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**AGRICULTURAL GROWTH AND RURAL
INDUSTRY: SOME REFLECTIONS ON THE
RURAL GROWTH LINKAGES DEBATE**

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**Agricultural Growth and Rural Industry: some reflections
on the rural growth linkages debate**

David Dunham

1. Introduction

There is a great deal of controversy about effects of the green revolution on rural poverty. Discussions have centred largely on the interpretation of statistical trends, and on the implications of growth for small producers and agricultural labourers. But there is another, equally contentious thread to the argument concerning the multiplier effects of agricultural growth within a rural economy. In addition to its effects on net farm incomes and agricultural output, the green revolution has been advocated as a potentially powerful generator of non-farm employment. Even in an unequal agrarian structure, with a skewed distribution of direct benefits towards large producers, the poor are said to benefit through the additional indirect employment that is created in other sectors. This contention - that heavy investment in green revolution technology in existing agrarian structures, by kindling a process of growth in the non-farm sector, reduces rural poverty - is challenged in this paper.

This debate is of contemporary relevance in two senses. First, because its growth orientation and its concern with rural diversification and poverty alleviation are very much at the heart of present-day policy discussions. And, second, because 'rural growth linkages' (RGLs) are a common place assumption of public policy prescriptions. While empirical studies would seem to support Mellor's argument, this paper offers a methodological critique that raises doubts as to their adequacy. Additional evidence is introduced from the Indian Punjab as a regional economy that is a 'classic' green revolution area, and that has also gained a reputation for its small-scale industry.¹ The paper is in three parts. The first summarises and discusses the RGL argument. It identifies a number of testable hypotheses and, though cross-references are necessary, each of these is examined in turn in the next part of the paper. A final part looks at the macro context in which they are expected to operate and asks what the lessons the debate offers for contemporary policy.

¹ The Punjab also raises the possibility of alternative sources of growth to agriculture. It does so in three ways. First, because Punjab agriculture recorded a high rate of growth before the green revolution (over 5% p.a. over the period 1952-53 to 1964-65) with industrial crops rather than foodgrains forming the cutting edge. Second, because manufacturing had also been growing rapidly in parallel (its value added rising tenfold between 1950-51 and 1964-65) though from almost nothing. And third because the Punjab's industrial growth was partly export-led (SAP 1967, 1971; Macrae 1971).

2. The Structure of the Argument

This section summarises the argument that there is a link between agricultural growth, non-farm expansion and reduced rural poverty. This is followed by a brief critique of some of the evidence marshalled in support of this position.

2.1 The theoretical starting point

The seminal work in this line of analysis is The New Economics of Growth (Mellor 1976). This put agriculture at the centre of the policy stage by pointing out strategic possibilities opened up by the surpluses accruing to successful farmers from the green revolution. The crux of the argument was that, under certain macro conditions, a boom in foodgrain production would not only stimulate growth in agriculture and agro-related sectors (such as trade, transport and services), it could even dictate the pace and the pattern of industrial expansion. The industry that was generated could be labour-intensive, and it could well be local. What Mellor envisaged was the possibility of endogenous, demand-led growth in a green revolution area, derived from its increased prosperity, and driven on by the higher levels of rural (consumption) expenditure.

On the supply side, he looked to (but did not really develop) productive reinvestment from agricultural surpluses. He pointed to underutilised funds accumulating in the hands of large commercial producers (1976:177). He argued in effect that - backed by an employment-oriented industrialisation policy and by decentralised planning and administrative procedures to ensure its effectiveness - there could be a strong incentive for these people to take advantage of the investment opportunities that were created by increased demand. It could be profitable and attractive for them to invest in local, small-scale, non-farm activities. Foodgrains would be traded with other regions, generating earnings for the import of goods produced by large-scale, capital-intensive plants in metropolitan areas (such as fertiliser and steel), but the production of goods and services for which there was local demand could be stimulated in nearby market towns and the countryside (1976:188). Rural expenditure data and capital-labour ratios for these commodities were taken as evidence that they could be produced by small-scale, labour-intensive units in the rural area (Mellor and Lele 1973; Johnston and Kilby 1975; Mellor 1976).

The mechanics of this process, of what have now come to be known as 'rural growth linkages', can therefore be broken down into five testable hypotheses. Given the right macro strategy, and with higher incomes accruing from the adoption of the green revolution package, it maintained the following:

1. that the increased demand of large commercial producers is crucial for the subsequent expansion of non-farm activities;
2. that consumption linkages are more important than production linkages;

3. that they generate a demand for labour-intensive goods and services that can be locally produced on a small-scale basis;
4. that the savings of these wealthy households is an important source of investment in non-farm activities; and
5. that the indirect effects from agricultural growth will be effective in generating employment, mopping up rural surplus labour, and reducing rural poverty.

The notion of 'the right macro strategy', that macro policy had to be conducive to and consistent with such a programme, was an essential part of the argument. This will be taken up in the final section after the internal mechanics of the argument have been explored.

2.2 Empirical support

Empirical studies that set out, or have subsequently been used to substantiate this argument have succeeded in finding considerable support for it. At the All-India level a link was found between agricultural performance and industrial growth - especially the growth of consumer goods industries (Rangarajan 1982). Local multiplier effects were found to have been large in the Muda irrigation project of west Malaysia (Bell, Hazell & Slade 1982). Employment multipliers were found to depend importantly on consumption linkages in a comparison of alternative rice production technologies in The Philippines (Ahammed & Herdt 1984). It was found that large farms were more likely to stimulate secondary growth in the local economy in the Muda Project and the Gussau agricultural project in northern Nigeria (Hazell & Roell 1983). And there is evidence that demand was focussed on local products in parts of Bangladesh (Deb & Hossain 1984). Hossain also found some support in his comparison of technologically more and less advanced villages in Bangladesh (Hossain 1987).

However, while these findings are generally consistent with Mellor's analysis, they cannot be said to offer an adequate test of it. Such studies interpret their research problem in one of two ways. It has either been a matter of measuring the impact of agricultural growth on the rest of an economy, or one of asking how changes in the distribution of farm income (or in production technologies) affect consumer demand, and thereby the strength of multiplier effects in the non-farm economy. In both cases agriculture is, by default, the source of dynamism. There is an a priori assumption that agriculture (or a particular size class of farms, or particular kind of technology) is the proper target for investment and for public policy. But this effectively by-passes other choices that could be crucial for policy; it precludes, for example, the possibility that employment linkages generated by large-scale investment in nearby urban industry could in comparison be stronger than those from agriculture, or that the most effective regional strategy might combine the two.

This problem is further compounded by the process of case selection. If the research problem is one of measuring demand effects that are generated by an increase in agricultural output and income in a particular area, then other, exogenous sources of demand are irrelevant and - to be methodologically correct - they should be consciously excluded. The most appropriate case is then one that reflects the introduction of this new technology in an economically backward agricultural region that is geographically isolated. This is true, for example, of Muda - which is a large irrigation project. However, this choice only reinforces the bias that we have already identified. If a more typical, regional economy were selected rather than a project - if the case area was more urbanised, more accessible and more diversified (as in Harriss' case of North Arcot District), then other strategic possibilities might be opened up. It could well transpire that - even under boom conditions of the green revolution - an important component of increased aggregate demand comes from urban growth (Harriss 1987a).

A third problem with these empirical studies concerns the limited range of hypotheses that they address. None of them places any emphasis on macro policy. As Harriss (1987b:280) has pointed out, they also provide little evidence that non-farm activities that were stimulated were necessarily local, small-scale or (with the exception of Deb & Hossain) especially labour-intensive. They provide little evidence that successful farm households were investing part of their increased savings in local non-farm activities (the only exception, to some extent, being the study of Hossain). Nor do they offer any concrete evidence that multiplier effects of this kind were a significant factor in the reduction of poverty. Their policy significance therefore continues to be unconvincing.

Such studies have also in practice been heavily quantitative. Technical problems in measuring RGLs are not insignificant; the exercise sometimes needs heroic assumptions, and this gives scope for doubts and for differences. However, it has also meant that, over time, the debate has shifted. It has moved from discussion of strategy (which was Mellor's strong point) to disputes over techniques, and over the results of modelling a limited number of the component hypotheses of the overall argument (Harriss 1987a; Hazell & Slade 1987). The impression has sometimes been given that if some mechanisms work - if consumption patterns, for example, are 'appropriate' - then the argument is vindicated. Other contributory mechanisms are left unattended, and as a result the case must be incomplete.

The following sections examine evidence on each of the five hypotheses that were outlined earlier.

3. Agricultural Growth and Increased Demand

The idea that a boom in agricultural production following the successful introduction of green revolution technology is likely to generate an increased demand for goods and services is hardly controversial. It would be far more surprising if it were otherwise. However, the assertion that a capitalist-farmer class is the driving force and that its demand is crucial for subsequent growth of the non-farm sector is far more contentious. Whether this is borne out in practice is an empirical question that will be examined in a moment. But if the labour absorption capacity of agriculture is limited and non-farm employment is believed to be crucial in reducing poverty, then this argument leads to conclusions that can be unexpected and that are not always so palatable. Poverty, it suggests, will be reduced more effectively if public resources raise the incomes of large producers instead of just dwelling on small producers, or on employment schemes for marginal producers and landless workers.

In its simplest form, this argument is predicated on Engels' Law, on the incremental demand of various categories of consumers. In the RGL debate this is expressed in terms of marginal budget shares (MBSs) - as the increase in expenditure on non-food, or non-farm goods and services that is stimulated by a unit increase in total expenditure. The poor channel a large proportion of any additional income to staple food requirements, whereas the rich have the money to devote to non-staple foods and to non-food commodities and services. A skewed distribution of income towards wealthier landowners will therefore generate a much greater demand for goods and services in the latter category. They will stimulate most of the growth. The size and nature of the multiplier that is eventually generated will then depend on the size of the income increase, on its distribution over different income categories, and of course on prices.

Mellor illustrated this part of his argument with NCAER data from the All-India Consumer Expenditure Survey 1964/65. Households in the 6th, 7th and 8th deciles of rural expenditure (those producing the major proportion of national agricultural output) were found to reveal a higher incremental expenditure on non-agricultural commodities (Mellor 1976:166). To emphasise the point he contrasted this situation with an alternative scenario to show that a massive (70%) transfer of income to the bottom two expenditure deciles - the landless workers - would generate a (25%) lower total demand for non-farm goods and services (ibid.:170). This he took to confirm the strategic potential that could be drawn from the success of large commercial producers.

While this argument may in some ways seem commonsense, it also has weaknesses. There are problems inherent in the nature in the exercise - with the significance of expenditure deciles, and with the notion of predicting dynamics of consumer behaviour from a cross-section analysis of a single survey. Mellor's use of the two

contrasting scenarios is also problematic, if only because it is in danger of confusing ends with means.²

From a policy standpoint, the extent to which the argument looks to the demand side is also a difficulty. Bhalla *et al* (1990 : 64) have pointed out that there can be no guarantee that such potential will produce the anticipated growth. The literature simply assumes that higher demand will translate into increased production though, as Harriss points out, this can only be assured if supply is elastic. If it is not, extra income will be absorbed in higher prices and in producer rents. If local output is to increase, or if new capacity is to be created or to be promoted responsibly, then there must be other points on the policy agenda (the capacity of existing investments, the propensity to import, the viability of units of different scale, the volume of demand, its quality requirements, sustainability etc.). We will return to these later.

In general, however, the supply response to an increase in consumer demand (which Mellor emphasised) is likely to depend on its scale and on its composition, and it is by no means clear that large-scale commercial farms will determine it. The pattern of demand that emerges is likely in practice to be a function of agrarian structure - of farm-size distribution (the distribution of money income being broadly consistent with that land), household size (the number of mouths that there are to feed), and of values that shape the consumption behaviour of rural households within a particular area.

If large farms are numerous and there is a highly inequitable distribution of assets and income at the outset, then Mellor's thesis seems likely to be justified. The argument becomes self-confirming. But the situation is not always as clear-cut as that. There has been a long debate about the scale-neutrality or otherwise of the green revolution, though often cast in the context of innovation diffusion and "bimodal" structures. Punjab data raises similar doubts about the theoretical significance of large producers in a "unimodal" area - one that is almost saturated with irrigation and other new technology. Bhalla and Chadha (henceforth B&C 1973) have estimated incomes and expenditure for a representative sample of 1,663 households taken from across the three distinctive agro-ecological regions that comprise the state. These are interesting from our point of view because of the differences they reveal in agrarian structures. The survey was carried out in 1974/75. Table 1 shows the relative importance of selected farm-size ranges in each of these regions and the share of total consumer expenditure on non-farm goods and services that they account for.

² For example, a lump sum shift of income, and a consequent shift from 10% to 80% of consumption expenditure in the hands of landless workers (as per the second scenario) would ease substantially (though not necessarily eliminate) the pressure for non-farm employment that is at the crux of the exercise. A 25% loss in demand for non-farm commodities might be more than offset (in the short and medium-term at least) by better nutrition amongst the poor and a lower incidence of poverty. It is therefore by no means obvious from this that a scenario in which income is skewed to commercial producers is at all socially preferable.

Table 1: The Percentage of Farms in Selected Size Ranges and the Percentage of Consumer Expenditure on Non-Farm Goods and Services Contributed by Them, Indian Punjab 1974/75

Farm-size range (acres)	Region I		Region II		Region III	
	Sample share	Share of cons.exp.	Sample share	Share of cons.exp.	Sample share	Share of cons.exp.
+25.0	(4)	7	(8)	18	(2)	5
+12.5	(21)	33	(34)	50	(11)	18
5-12.5	(50)	55	(47)	47	(51)	55
5-25.5	(68)	75	(74)	71	(59)	68

Source: Compiled from B&C 1983, p.31 and tables 2.2-2.4 and 5.2- 5.4. Consumption expenditure includes beverages, fuel and light, clothing, footwear, other durables, miscellaneous, rent and taxes and also house improvements (though the latter item is small)

Two points emerge from the table. First, it is clear that, in the case of the Punjab, large farms - those over 25 or over 12.5 acres (B&C's "very big" and "very big and big" categories) - were not the dominant source of demand for non-farm goods and services (NFG&S). The exception was Region II (the old cotton belt), where the top 34% of farms by size accounted for 50% of all consumer expenditure. But here large farms were more dominant. In Region III (the semi-hilly areas), the same size range accounted for only 18% of total expenditure. There farm-size distribution was skewed more towards the lower end. On both counts Region II, the Central Plains, was mid-way between them.

The 5-12.5 acre range (B&C's "middle peasantry") were consistently important, but it took a much greater range to account for the major part of all consumption expenditure. The importance of looking to a wide range of farm-sizes has been noted by Harriss (1987a) and incorporated in the work of IFPRI (1984). However, a case can clearly be made that the important point in determining the source of consumer demand is not farm-size per se so much as agrarian structure.

A second variable influencing the pattern of demand is the size of these households. A disturbing feature of Hazell and Roell (H&R 1983)'s Muda data is the weak correlation between farm-size and per capita expenditure.³ Family size declined, as might be expected, with rising income (from 7.1 in the lowest expenditure decile to 3.4 in the highest - H&R 1983:table 12), but it increased with farm-size (from 4.7 to 6.4, albeit somewhat less regularly - ibid.:table 15). Interestingly, B&C's Punjab data reveals a similar picture. In all the three regions household size increased

³ Comparing MBSs for NFG&S by expenditure and by farm-size decile reveals important differences that influence interpretation for any policy purposes. Households by size of farm are obviously more manageable as a target category, but whether size of farm was of such central significance is not altogether convincing.

steadily with the size of farm, from just under 6 members on marginal farms of less than 2.5 acres to 10 or more on very big farms of over 25 acres (B&C 1983:tables 2.2-2.4). As a result the ratio of consumption expenditure on "very big" compared to "marginal" farm households was significantly lower than that in terms of income (3:1 as compared to 7:1, and even 11:1 in the case of Region III). There were more mouths to feed, and this in turn had implications for the composition of demand.⁴

The third variable is consumer behaviour itself, a factor which obviously has a strong cultural dimension to it. The Punjab example brings out the point that household consumption patterns may not change all that easily. Chadha has shown that in the Punjab prosperity from the green revolution was not rapidly translated into any real qualitative change in consumer behaviour. He has pointed out that, after a period of some 15 years, the rich "merely use a greater amount of much the same package of goods and services (Chadha 1986:318)". Ranking and then correlating the relative priorities attached to a key range of commodities by households in different farm-size categories, he found that there was no significant variation from small to large (*ibidem*).⁵ No doubt this reflected in part the value they placed on a joint or extended family system (the larger household size) as against a more refined or conspicuous consumption pattern for the nuclear family, but it also confirms the sense of looking at aggregate demand. It could well be argued that the Punjab's 'chicken and whisky' culture is itself rather distinctive. But if Chadha's rank correlation is applied to the Muda project (using ABSs by farm-size as basic data) it reveals similar results.⁶

Given these observations, just how significant is the emphasis that the literature places on marginal budget shares? They are obviously relevant in as far as a higher growth of incremental income and higher MBSs shift the distribution of income and the structure of demand over time towards large-farm households (Mellor & Lele 1973:36). This is an assumption of the thesis. But, as we have seen, this may not be what is happening. How far it has occurred is difficult to generalise. Certainly it would seem to have been true in the case of the Muda project where landholdings appear to have become more concentrated (World Bank 1975; Siwar and Mustapha 1989). But recent evidence has in other areas revealed a different outcome (see Shand and Kalirajan 1991, for example, on the Kemubu Project). This brings us back into the debate on agrarian structures. Finally, even where large-farms have emerged more dominant, it is unclear whether this is an inevitable result of green revolution technology or a reflection of a capital-subsidising government policy.

4 This suggests that in some respects per capita income is a better measure of the economic standing of a household than is household income, though there may be economies of scale in the expenditure on other commodities. Savings behaviour could also play a role here and will be taken up in section 5.

5 With the exception of 'very big' farms, which were small numerically, average budget shares (ABS) of NFG&S consumer expenditures showed little variation with farm-size in any of the three regions.

6 Coefficients range between 0.95 and 1.00.

Studies on the Punjab have tended to take a different tack. They have focussed on the farm-size/productivity debate. But the results are equally ambivalent. Johl (1975) has argued that in the early years the green revolution did not have a negative effect on the distribution of income. Certainly, as far as wheat was concerned, there was little or no difference in output per acre between large and small farms (B&C 1983), though there were signals that in the more advanced areas the largest farms had a competitive edge (Chadha 1978; Roy 1981). How far it was farm-size that was at stake and not differential access to resources (which in a different farm-size structure might reflect a different social base) is again uncertain.

Whether a shift in income distribution has moved the structure of consumer demand more towards large-farm households in any region of the Punjab, and how significant any such shift might have been for potential suppliers of consumer goods and services that were in demand is therefore hard to gauge. Johl speaks of an upward movement across the board into higher income categories, and Chadha found that the Gini coefficient for non-food expenditure declined (from 0.43 to 0.39) over the period from 1964/65 to 1983 (1986:313). This does not suggest a significant transfer towards large producers. It could well be that if large farms are not already prominent, then there is no a priori reason for the basic pattern of demand to see a transformation. But that is not certain. However, what the evidence we have examined does, as a whole, suggest is that the demand of wealthy landowners on large farms is not necessarily crucial for the pattern of consumer demand, and that public policies will not necessarily be more effective in promoting the non-farm sector if they favour this stratum. Harriss indeed concluded that in North Arcot District new demand could be generated by the increased income of urban merchants and industrialists, government officials and employees of public sector corporations as well as that of farmers (1987b:40).

4. Production and Consumption Linkages

So far, discussion has been confined to consumer expenditure. H&R (1983) assumed that consumption linkages were central, and Ahammad and Herdt (A&H 1984) focussed on the trade-offs between employment losses caused by more advanced production technology as against the employment gains created through consumption linkages. Both A&H (1984) and BH&S (1982:179) found consumption and production expenditure to be important, but consumption expenditure to have significantly stronger multiplier effects within the local economy. In how far, therefore, is it sensible to focus attention on consumption expenditure and to see it as the driving force for non-farm expansion?

Mellor is widely known to have stressed the consumption side. His (1976) argument had two dimensions to it. He felt the need to reject the earlier Hirschman preoccupation with production linkages as restrictive and indeed misleading in its pointers to policy. And at the same time he was probing for areas that an employment-oriented policy might effectively influence. He did not argue that expenditures on producer goods were unimportant or that they would not generate

linkages. It was just that they seemed more likely to be determined technologically by the nature of competition in a dynamic agrarian environment than by government policy (1976: 1962-3). Nor, in his view, could they be so easily manipulated to increase employment. Expenditures on capital goods might be considerable, but they would be lumpy; they would fluctuate and, in the long run - as incomes rose, they would decline in relative terms. A farm of a given size could after all only use so many pumpsets or use so many tractors economically. Current expenditures on fertilizers and other inputs would be more important, but even so the purchase of consumer goods would absorb a growing proportion of increased incomes from the green revolution.

On reflection, however, it becomes clear that this can only be part of the story. Johnston and Kilby have pointed out that the relative importance of farm household expenditure on producer and consumer goods varies with the stage of structural transformation of the agricultural economy. Expenditure on consumer goods tends to dominate in a technologically stagnant, 'traditional' agriculture, while in the United States the pattern has been more or less reversed (1975:302-3). It is also debatable in how far innovation in a competitive environment can really be seen as a one-off investment rather than as continual up-grading. A key question, therefore, is how far along the path of technological development are these green revolution areas.

This reasoning would suggest that the level of technological development in the Muda Project was comparatively modest, a predominance of consumer expenditure having already been noted. There is evidence in support of this (BH&S 1982:29-32). But what of a more advanced area? Punjab agriculture - especially that of the Central Plains - was more advanced; it was saturated in terms of irrigation investment, and it was advanced in terms of the use of modern inputs and of mechanisation (Chadha 1978;1986). Could it be that household expenditure on producer goods would as a consequence be higher and might itself constitute an important source of demand for the non-farm sector?⁷

A picture can only be constructed of the situation in the Punjab for a single year (1974/75) - from the work of Bhalla and Chadha (B&C 1983). For the purposes of this exercise, NFG&S production expenditure (P) is defined as the average annual expenditure of a household on non-farm material inputs, purchased producer services and farm assets (B&C 1983: tables 3.10-3.12 and tables 4.2-4.4).⁸

⁷ The increasing capital-intensive nature of Punjab foodgrain production can be readily demonstrated. In the state as a whole, the number of tubewells rose from 45,903 in 1966 to 617,392 in 1981. The net sown area per tubewell fell dramatically from 684 to 17 acres. The number of tractors rose over this period from 10,636 to 117,627 - the net sown area per tractor falling from 882 to 88 acres. Fertiliser use per cropped acre rose tenfold (SAP var.; Chadha 1986). Clearly, expenditure on producer goods was substantial - and markedly different from Muda and Gussau, and it reflected considerable demand for non-farm products and services. However, it is not necessarily indicative of any greater relative importance of production expenditure. For that we need to return to the data on household expenditures.

⁸ This includes purchases of diesel and electricity, repair and maintenance of implements, marketing and transport, manure and fertilisers, water and pesticides and hire charges. It excludes costs of draught cattle, seeds and labour.

Consumption expenditure (C) is defined as average annual household NFG&S consumption expenditure plus investments in house improvements (*ibid.*:tables 2.2-2.4 and 5.2- 5.4).⁹ The ratio P:C can then be taken as an indicator of the relative importance of production expenditure as a source of demand for the non-farm sector.

The resultant ratios by farm-size and by region are given in Table 2. This is very revealing. First, the ratio P:C does increase with the level of technological development in agriculture. It increases steadily from 1.3 in the semi-hilly areas to 1.7 in the south-west Punjab, to 2.0 in the central plains. These figures are quite different from those of BH&S for the Muda Project. In all regions average household production expenditure on NFG&S exceeded that on consumption expenditure, and generally by a clear margin. With but one exception - that of the largest farms in the semi-hilly area (and this could even be a data problem) - the ratio also rose steadily with the size of farm. This would seem consistent with recent linkage analysis carried out for the Punjab. In 1979/80 industrial inputs (including fuels and lubricants) comprised 66.2% of the total value of imports used in agricultural production (Bhalla *et al* 1990:59).

Table 2: The Ratio of Producer and Consumer Expenditures (P:C) by Farm-Size Category and Region, Indian Punjab 1974/75

Farm size category (acres)	Region I (Plains)	Region II (S-W)	Region III (hills)
- 2.49	0.6	0.4	0.6
2.5- 4.99	1.2	1.0	0.8
5.0- 7.49	1.4	1.2	1.1
7.5-12.49	1.8	1.7	1.8
12.5-24.99	2.6	1.9	2.2
+25.0	4.7	2.2	1.3
All farms	2.0	1.7	1.3

Source: B&C 1983. For table sources see the text.

Second, it was the distribution of expenditure on producer NFG&S that generated the skew towards the larger farms. As a result, when consumption and production expenditures are aggregated, it is the production component that provides the bias towards large producers and that fits the thesis better. Thus, while Mellor would seem to have been right in challenging Hirschman's assertion that agricultural linkages were weak, he would seem himself to have underestimated the dynamics of this new technology. In the Punjab in the mid 1970s it was backward linkages

⁹ It is debatable whether house improvements should be seen as luxury consumption expenditure or as investment. It is included here because of its direct effect on NFG&S demand which would not be caught by categorising it as investment. However, in B&C's data it is not a large item and inclusion or exclusion has no affect the outcome.

rather than consumption expenditure that were the principal factor influencing aggregate (consumption and producer) demand for NFG&S. Harriss (1987b : 279) has suggested the same may have been true in the Muda case.¹⁰ Whether this demand was for local products and or for imports will be taken up in the next section.

There is also a final point to be reiterated with regard to policy relevance. By the early 1970s government pricing policy was subsidising the cost of capital investment in Punjab agriculture. Thus the state - contrary to Mellor's assumption - was instrumental in supporting a shift in the production patterns of large producers, and in promoting this bias in the pattern of demand that has just been observed. The argument that giving policy priority to large farmers would generate more demand and best promote expansion of the non-farm sector was, therefore, in the Punjab at least, circular. Alternative policy priorities favouring greater labour intensity would have yielded different results.

5. Scale, Location and Labour Intensity

A third basic assertion of the Mellor programme was that, in the course of this economic expansion, the preferences of rural households for local patterns and local forms of consumption would not be displaced by more sophisticated metropolitan tastes. They would promote local enterprise. Capital-intensive producer goods (such as chemical fertilisers or steel) may have to be imported, but this would still leave scope for local production and servicing. Where this was the case, it would generate employment. The businesses that grew would be smaller-scale, and this, together with the dispersed nature of demand would encourage widespread production (Mellor & Lele 1973; Mellor 1976).

Mellor illustrated his argument, as we have already noted, with evidence of capital/labour ratios at the All-India level. Hazell and Roell in their 1983 study took a slightly different view. They looked at the actual and potential demand for goods and services produced in local towns and small villages in the Muda area. The demand for the latter compared to that for imports was then taken to be indicative of the potential that existed for promotion of local activities (H&R 1983:37). Deb and Hossain (1984) - though their Bangladesh case was not a green revolution area - also examined the factor intensities of observed consumption patterns. These studies all suggested that there was scope for expanding the local non-farm sector. The third hypotheses is also, in a way, supported by the consistency of consumer behaviour as observed in the Punjab.

And yet the dynamics that underlie this argument are rather conjectural. In the Muda case, for example, between 42-44% of household consumer expenditure on non- food goods and services in the four highest farm-size deciles was in fact

¹⁰ She also points out that the distinction between interregional and local products is blurred by the absence of reliable commodity flow data. Without it the classifying criterion is of necessity the place purchase.

imported. This was considerably higher than the 16-19% of all consumer expenditures (H&R 1983:61). It shows that, in the crucial non-food sector, imported goods and services were already significant. The argument of H&R is that it is not these average expenditures that are important, but what is happening at the margin. Hart, however, suggests that imports were particularly important for the rich (1989:572), and in the Bangladesh case Hossain (1987:14) similarly found that the demand for imported industrial goods rose at the expense of local manufactures as incomes increased.¹¹

In other words, if the analysis is explicitly concerned with the non-farm sector (of which non-food production is an important element), then the Muda evidence may not be all that convincing. Hart (1989) points to the disappointing results of the Muda non-farm economy. More generally, there must also - as we have noted - be methodological doubts about the estimation of consumer preferences for non-farm goods (and forming policy conclusions on them) by means of cross-section analysis. In a dynamic situation where agricultural productivity and incomes are increasing, the potential for local growth in the non-farm sector is likely to hinge on a range of circumstances. Important amongst these will be (1) the nature of the particular product or service (and especially whether or not it is technically 'inferior' to those imported); (2) the industrial history of the area; (3) the accessibility or degree of closure of the local economy; and (4) purchasing power and the size of the local market. In the context of a growing regional agricultural export economy, 42% of non-food goods and services imported can very quickly become 50-60% as trading and transport facilities expand and see a qualitative improvement.

There is no reason, therefore, why booming agriculture and a rapidly expanding regional market for consumer and producer goods should only be attractive to investors from within the region. National firms may also be looking to market or to manufacture there. As the expanding interregional trade in foodgrains promotes closer integration into the national economy, supply itself will become a factor in the resulting pattern of demand. Well-known brand names may become important (even of foreign goods), and increasingly the local non-farm economy will need to be efficient to have a competitive edge. Not all regions will be able to respond effectively.

There is evidence to suggest that the productivity of rural industry has risen in parts of India that have recorded a fairly sustained rate of agricultural growth (Papola 1987). There is some evidence of a shake-out having occurred in local patterns of production (S.Bhalla 1981:1026; Harriss 1987a:40). However, Harriss, in the more complex setting of North Arcot, also found that - while agricultural growth may have stimulated industrial expansion - it was not always local industry that was to benefit, and that when the industry was local it was not necessarily small-scale, nor

¹¹ H & R's Gussau data also shows that it was only amongst the very largest farms (in the 10th decile) that more of each additional dollar was spent on locally produced NFG&S than on imported items (1983:51). For every other decile more of each additional dollar went on imports.

indeed labour-intensive (Harriss 1987a). Upadhyaya (1988) has also noted the entry of large companies from outside the region into the commercialised coastal area of Andhra Pradesh, and considerable import leakages have been noted in the Punjab economy with its dependence on industrial inputs for both agriculture and industry (Bhalla *et al* 1990:60).

In fact there are common problems with the RGL thesis in the cases of North Arcot and Punjab. First, large-scale firms were sometimes more labour-intensive than smaller ones - though both areas saw rising capital intensity and saw medium and large firms becoming increasingly dominant. Income and output linkages were to a large extent non-local, and there was a good deal of diversity to be observed within any one product line. Thirdly, in the competitive context that has been outlined, the classification of commodities on which the demand analysis was based would seem problematic. A given commodity (Harriss quotes shoes, but in the Punjab it could just as well have been garments or agricultural machinery) can be both imported and at the same time produced locally.

And finally, the argument has to hinge on a notion of 'local' industry. This does not really seem to be problematic. Harriss has attacked the RGL thesis on the grounds that the industry that is generated in such a process would not necessarily be rural, and that it might even prove (as in the case of North Arcot) to be overwhelmingly urban (1987b:33). This, however, is not a convincing position.¹² Mellor emphasised the locational potential of market towns in his policy analysis (1976:188), and observation suggests that they are typically an integral part of the rural community. There would seem to be no reason, therefore, why 'local' should have to be interpreted as 'rural' industry - certainly not with the restricted Indian census definition of a rural settlement.¹³ The Punjab experience strongly supports this interpretation. It demonstrates, on the one hand, the locational pull of urban centres and the principal transport axis (the G.T. road) and, on the other, the possibilities of workers commuting daily to these locations from surrounding rural areas (SAP 1971: section IX; Chadha 1986:35). Transport facilities in the Punjab may be unusually good, but the point still seems a valid one.

Overall, therefore, while it would seem logical - indeed almost inevitable - that increased demand should provide some impetus to the local non-farm sector, how strong it will be, and what kind of growth will occur would seem much less certain. In the case of the Punjab the in-migration of skilled labour after the partition of India and Pakistan and the ingenuity of the local artisan (Ramgarhia) caste together provided a very competitive base for small-industrial development (UNESCO 1966; Randhawa 1974; Pandit 1978; Chadha 1986). But that would seem an

¹² It is difficult to accept Harriss' position in this regard. In the 1970s the urban structure of Tamil Nadu was becoming perceptibly more primate and policies that attracted industry to smaller centres (such as Vellore - the eighth largest in the state) and not to a large metropolis would appear on the face of it to have been rather desirable. Centres of less than 100,000 were actually growing slower than the population as a whole.

¹³ Defined as one with less than 5,000 inhabitants and more than a quarter of its male employment in agriculture.

exception. In other cases the supply side response will be much less vigorous and considerable onus will rest upon government policy.

6. Investment in the Non-Farm Sector

Though the RGL thesis has emphasised the demand that is generated by a sustained growth in food production, the willingness of successful farmers to boost investment in the non-farm sector is a premise of equal importance. And it is just as controversial. In Mellor's programme, investment by large, commercial farmers in efficiency-increasing agricultural technology was pivotal in generating the higher yields and profits that would enable them to accumulate substantial surpluses. The key, then, was their interest in diversifying their investments into non-farm activities. There was the notion of mobilising underutilised savings to bolster local industrial expansion. Tapping these resources would naturally hinge to a large extent on their capital requirements to stoke agricultural expansion, on local entrepreneurship and perceptions of non-farm investment opportunities within the area, on the development of institutions to transfer savings, and on relative rates of return in agriculture, local non-farm investment and other sectors of the economy (Mellor 1976:176).

However, there has been very little analysis of these situations. It has been assumed that local non-farm production will be elastic because "the supply of labour which is their major input is also elastic (H&R 1983:15)" and in most studies (Mellor 1976; BH&S 1982; H&R 1983; A&H 1984) investment behaviour and the supply side response to increased local demand is essentially ignored. There is evidence from other sources of an emerging capitalist-farmer class moving into non-farm activities in certain areas of India - and this is hardly surprising - though often into pursuits (such as trading, processing, contracting and transport) that are related to agriculture (Lele 1971; Upadhy 1988). Harriss (1987a:36) observed agricultural profits being used as a source of starting capital in North Arcot District, though they were never to prove dominant. In contrast, Hossain (1987:24f) found a low proportion of productive investment amongst large landowners in Bangladesh.

The evidence on this point is again therefore rather inconclusive. The case of the Punjab shows just how difficult it is to gauge the extent to which profits from agriculture find their way into the financing of local small-scale industry. Neither Dasgupta, in his *Global II* villages in Ferozepur and Gurdaspur Districts (1977:275) nor B&C (1983:90) provide any evidence of it. B&C found that in the mid '70s at least there were substantial savings, especially amongst 'big' and 'very big-farm households' (table 4.1). But what they did with these surpluses is far more hazy. The situation in the Punjab was also of course complicated by capital flight during certain periods - as in the wake of the Indo-Pakistan conflict in the mid 1960s.

Capital could of course have been channelled to industrial growth via the banking system. But it is not clear how widely used it was,¹⁴ and the Punjab's credit:deposit ratio was particularly low. In 1966 it was understandably low (at 31%) given the conflict with Pakistan, but in 1975 it was only 38% and in 1979 only 42%. This was well below the All-India average of roughly 70% (GOP 1968:195; RBIB January 1979:29 and January 1982:36). In other words there was an outflow of savings from the Punjab to other parts of the country. Presumably small-scale Punjab industries (and the majority were small-scale) seemed a less assured investment than firms in more established industrial areas such as Maharashtra. If this was so, it would seem neither surprising nor indeed untypical. BH&S (1982) observed the same phenomenon in the Muda region, as did Harriss in North Arcot (1987a:35). Hart indeed argues that what has emerged in Muda is "an aggressive class of part-time farmers who are willing and able to press for government favours ... but who are certainly not investing in little factories in the fields, or in local towns (1989:574)". Again, therefore, onus would seem to swing into the arena of policy to make local investment a viable and an attractive proposition for those with savings. This is a heavy responsibility that will be addressed in the final section.

Nor is there any reason why money that is invested in local industry should come only from agriculture. It would seem neither surprising, nor necessarily incompatible with Mellor's analysis, to find rural industry stimulated by a regional boom from commercialised agriculture, but financed by a mixture of agrarian, mercantile and industrial sources. This appears to be the case in Surat District (Breman 1985:43). Particular trading castes were also dominant in the Punjab textile and hosiery industries.

A wider knowledge of the region's economic history and structure is therefore relevant to incorporate these possibilities. In the Punjab, as in North Arcot, there were other sources of dynamism than agriculture itself that were important. Industrial profits were ploughed back in new capital stock (UNESCO 1966:135), and while this may have been augmented by surpluses from agriculture, it seems quite unlikely that the latter were at all the principal source. There may indeed be a tendency in the whole RGL debate to underestimate the perceived risks and the barriers to entry to local industry, and to overestimate the level at which small workshops can finance and direct their own expansion in the right policy environment. What is clear, however, is that any expansion of rural industry does not necessarily hinge on a class of successful capitalist-farmers, and that policy will not necessarily be most effective when steered in their direction.

¹⁴ Lele's Punjab work (1977:55) raises questions about the extent to which commercial farmers were using the banking system - at least in the late 1960s. She found it customary for a Punjabi cultivator at that time to deposit returns from the sale of produce with a broker or commission agent (the kachha arhitya). There have also been suggestions of hoarding and of investment in gold.

7. Non-Farm Employment and Rural Poverty

Advocates of the RGL approach have basically assumed that rural poverty would decline if there was an increase in consumer demand and a subsequent growth in local non-farm employment. For Mellor poverty alleviation was in effect a function of the pattern of economic growth that would be initiated, and in this the green revolution was the centre-pin. It was crucial in three respects. First, it would keep small peasant producers on their land, making small units more viable (thus keeping the numbers of non-farm jobs that were needed in more manageable proportions). Second, it would stimulate local investment and create additional non-farm employment in which the poor would participate. And, third, it would generate the revenue that would make possible a wider package of state assistance for the poor, such as rural employment programmes.

However, there has been no serious assessment of this argument in the RGL literature. On the contrary, despite being a showpiece as a successful agricultural project, serious doubts have been expressed about poverty reduction in the Muda case (Siwar and Mustapha 1989:111).¹⁵ In the Punjab, the incidence of poverty did decrease after the green revolution became well-established in the early '70s. Recent data confirms this trend, and there is evidence of improved nutritional standards and housing among lower income groups (Chadha 1986). What is far less clear is the extent to which multiplier effects on the non-farm sector were a cause of it.

There was certainly a significant improvement in the situation in agriculture. Small-farmers became more viable. There was an increase in employment, and a significant rise in real wage rates for most on-farm employment. Moreover, this was true despite an influx of labour from other states and despite a considerable degree of farm mechanisation. The employment situation for agricultural labouring households improved significantly and the incidence of unemployment amongst them was to become very low (Chadha 1986:266f).

How far this helped in the non-farm sector is less certain. Obviously it did help. In some occupations - most notably blacksmiths and carpenters - improvements were considerable, though this was also influenced by out-migrations from amongst their numbers to Arab countries. But the notion that local, small-scale businesses were springing up and were generating significant employment for the rural poor is not borne out by the evidence that we have seen. The Punjab economy grew quite impressively at 5% p.a. throughout the two decades 1961-81 (Chadha 1986:table 2.6). Small peasant holdings became far more viable (B&C 1983), but total male employment recorded an expansion of 2% or less - the bulk of which (roughly three quarters) was in agriculture. Manufacturing employment declined in the 1960s (as people in marginal household production took up more remunerative employment in agriculture) but grew by 3.6% in the 1970s (Chaudhuri and Dasgupta 1985:151).

¹⁵ Their evidence suggests that the incidence of poverty in fact increased after 1975 when a headcount measure at 32% was by no means low.

Even so, employment gains in the small-scale sector were extremely modest.¹⁶ As noted earlier, the principal gains were in the medium and large-scale sector. Add to this the fact that export demand was as important (if not a greater) stimulus to industrial growth as the growth of agriculture and that the indirect income and employment generated by agriculture was lower than that of the industrial sector (Bhalla *et al* 1990:84), and it is clear that the main axioms of the thesis failed to work in the Punjab quite as Mellor predicted.

Finally, it should be added that the principal industrial resource of the Punjab was its stock of cheap skilled labour. Pandit's (1978:1935) evidence suggests that little of the employment on offer involved, or seemed likely to involve a significant number of unskilled manual labour from which the core of the rural poor would have been likely to benefit. In workshops in particular, low unionisation, lax labour regulations and poor working conditions also seem to have had a deleterious effect on the quality of much of this employment.

What the Punjab case does suggest is that sustained, around regional growth will reduce the incidence of poverty. Clearly the expanding export base was an important part of this, and there was a corresponding response in the commercial sector (where employment grew at 3% p.a.). But the prominence of agriculture and improving agricultural employment conditions, together with the importance of a parallel, export-led demand for the state's industrial products means that RGLs do not stand out as the principal cause of the reduction in poverty. If anything, the Punjab example draws policy attention to the conditions for effective regional growth.

8. The Right Macro Strategy: Some Concluding Remarks

Though Mellor's key study was written fifteen years ago, it is of contemporary relevance in two respects. First because, with low rates of industrial employment creation and anticipated limits on labour absorption in agriculture, expansion of the rural non-farm sector is a growing policy priority. And second because many aspects of his macro framework are today still very pertinent.

Mellor's programme for India was in essence growth-oriented. It advocated a more open economy, stressing comparative advantage in international trade with the import of capital-intensive production and intermediate goods and the export of labour-intensive manufactures (Mellor 1976:17f). He stressed the need for strong anti-inflationary measures at national level (to keep food prices down). As far as

¹⁶ It is difficult to state precisely the employment that was generated in small-scale industry. This is in part a definitional problem, and partly a consequence of the classification in available statistics. It is clear that the overriding majority of unregistered workshops were small family concerns that gave very limited employment (Gupta 1982:table 13; SAP 1985:table 16.5) and that they were outside the 5-20 worker category to which Mellor referred. When it comes to the smallest (10-19 worker) category of registered industries, it can be shown (depending upon various assumptions regarding non-respondents) that some 35,000-40,000 jobs were probably created over the period 1966/70 to 1980 for a total Punjab workforce of 4-5 million (SAP 1971, 1983). Growth appears to have been concentrated more in medium and large-scale firms.

promoting the small-scale industrial sector was concerned, emphasis was to be given to market efficiency. He highlighted the need for an identification and removal of market bottlenecks - particularly with regard to input supplies and to infrastructure which were seen to be creating uncertainties for local industrial expansion (ibid.:173). He looked to less government control, and for a switch in its emphasis from regulation to facilitatory support (ibid.:13). He also gave high priority to alleviation of poverty.

All this strikes a familiar note in the early '90s, and it is therefore relevant to ask how far these ideas can be used in a contemporary policy setting. One conclusion that has recurred consistently regarding most of our hypotheses is the overriding importance of macro policy choices. In this respect Mellor's initial casting of the problem would seem quite correct. Similarly it has been a serious weakness of the RGL debate and of efforts to quantify rural growth linkages that they have assumed a life of their own and have derived policy conclusions without adequate reference to the macro economic and political framework in which their particular cases were located. Harriss has argued that in effect it has been providing a technocratic rationale for large-scale agricultural projects (such as the Muda project) as against an understanding of the mechanisms of regional expansion in a wider sense.

Macro-strategy sets the conditions for regional expansion -- through its general orientation, through its impact on prices and the overall investment climate and, as far as Mellor's thesis is concerned, through the priority, subsidies and other supports it affords the small-scale investor. The consistency of commercial and industrial policy, and of industrial policy regarding large and small-scale concerns is obviously important here. But unless macro conditions are conducive to autonomous growth in an agricultural region, there can be no assurance that rural growth linkages will ever operate as the thesis intended. Priority has to come back to the macro policy.

Secondly, many of the more traditional concerns of regional planning are pertinent. Much will depend on the degree of decentralisation in decision-making - as has been noted in comparing experiences with the non-farm sector in Taiwan and in South Korea. Mellor did give weight in his 1976 study to the institutional environment. He saw the need for a pragmatic planning structure, and for a bureaucracy that could service the special needs of local entrepreneurs. Decentralisation in his view was quite essential - decentralisation of planning and administrative procedures, and of decision-making in credit, transport, technology and a range of other institutions that he considered to be important for local industrial growth. Direct government investment could then be limited. Considerable investment was envisaged in rural infrastructure (in transport, communications and electrification), and in market analysis, development and promotion (including a degree of risk absorption) in promoting promising product lines (ibid.:208) - the latter suggesting the relevance of a rural industrial development agency in one form or another. Whatever form this might take, it

seems difficult to argue that self-sustained regional growth could be a viable proposition without an institutional framework that is sufficiently supportive.

Seen in such frameworks, the potential of rural growth linkages in green revolution areas is still, for all the debate, comparatively unexplored. This is in part because the situation is often in reality inconducive. But policy - like the debate - has tended to see large-scale agricultural projects as agricultural areas. They have paid much less regard to regional strategies - to interregional integration, and to the importance for regional growth of urban-rural relations. In doing so, it has effectively bypassed such questions. In terms of its local focus, there must also be serious doubts about the general policy relevance of an emphasis on large, commercial producers and about the notion of confining discussion to consumer goods. Problems may also arise, as we have seen, with the viability of local production in the face of imported substitutes, and with the willingness of those with capital to invest it locally. The extent of the employment that can be generated may also be problematic. These are important issues. Thus any mechanical application of the RGL debate as it has evolved so far, or of the lessons of quantification that have been associated with it, would seem essentially limited. Nevertheless, the problematic remains one of priority, and it may benefit from some of the questions that the debate has raised.

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