-74 | 18.43 | 61.55 | 48.66 | 17.54 | 12.11 | 13.73 |
| 1974-75 | 16.22 | 64.00 | 40.46 | 18.37 | 12.90 | 8.19 |
| 1975-76 | 19.89 | 64.61 | 52.44 | 16.48 | 12.52 | 9.16 |
| 1976-77 | 16.82 | 67.35 | 50.57 | 12.73 | 11.00 | 8.88 |
| 1977-78 | 24.66 | 66.90 | 61.37 | 11.84 | 13.24 | 3.21 |
| 1978-79 | 31.12 | 62.88 | 54.99 | 10.83 | 12.95 | 7.15 |
| 1979-80 | 32.11 | 71.01 | 52.79 | 11.40 | 7.49 | 9.53 |
| 1980-81 | 29.31 | 75.54 | 51.04 | 11.48 | 6.56 | 12.72 |
| 1981-82 | 25.13 | 72.11 | 40.68 | 10.76 | 6.43 | 8.62 |
| 1982-83 | 29.14 | 71.29 | 39.37 | 13.57 | 5.66 | 8.48 |
| 1983-84 | 25.80 | 74.50 | 41.50 | 14.11 | 5.35 | 7.88 |

Table 13
Trends in the Share of Casual Labour in Hired Labour Costs

| Year | Share of Casual Labour in Hired Labour Costs | | |
|---------|--|----------------|-------|
| | Haryana | Andhra Pradesh | Bihar |
| 1971-72 | 54.09 | 85.82 | 82.68 |
| 1972-73 | 49.45 | 83.60 | 87.80 |
| 1973-74 | 51.24 | 83.56 | 77.99 |
| 1974-75 | 46.89 | 83.22 | 83.17 |
| 1975-76 | 54.69 | 83.77 | 85.13 |
| 1976-77 | 56.92 | 85.96 | 85.06 |
| 1977-78 | 67.56 | 83.48 | 95.03 |
| 1978-79 | 74.18 | 82.92 | 88.89 |
| 1979-80 | 73.80 | 90.46 | 84.71 |
| 1980-81 | 71.86 | 92.01 | 81.11 |
| 1981-82 | 70.02 | 91.81 | 82.52 |
| 1982-83 | 68.23 | 92.64 | 82.28 |
| 1983-84 | 64.85 | 93.30 | 84.04 |

Note: Sum of casual plus attached = all hired labour.

With respect to family labour no conclusive trend is established, although it appears that the share of family labour may now be rising in Bihar.

With respect to the composition of hired labour, however, there are clear and potentially interesting developments. With respect to casual labour, in the high output growth rate states (Haryana and Andhra Pradesh), the share of casual in total labour costs is clearly rising. The corresponding share of attached labour, which rose during the early 'expansionary phase'¹² in labour absorption in Haryana, is now falling. The decline is marked in Andhra Pradesh, despite the continuing increase in total per hectare labour absorption. No trend is discernible in Bihar. One consequence is that the share of casual labour in hired labour is rising un-ambiguously in both Haryana and Andhra Pradesh. Nothing much of note is happening in Bihar.

The underlying hypotheses tested against the evidence presented in these three tables was that--(1) the share of family labour in the total would rise as and when labour-displacing technology was adopted --the case of Haryana.

(2) that it would fall in the face of rapid growth in yields combined with labour using technologies -- the case Andhra Pradesh; and finally

(3) that in an 'agricultural involution' context, such as Bihar's, family labour would gradually displace hired labour.

Of the three, only the last proposition found any support in the data. Clearly more work needs to be done to identify the links between the technological changes which are taking place, and the persistence or otherwise, of the family labour based farm production system in Indian agriculture.

¹² Spanning roughly the decade 1967 to 1977.