

**Speeding up Agricultural Growth:
Implications for Labour Absorption**

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Throughout the nineteen fifties and sixties, and in the early phases of the green revolution, policy makers could count on employment gains from virtually every increase in farm productivity. This is still appropriate in a number of states, but it is no longer so in Uttar Pradesh, Rajasthan, Madhya Pradesh, Tamil Nadu and Bihar. In these five states, when farm output and net value added (NVA) go up, farm employment goes down. The result is that more and more people born into farm and farm labour households in these states, either have to find jobs outside of agriculture, or work in agriculture for fewer and fewer days in each successive year on the average).

Why does speeding up agricultural growth reduce farm employment opportunities now, when growth improved labour absorption twenty to twenty five years ago? The preliminary answer is that at least two important circumstances have changed.

First of all, in the decades before the mid-sixties, the main source of agricultural growth was the expansion of net sown area. This being the case, there could be no conflict between farm output and farm income goals on the one hand and rural employment objectives on the other. Whatever pushed up total cropped area was instrumental in expanding employment. In the last twenty years, however, increasing yields have become by far the most important source of farm output growth; area expansion has been relegated to a minor role. This shift from area expansion to yields as the main source of farm output growth was not the result of deliberate choice. It was forced on us by changed circumstances. By the mid-sixties the possibilities for extending net sown area had been more or less exhausted; and the alternative, of pushing up gross cropped area by increasing cropping intensity, is not only a slow process but also a costly one. The result is that policy makers now rely heavily on increasing yields to accelerate agricultural growth.

The second circumstance which was changed is the response of employment to increases in yields. In the past, when real wages in agriculture were more or less constant, and the new technology involved mainly a new biochemical input combination --- HYV seeds, water and chemical fertilisers --- increases in yields were associated with increases in labour absorption. This is no longer so. Now negative employment elasticities with respect to yield have appeared in most states, including Uttar Pradesh. This new feature has greatly complicated the situation. By themselves, of course, negative employment elasticities with respect to yield are not a disaster. As long as they go hand in hand with cropping pattern shifts which favour labour absorption, or with compensating increases in gross cropped area, total farm employment can still rise. But in several states these potential compensating factors are either absent altogether, or they are too weak to offset declining labour intensity in the production of one or more crops.

The consequences for rural employment are clear. The figures in table 1 below, show that in U.P. field crop employment declined at a significant rate. Non field crop on farm employment gained, but not enough to cancel out the effects of falling employment in crop production. In U.P. the weight of agricultural employment in all rural employment is

so great, that the latter declined, despite the positive growth rate of non farm employment, which was too low to compensate for the contraction of labour use in agriculture. It is evident from the table that Uttar Pradesh is one of four states where field crop employment has gone down. On a per capita basis, given a growing farm and farm labour population, the number of days work available per person has also gone down in Punjab, Bihar, and Karnataka. Maharashtra just about breaks even. The rural employment situation as whole is in fact comfortable, only in Haryana and Andhra Pradesh.

Table 1

**Compound Growth Rates of Field Crop Employment, all Agricultural Employment, Non-Agricultural Employment, and All Employment in Rural Areas, by State 1972-73 to 1983
(NSS Persondays for persons age 15 to 59 and CSS data without regard to age)**

State	Compound			
	Field Crop Employment	All Agricultural Employment	Non-Agricultural Employment	All Rural Employment
1. Uttar Pradesh	-0.5983	-0.2130	0.6678	-0.0333
2. Rajasthan	-0.5807	1.1638	-0.6300	0.8453
3. Madhya Pradesh	-1.6877	0.0982	1.7402	0.2856
4. Tamil Nadu	-1.2830	-2.4514	3.1744	-0.9278
5. Punjab	0.1720	-0.0424	0.0688	-0.0115
6. Bihar	0.8704	-0.1639	0.6413	-0.0003
7. Karnataka	1.2150	1.1689	1.8088	1.2961
8. Maharashtra	1.5580	2.0538	-3.2581	0.6101
9. Andhra Pradesh	2.2392	1.7251	3.5552	2.1564
10. West Bengal	2.3823	0.7196	3.2339	1.5071
11. Haryana	2.5308	2.4517	7.2124	3.5646
12. Orissa	2.7765	0.3248	1.6832	0.6644
13. Gujarat	3.9910	1.0892	0.6359	1.0030

Note: All data is from the National Sample Survey, except that for Field Crop Employment, which is from the Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in India.

Since the chief culprit in all this is declining employment elasticities with respect to yield, (see table 2) the big question is: why has employment gone down when yields rose, in recent years?

There seem to be at least two reasons. One factor at work - the most important one - has been factor substitution adverse to labour in response to rising real (product) wage rates. The second one, which has affected very few crops in a few states only, is non-neutral technological change which is labour saving.

Let me deal first with the question of technological change.

Table 2
Long Term Per Hectare "Trend" Employment Elasticities with respect to Yield ($[(dy/dt / dx/dt) * X/Y]$)
(All crops combined - values at constant 1980-81 Farm Harvest Prices Period 1971-72 to 1983-84)¹

SNo.	State	Elasticity	Sig ²
1.	Uttar Pradesh	-1.72	
2.	Rajasthan	-0.58	@
3.	Madhya Pradesh	-1.58	*
4.	Tamil Nadu	0.51	@
5.	Punjab	-0.52	@
6.	Bihar	-0.01	
7.	Karnataka	0.22	@A ²
8.	Maharashtra	0.14	@
9.	Andhra Pradesh	0.49	@*
10.	West Bengal	0.51	@*
11.	Haryana	1.08	
12.	Orissa	0.13	@
13.	Gujarat	0.66	@*

Unambiguous technological change which is labour saving is a rather rare phenomenon in India. When technical progress is defined in terms of a shift in the production function over time, then only 19 cases out of a total of 79 studied, of non-neutral technical progress turned up, and out of these only 11 were cases of labour saving technological change. There were 8 cases of labour using technological change. This means that at the all India level, labour saving technological change cannot be blamed for most of the negative employment elasticities which now prevail. (Negative employment elasticities were recorded for 31 out of 79 crop state combinations studied). Table 3

¹. Based on CSS data.

². @ indicates that t values for slope of dx/dt are significant at the 5 per cent level; * similarly for dy/dt. A² indicates that a two segment linear equation gives a better fit, with significant t values for the second arm of the V.

summarises the situation in Uttar Pradesh. There are only two cases of non-neutral technological change in UP, both of these are labour saving, but there are six crops where per hectare labour absorption has gone down when yields rose. Evidently other forces are also at work.

Table 3
Employment Elasticities and Technological Change
in Uttar Pradesh: 171-72 to 1983-84

Crop	Long term employment elasticity (in persondays w.r. to yield)	Non neutral technological change (if any)	Whether labour saving or labour using
1. Paddy	-1.197	-	-
2. Wheat	-0.990	Yes	Labour Saving
3. Arhar	-1.995	-	-
4. Urad	0.715	-	-
5. Gram	1.522	-	-
6. Soyabean	-11.725	-	-
7. Mustard	1.336	-	-
8. Sugarcane	-3.650	Yes	Labour Saving
9. Bajra	-1.469	-	-

Tests were done to find out what exactly determines the sign and magnitude of employment variations for each crop. The factors considered were: net value added per hectare; capital used per hectare, (measured as depreciation plus "modern intermediate costs" defined as the sum of machine labour costs, chemical fertilizers, pesticides, weedicides and irrigation); and the product wage. It was anticipated that employment would rise in response to rising NVA per hectare, and fall in response to a rising product wage.

For the country as a whole the following results emerged. Rising NVA per hectare by itself generally produces a favourable impact on employment - a significant one in roughly two thirds of the 74 cases studied. Increases in the use of capital leads to higher employment per hectare in 26 significant cases, two of them in UP; (sugarcane and bajra). But most generally, and most important of all, a rise in the product wage induces a fall in employment more than 90 per cent of the time, when nothing else changes. (In seventy per cent of these cases the t value for the x coefficient is statistically significant). In UP, for 6 out of 8 crops which could be studied, the observed rise in the real (product) wage rate, had a highly significant negative impact on employment per hectare; in the other two cases (paddy and bajra) the negative effect was not statistically significant. In UP, it may also be worth noting, the influence of the increasing use of capital on employment was positive in all cases other than paddy. In short, the increased use of capital by itself has a favourable

impact on employment usually. It is the adverse effect on employment of rising real wage rates which have led to most of the observed negative elasticities. In brief, what has happened is the following. The employing cultivator's response to a rise in real wage rates has been to try to cut down labour costs, by reducing labour inputs, regardless of whether or not a new, labour saving, technology is available.

But what led real wages to rise? This is the last in the series of linked questions I am going to try to answer.

In brief, real wages went up largely because surplus labour is being siphoned off into non-farm activities in rural areas, and into urban jobs as well. Increases in labour productivity seem to have played mainly an enabling role. In Uttar Pradesh, the positive impact on real wages of a rising share of the non-agricultural workforce in the total (rural plus urban) workforce is highly significant. That is, the recent rising trend of real wage rates in agriculture is mainly explained by the emergence in the economy of increasing numbers of non-farm work opportunities. Thus we have had a chain of events, in which the prime mover is occupational diversification³. Since, by and large, we also know⁴ that rural people in non-farm jobs are at least no worse off than those dependent on agriculture, this is in itself a healthy development. The problem is that it is, in the end, depressing employment prospects in rural areas.

Are there solutions? Yes, and for Uttar Pradesh they are fairly straight forward. In agricultural policy, in order to avoid a conflict of objectives with employment policy, greater emphasis needs to be placed on the expansion of GCA (increasing cropping intensity) and proportionally less reliance placed on increasing yields. It is also crucially important in UP to initiate direct programmes for increasing productive non-farm work opportunities. At present the growth rate of non farm jobs in UP is low, by the standards of other states. Investment in rural (and urban) infrastructure including electricity distribution, road transport and communications, as well as in irrigation is indicated. There is plenty of scope for this kind of thrust, especially in Eastern UP. Finally a reduction in present population growth rates would ease the situation.

To sum up:

Unless great care is taken, in UP under present conditions, speeding up agricultural growth will tend to reduce on farm employment. But it is feasible to alter some of the under lying condition which produce this result. In particular in agriculture, greater emphasis is required to be placed on extending gross cropped area. But this, by itself, can not solve the rural employment problems which have emerged. A two pronged policy is now required, in which active intervention is directed toward generating non-farm jobs, and improving the access of rural people to them.

³. The details of the analysis on which this conclusion is based are given in chapter four, of the Report of the Study Group on Employment Generator, national Commission on Rural Labour.

⁴. See chapter three of the Report opcit.