

and expansion of industrial capacities.⁶²

Having then discussed the principal issues and models which have emerged in relation to Indian planning, we now proceed to the Indian analyses that bear on questions of agricultural policy.

II. Agriculture

Indian agricultural policy discussion has taken place against the background of a trend rise in agricultural production, especially of foodgrains, which has fallen sufficiently short of the growth in demand arising from income and population growth to require continual and significant import of foodgrains under the P.L. 480 program. In consequence, economic analysis has largely been concerned with questions relating to agricultural price and distribution policy, and also the economic efficiency of alternative forms of land tenure and agrarian organization.⁶³

In turn, these questions have led to analytical work on a whole range of problems with a direct bearing upon policy decisions.⁶⁴ Prominent among these studies have been the analysis of (1) the economic "rationality" of farmers, (2) the response

⁶² For general work on "regional" models in India, the survey by Ghosh [58], which we have referred to earlier, is a valuable reference. Aside from the many references there, work on transportation and regional planning models has been done in India by several other economists, including M. Datta-Chaudhuri [39] and K. Sundaram [168].

⁶³ With respect to agrarian organization, the *social* aspects of alternative policies have also claimed equal attention in the Indian discussions. Cf. Dantwala [35]: "It may be pertinent to enquire as to what has provided the main inspiration for the proposal to impose a ceiling on individual ownership of land: the urge for distributive justice or the necessity of a more rational use of the land surface? The impromptu answer would perhaps be: both. But it would be honest to admit that the prime motivation is distributive justice. In the context of the acute land hunger and millions of dwarf farms, ownership of large areas of cultivated land by a few is considered highly inequitable, justifying the imposition of an upper limit to individual ownership."

⁶⁴ *The Indian Journal of Agricultural Economics*, currently in its 22nd volume, is an excellent guide to the full range of problems that Indian agricultural economists have considered from time to time. As already noted earlier, our survey is necessarily selective.

of marketed surplus and production to price changes, (3) the relationship of land tenure systems and agrarian organization to the efficiency of factor use and to the elasticity of marketed surplus, production and investment to price change, and (4) the question of the existence and measurement of disguised unemployment.

Furthermore, Indian economists have also turned increasingly to efficiency questions relating to public agricultural investments. Economic analysis has been increasingly deployed, principally by Minhas [114] and Minhas-Srinivasan [115] to examine problems such as the efficient allocation of irrigation water and fertilizers,⁶⁵ although the choice between alternative ways in which farm output may be raised (e.g. land reclamation *versus* intensive cultivation) has not yet been fruitfully explored at an empirical level.

Agricultural Performance

At the outset, we may note that the production performance of Indian agriculture has been the subject of lively debate.⁶⁶ Pointing to India's continued reliance on P.L. 480 imports, economists such as Dandekar [33] have tended to dismiss India's agricultural performance as dismal. On the other hand, Raj [135] and Dantwala [34], while conceding the inadequacy of this performance, have attempted to put it into perspective by noting that the annual, compound rate of growth of production of foodgrains at 2.98 per cent and all commodities at 3.19 per

⁶⁵ We may also recall here the cost-benefit analysis of Sovani and Rath [164] and Raj [133] which we have surveyed in Part I. See also the excellent review of the literature on application of economic theory to Indian agricultural policy discussion by Khuro [76].

⁶⁶ We may note here the important work of Minhas and Vaidyanathan [116] in measuring the rate of growth of Indian agriculture, by 268 districts, for the aggregate output of 28 major crops for 1951-54 to 1958-61. For their method of measurement, including their decomposition of this growth into crop pattern change, productivity and acreage "effects," as also a valuable survey of other work in this area, see Minhas [113]. Parikh's work [127] in this area is also noteworthy.

cent for 1949–50 to 1964–65 does not compare unfavorably with performances in most other countries including those in South East Asia.⁶⁷ Moreover, Dantwala [34] has also noted that, contrary to general belief, productivity has also increased through this period, with acreage under all commodities increasing by 8 per cent but production by 34.8 per cent.⁶⁸

Whether one regards the agricultural performance, however, as dismal or just inadequate for India's developmental needs, the pertinent questions are whether (1) governmental policies (especially concerning prices) could have improved it, and (2) governmental policies (especially with respect to internal procurement, imports, private trade and public distribution), were efficient, *given* the agricultural performance. Before we discuss these two principal policy questions at some length, we survey the Indian analysis of the empirical relationships, pertaining chiefly to the marketed surplus and production of foodgrains and overall agricultural production, that have a direct relevance to these questions and have indeed entered into the controversies surrounding these questions.

Economic Rationality in Agriculture

We begin with the literature on the "economic rationality" of the agricultural sector. Whether agricultural and rural people and institutions respond to econom-

ic motivation or are impervious to it is a general question, of which the possible response of marketed surplus and production to price changes (which we discuss in the ensuing sections) are only the most obvious examples. The Indian literature on the broader question of economic rationality in this sector divides itself into empirical analysis aimed at (1) examining the efficiency of factor use within the existing institutional framework, and (2) demonstrating that the institutional framework itself adapts to the profit motive.

(1) Among the principal contributions to the former class of questions is Hopper's [70] analysis of the efficiency of Indian farmers in the allocation of resources. Hopper's method is to estimate production functions for his selected crops⁶⁹ and demonstrate that the factors used indeed earn the value of their estimated marginal products. However, as Nowshirwani [123] has correctly pointed out, Hopper's single equation estimation of his production functions leads to estimates that are neither unbiased nor consistent (in a statistical sense) so that Hopper's results must be treated with some scepticism.

Furthermore, we must note a different approach by D. K. Desai [40] to the problem of efficiency of factor use, which aims at discovering the optimal utilization of *existing* resources on individual farms and contrasting the resulting utilization pattern and returns with the actuals. Desai uses linear programming methods for this purpose, utilizing data collected for the Farm Management Studies in two districts of Maharashtra during 1954–55 to 1956–57 and examining forty *individual* farms. This pioneering work has reached the conclusion, at variance with Hopper's, that there is often a significant gap between possible and actual returns to farming, indicating economic inefficiency. However, as Hanu-

⁶⁷ Dandekar [33] has noted that if the two (drought) years 1965–66 and 1966–67 are included, the performance looks even less satisfactory; however, Dantwala [37] has pointedly replied that the 1967–68 crop, which is at a bumper level, would bear out *his* notion of the trend. In this context, we may also note that Raj's [138] comparison of the agricultural growth rates in India and Pakistan is a useful corrective to Mason's [106] adverse, comparative view of India's agricultural performance.

⁶⁸ However, the performance through the entire period conceals a serious deceleration which sets into the overall growth performance as also in the growth of average productivity, with the Third Plan. Hence, the agricultural performance may have been not merely inadequate but also steadily becoming worse. The 1967–68 crop, however, has been a bumper crop.

⁶⁹ The data relate to one Indian village and to the expected output from invested resources of its farmers in a single agricultural season.

mantha Rao has pointed out to us, the gross inefficiencies which Desai's analysis indicates are probably to be attributed to the fact that the results are derived by references to single period, *ex post* price vectors. If *expected*, rather than *ex post*, prices were considered, the results might be significantly different. A similar doubt attaches to Desai's use of given production relationships, which again may lead to inefficiency in the design of the test for optimality: expectations with respect to weather, for example, may significantly alter the crop pattern that may be adopted on efficiency grounds. Apropos of this discussion, it is also pertinent to remember the important distinction that Lipton [91] has drawn between farmers' production response to price change (which we discuss later) and profit maximization. For example, producers responding to prices in a cobweb model may not be maximizing profits in the long run.⁷⁰

(2) The analyses which seek to establish that the rural institutions change in response to economic motivation are of equal interest. While a sociologist such as Scarlett Epstein [52] has attempted cross-section analysis to show this, by contrasting two villages which differ only in terms of the recent availability of irrigated water, Raj [139] has noted that the "sacred cow" is not so sacred after all and manages to get slaughtered even in Hindu-intensive areas if ecological and price factors make it economically advantageous to do so.⁷¹

Hanumantha Rao's [67] analysis of share cropping is also of considerable importance in this context. Rao shows in an ingenious fashion that share cropping obtains generally in those areas, and for

⁷⁰ Lipton [91] provocatively entitles his review of Dharm Narain's work: "Should Reasonable Farmers Respond to Price Changes?"

⁷¹ Raj's cross-section investigation of this question is of further interest because he considers the important, related question of how the cattle stock should be evaluated from an economic point of view.

those crops (such as rice and wheat), where the element of innovative management and entrepreneurship is minimized because of lack of significant substitution possibilities among rival crops and factors, and the element of *uncertainty* is thus reduced to negligible levels: "crop-sharing arrangements are extensive under relative economic certainty and fixed contractual payments where the degree of uncertainty is high."

A few comments on this novel idea are in order. (1) Rao's hypothesis, which seems consistent with the cross-sectional facts of the Indian situation as of any one period, would lead to the further refutable hypothesis that, as technological possibilities for application of new inputs such as better seeds and fertilizers are introduced, share cropping would give way to other forms of tenurial relationships. With the introduction of these new techniques in India during the last few years, such an empirical test should be feasible.⁷² (2) Further, even if Rao's explanation of the "rationality" (in the sense of its consistency with profit maximization) of share cropping is valid, how are we to interpret its effect on efficiency of the utilization of available resources? An alternative formulation of the rationality of share cropping, in the spirit of Rao's argument, provides a clue to the optimality of share cropping as an institution. If we focus on the *stability* (or stationariness) of the agricultural techniques and acreage allocation possibilities, it is possible to argue that share cropping is consistent with optimality because the shares would come to approximate the level where factors tend to earn the value of their (stable, long-run) marginal product. Share cropping would then yield, on the average, the same results as capitalist

⁷² Rao explicitly notes that: "Crop-sharing may cease to be a beneficial arrangement as modern profitable inputs assume significance. The incentives for increased investments as well as for capturing the returns on such investment may lead to the preference for fixed contractual payments."

methods in a situation of long-run stability characterized by stagnant technological possibilities. A possible test of this hypothesis would be to examine share cropped farms, over a period characterized by such stability, for efficiency of factor-use in the sense in which Hopper [70] has done for his village.⁷³ Clearly, in any case, Rao's analysis opens up a fruitful area for further empirical investigation.

Behavior of Marketed Surplus

Indian economic analysis has concerned itself with two principal questions relating to the marketed surplus of agricultural foodgrains: (1) does this surplus vary directly with the relative price of these goods or does it behave "perversely"; and (2) what is the share of holdings of different sizes in the supply of marketed foodgrains? The former question has direct and obvious relevance to the issue of agricultural price and tax policy whereas the latter bears on the important question of the economic effects of land reform which involves regrouping of landholdings into different sizes, whether towards smaller holdings via measures such as landholdings ceilings or towards larger holdings via measures such as legislation preventing further fragmentation. Further, the two questions have, in turn, been linked in the analytical discussion by economists who argue that the price response of the small and large holdings with respect to marketed surplus is not similar.

Response to Price Change: Essentially, the question at issue, in analyzing the response of marketed surplus to price change, relates to the elasticity of the Marshallian offer curve of the sector supplying the surplus. And this is indeed how Raj Krishna [80] and T. N. Krishnan [86] have explicitly formulated their analysis

⁷³ In this connection, it is suggestive that Hanumantha Rao's comparison of the share cropping rental with the output per acre on "capitalist" farms [67, Table 6] shows a similar intensity of cultivation, per acre, on both sets of farms.

of this question. Furthermore such a formulation of the problem directly indicates that positive and negative price responses are both "normal": the offer curve may readily have a backward bending stretch where the elasticity of supply of the (food-grain) surplus with respect to price change is negative.

Nonetheless, the Indian debate on this issue has elicited arguments, mainly by Khatkhate [71] and Khusro [75], which aim at establishing a priori the "normalcy" or the inevitability of a positive or a negative elasticity. More interesting, however, have been the analyses, principally by Mathur and Ezekiel [110], which have attempted to explore the issue a priori within a framework which differentiates between different size-classes of holdings. At the same time, Raj Krishna [80] and Krishnan [86] have made perhaps the only systematic attempts at indicating what the likely elasticity of the offer curve for foodgrains might be in the Indian context.

Khusro's [75] analysis reaches the "strong" result that farmers will retain more and hence market less, out of given foodgrain production, if the market price is lowered. This is the consequence of his method of analysis which implicitly puts restrictions on the shape of the offer curve. Taking a box diagram as in Figure 1, where AZ is the given output of foodgrains, Khusro draws in PR' as the curve showing diminishing marginal utility of produce retained for consumption and SS' as the schedule representing diminishing marginal utility of sales. Then, equilibrium is at D where the amount of marketed surplus is EZ . With a lower price for foodgrains, Khusro shifts the curve SS' down to ss' , when G becomes the new equilibrium point and the marketed surplus has decreased to FZ . This conclusion, however, is the result of two highly restrictive assumptions: (i) separable (and hence cardinal) utility, explicitly noted by Khusro; and (ii) sufficient restrictions on the rate at

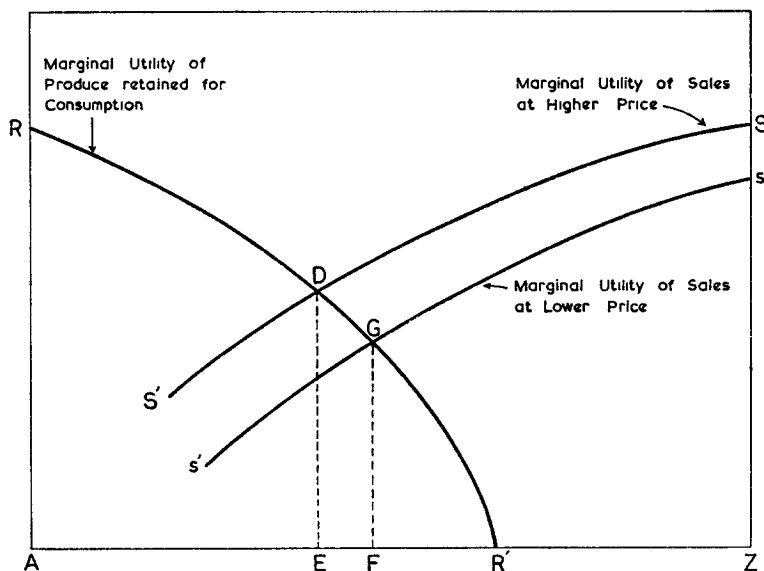


FIGURE 1

which the marginal utility of nonfood-grains falls vis-a-vis the price difference in the two situations, to ensure that the SS' and ss' curves do not intersect.⁷⁴ If either of these assumptions is relaxed, the possibility of a negative elasticity of marketed surplus will reemerge.⁷⁵

As with Khusro's attempt, other economists have attempted to argue exactly the opposite proposition on a priori grounds. Thus, for example, Khatkhate [71] has argued that the (small scale) Indian farmer will increase his marketed surplus when price falls "in order to maintain the same level of money income." Mathur and Ezekiel [110] have similarly argued that the subsistence farmers have

⁷⁴ Khusro [75, page 278] outlines the second condition as well, though not quite fully. While he mentions that the rate of diminishing marginal utility of sales receipts should be "small," he omits reference to the fact that the price change may be "large" and may outweigh the "smallness" of the diminishing marginal utility, resulting in the intersection of the two schedules and the reversal of his proposition.

⁷⁵ Of course, the entire argument relates only to the sign of the consumption effect as price changes. If production were also allowed to vary in Khusro's exercise, and if it was positively price elastic, then the price elasticity of marketed surplus could well be positive despite the consumption effect being positive.

an inelastic demand for cash and hence "if prices rise, the sale of a smaller amount of foodgrains provides the necessary cash and vice versa. Thus prices and marketable surplus tend to move in opposite directions." The fixed cash needs which these authors have in mind are debt obligations, rent, land revenue and a Ricardian-type bundle of nonagricultural subsistence goods. However, this argument seems tenuous. It implies that, at subsistence level, there is zero income elasticity of demand for commodities other than the foodgrains (produced on the farm) and also a zero substitution effect: neither assumption would appear to be logically or empirically inevitable at a "subsistence" level of farming and income, no matter how subsistence is defined.⁷⁶

Dandekar [31], in examining the Mathur-Ezekiel thesis, has argued that a

⁷⁶ Also note that the Mathur-Ezekiel assumption of "fixed cash needs" is *overly* sufficient for deriving a negative elasticity of marketed surplus. Further, as Nowshirvani [125] has noted, the negative unitary price elasticity for marketed surplus is implausible on dynamic stability grounds, since it would require the urban elasticity of food demand to exceed unity, which is an implausible assumption.

negative price elasticity of marketed surplus would characterize the farms which are not too close to subsistence and hence are large enough to supply marketed surplus and therewith earn cash income and which are at the same time not large and prosperous enough to show a "normal," positive price elasticity of marketed surplus. Dandekar argues that, for this size-class of holdings, the negative price-elasticity is readily explained, not by reference to a "fixed cash needs" hypothesis, but "as normal consumer behavior in the face of changing income. When the price of the crop which they produce changes relative to other prices, the real income of the farmers in effect changes. With lower relative prices for what they produce, their real incomes are in effect lower and as consumers they are worse off. Under the circumstances, they behave like other consumers at their income level would do. They must consume a little less of everything, food and non-food alike even if they happen to be producers of food. This is what they do. They consume a little less of their own produce and consequently sell more of it on the market." Dandekar reaches this apparently obvious conclusion by either ignoring the substitution effect or by implicitly assuming that the income effect will dominate the outcome.

Dandekar's analysis of the elasticity of price response by other size-classes of farmers is also not persuasive. With respect to the farmers at the bottom end of the scale, he argues that the absence of marketed surplus of foodgrains and the dependence "mainly on other means such as sale of other crops or wages earned from farm and off-farm employment or even remittances received from family members working in cities" implies that the question of the elasticity of marketed surplus does not apply to them. However, this argument rules out the possibility of a marketed surplus arising in response to

price rise, for example, via shift in resource allocation toward foodgrains and/or curtailment in own consumption if the substitution effect is large. Dandekar's further contention that, in many cases, the farmers in this size-class of landholdings actually buy foodgrains on a *net* basis, is also inconclusive in this respect: these farmers can still turn into net suppliers if the price change is favorable enough and the consumption effect has a negative sign. Moreover, even on an empirical level, Dandekar's citation of the data for sale and purchase of Jawar by the small landholdings in the Akola and Amraoti districts of Madhya Pradesh for 1955-56 is not conclusive. The fact that these farmers purchase *jawar* on a net basis does not necessarily rule out their selling *other* foodgrains (such as wheat, which is also produced and sold in these districts), so that the *net* position on *overall* foodgrains supply may be different from that on the supply of only *jawar*. More systematic empirical analysis of this question is clearly necessary.

Similarly, it is hasty to conclude that the "large" holdings will necessarily have a positive elasticity of marketed surplus, thanks to a "well behaved," negative consumption effect. It is easy enough to imagine, for example, a lower price of wheat leading to greater supply of marketed surplus thereof as the farmer shifts to increased consumption of the inferior cereal, *jawar*.

Despite these qualifications, it is clear that empirical analysis of the price response of marketed surplus, which differentiates between different size-classes of landholdings, is likely to be more insightful than an aggregative analysis.⁷⁷ Unfortunately, however, the only serious attempts at empirical analysis of the

⁷⁷ Since foodgrains also represent a complex of different cereals, the analysis would have to contend also with (1) their price substitution in production and consumption; and (2) the possibility that some of them may

problem in India have been at an aggregative level.

Using Rural Credit Survey data on the market surplus of foodgrains, Krishnan [86] has estimated the constant elasticity demand function: $r\bar{Q} = AP^{-\alpha}(\bar{Q}P)^{\beta}$ where \bar{Q} is the total output of foodgrains in the short-run, P is the price of foodgrains, $\bar{Q}P$ is the income of the farmers and r is the proportion of output consumed by the farmers themselves. He estimates the elasticity of marketed surplus to be -0.3030 for the period 1959-60 to 1962-63. Note, however, that if the price elasticity of production response, which has been estimated to be positive in other studies surveyed elsewhere by us, were to be admitted into this exercise, and the assumption of a constant output thus relaxed, the price elasticity of marketed surplus could well become positive.

Raj Krishna [80], in fact, has experimented with different ranges of price elasticities of output and consumption to establish that, in the Indian context, the price elasticity of marketed surplus of a *single* subsistence crop (as distinct from Krishnan's estimate for all foodgrains) is indeed likely to be positive. Starting with the simple identity:

$$(33) \quad \frac{dM}{dP} \equiv \frac{dQ}{dP} - \frac{dC}{dP}$$

where M is the marketed surplus, Q is production, C is self-consumption and P is the price, Raj Krishna further decomposes the consumption term into income and substitution effects and then proceeds to put hypothetical ranges of values on each of the parameters in the derived expression for the elasticity of marketed surplus.⁷⁸

be inferior goods in consumption. In consequence, a sharp distinction would also have to be drawn between the price elasticity of the marketed surplus of a single foodgrain and more.

⁷⁸ These values are not entirely hypothetical but are derived by him from several studies, including his own study of the production response to price change in the Panjab [81].

Unfortunately, however, his decomposition of the consumption term omits the income effect which follows from the change in the value of the initial consumption as price changes. Nowshirvani [124], who spotted this error, has reworked Raj Krishna's analysis and, on using the same empirical ranges of values for the parameters relating to production and consumption response, finds that it is not possible to rule out negativity in the price elasticity of the marketed supply of foodgrains in the Indian context.⁷⁹

Distribution of Marketed Surplus by Size-Classes of Landholdings: Indian analysis has also extended to the question of the shares of different size-classes of holdings in the marketed surplus of foodgrains and agricultural produce in general. Unlike with the question of the price elasticity of marketed surplus, however, this problem has attracted mainly *empirical* analysis. Among the contributions to this area of research, Mathur's [107] findings on the marketed output of *jawar* in Akola and Amraoti for 1955-56 and Dharm Narain's [120] patient compilation and processing of the relevant information for the marketed surplus of *agricultural produce* for India in 1950-51 are of interest. Raj Krishna's [82] attempt at cross-section analysis of the marketed surplus, by size of farm *output*, for rice and wheat for selected markets has also attracted considerable controversy in this context.

While these studies agree on the proposition that the supply of marketed surplus is not a characteristic of only the "large" landholdings, they differ on several other points of substance. While Dharm Narain finds, for example, that even landholdings in the size-class 0-5 acres contribute as much as 20.7% of the value of their output as marketed surplus (Table 1), Mathur's study shows that the sale of

⁷⁹ We may emphasize however that the negativity of price elasticity does not imply the unitary elasticity assumption of Mathur and Ezekiel.

TABLE 1—DISTRIBUTION OF MARKETED SURPLUS BY SIZE-GROUPS OF HOLDING

I				II		
Size of holding (acres)	Marketed Surplus (R ^s . crores)	(1) as % of value of output	(1) as % of Total Marketed Surplus	Marketed Surplus (R ^s . crores)	(4) as % of value of output	(4) as % of Total Marketed Surplus
	(1)	(2)	(3)	(4)	(5)	(6)
0-5	266.7	20.7	24.9	564.0	33.6	26.0
5-10	175.8	14.1	16.4	444.8	27.4	20.5
10-15	54.7	9.7	5.1	170.1	23.1	7.9
15-20	80.1	18.2	7.5	172.8	30.1	8.0
20-25	54.0	20.4	5.0	111.0	32.2	5.1
25-30	65.4	28.8	6.1	116.8	39.7	5.4
30-40	80.5	29.9	7.5	139.6	39.8	6.4
40-50	67.8	38.0	6.3	107.8	46.4	5.0
50 and above	228.0	44.8	21.2	339.9	51.4	15.7
Total	1073.0	21.5		2166.8	33.4	

Source: Dharm Narain [120, 35].

jawar by landholdings in the size-class 0-5 acres is practically nil. While this discrepancy in the results may arise from differences in the concept of the marketed surplus and also in the period and area covered, it arises undoubtedly also from the fact that Mathur's findings refer to a single crop, *jawar*, whereas Dharm Narain refers to agricultural produce in general. As Dandekar [31] has noted, the All-India Rural Credit Survey has shown that this size-class of farmers are typically net purchasers of *foodgrains*, while earning cash income by "sale of other crops or wages earned from farm and off-farm employment or even remittances received from family members working in cities."⁸⁰

Another difference of considerably greater policy relevance relates to Dharm Narain's finding that the proportion of output marketed falls until the size-class 10-15 acres is reached and rises rapidly thereafter. An important consequence of

this finding, if statistically valid despite the numerous "adjustments" that have gone into its derivation, would be that land ceilings resulting in breakup of the larger holdings could increase, rather than diminish, the marketed surplus of agricultural produce—ignoring, of course, the derivative effect of any resulting shifts in production itself.⁸¹ Since in Dharm Narain's findings, the distribution of marketed surplus by size of holdings is bi-modal, this would imply that the effect of redistribution and changes in the number of landholdings on the proportion of marketed surplus would be ambiguous in general. On the other hand, Raj Krishna's

⁸¹ We deal with this question separately, when we analyze the response of production to shifts in parameters such as prices and size-class of the landholdings. We may also note here that a satisfactory investigation of the question of the effect of land ceilings and a consequent break up of larger into smaller farms requires a *general equilibrium* analysis, even within a comparative static framework, which would also take into account resulting shifts in the labor force, consumption patterns and relative prices between agricultural and nonagricultural commodities.

⁸⁰ Italics have been inserted by us.

[82] analysis of market arrivals of rice and wheat for certain markets, by size-classes of farm output, reaches the conflicting conclusion that, except for the "very poor, and the very rich" areas, the marketable surplus (M) is linearly related to the level of farm output (Q) by the relation: $M = a + bQ$ (where the estimated 'a' involves a negative intercept). This conclusion naturally implies that shifting output between farms of different size-classes will *not* affect the volume of the marketed surplus if the number of landholdings is not changed; however, if the number is increased via land ceilings, for example, the marketed surplus would necessarily diminish (since 'a' < 0).

Raj Krishna's startling finding, however, may be largely due to the fact that, as he had himself noted and Hanumantha Rao [65] has emphasized, he is dealing with a *single crop* and not with the overall marketing of agricultural produce by different farms. Indeed, it would appear that his data must come from farms which produce more than a single crop, or alternatively have income from different sources. As Majumdar [97] has pointed out, Raj Krishna's results imply that the output elasticity of consumption on the farm increases as output, and hence farm income, increases: a proposition which certainly is empirically untenable for India at all farm income levels.⁸² Thus, it is only if these samples farms have income from *other* sources that increment in output of the foodgrain crop (rice or wheat) would not imply increment in *overall* farm income and hence would make Raj Krishna's results appear tenable.

But if then Raj Krishna's results for a *single crop* are to be considered to have

⁸² $(M/Q)E_{MQ} = 1 - (C/Q)E_{CQ}$, where E_{MQ} and E_{CQ} are the output elasticities of marketed produce and of consumption respectively and C is the consumption. Thus if E_{MQ} decreases with output, as a linear relation between M and Q ($M = a + bQ$) with a negative intercept 'a' would imply, then E_{CQ} must rise with output [97].

come from *diversified* farms, it is not surprising that they are not consistent with Dharm Narain's results which relate to the *entire* agricultural produce from all landholdings by size-classes. If we were to assume that Raj Krishna's statistical results have validity over a wider range of foodgrains and area within the country, despite his careful caveat that they apply only to his extremely limited sample, there would clearly be important economic implications: for, from certain economic points of view, the supply of the marketed surplus of direct wage-goods such as foodgrains may be crucial but the supply of the surplus of overall agricultural produce may not be.

Apropos of this distinction between foodgrains and agricultural produce, we may also note that the precise definition of the marketed surplus is also relevant and would have to be adapted to the policy problem being considered. Thus, for example, Dharm Narain carefully states that his definition relates to the quantities that the cultivating families *directly* market. Thus, insofar as these families may themselves buy agricultural produce from the market or make payment of rent or wages in kind which, in turn, seeps into the market, the measured surplus will differ from the surplus that becomes available for *nonfarm* use. An important consequence is that, insofar as we are interested in the availability of agricultural produce for nonfarm consumption, Dharm Narain's definition will understate the marketed surplus ensuing from the larger farms which make wage payments in kind and whose purchase of agricultural produce is likely to be proportionately lower in relation to their output.

We may also remark that the Indian discussion of the marketed surplus, while it has taken different size-classes of holdings into account as a relevant variable, has not considered the possibility that al-

ternative forms of land tenure may also affect the overall level of the marketed surplus and its price elasticity. This may be via the efficiency and/or the price response of *production* varying under alternative forms of tenure (such as share cropping and peasant proprietorship). It could also result from differences in *consumption* patterns, for any given level of farm output, that may arise from differences in the distribution of the farm income among rents, wages and imputed self-incomes under alternative tenure systems. Where the tenure systems, in turn, overlap with size-classes (as, for example, when "small" farms are characterized by peasant proprietorship and the "large" farms by tenancy), the causal explanations may also overlap.

Behavior of Production

In contrast to the analysis of the marketed surplus problem, the Indian analysis of agricultural production has been empirically more systematic and analytically more interesting. As with marketed surplus, two of the major problems analyzed have been (1) the elasticity of price response and (2) the relationship of farm size to productivity. At the same time, however, the efficiency of production and investment has been discussed in the context of alternative tenure systems such as share cropping and of agrarian organizations such as cooperative farming.

(A) *Price Elasticity of Production*: There is an important, empirical distinction between the elasticity of price response of total agricultural production and of single crops or subgroups thereof. Furthermore, the elasticity of response to change in the relative price of outputs needs to be distinguished from the elasticity of response to change in the relative price of inputs to output. Each of these behavioral relationships has a bearing upon the Indian policy discussion, although it is only recently that

careful distinction among these alternative concepts has begun to emerge in the policy debates.

Furthermore, practically the bulk of the systematic, empirical literature in this area has been confined to the estimation of production, or rather acreage, response of *specific crops* to changes in the relative price of *outputs*. Recently however Minhas and Srinivasan [115] have investigated the interesting question of farmers' potential response to fertilizer availability at specified prices, using crop-cutting experimental data on fertilizer productivity and *assuming* profit maximization; their work is thus aimed at predicting product response to alternative fertilizer prices but does not estimate it from observed data.⁸³ We should however note that the fertilizer response functions used by Minhas and Srinivasan cannot be necessarily generalized to Indian agriculture as a whole since they were obtained from experimentation done by the Indian Council of Agricultural Research and there is no reason to treat these as "typical" response functions. Hence the accuracy of predictions based on the Minhas-Srinivasan exercise is likely to be limited, despite its value in providing a systematic analytical framework for doing so.

Among the empirical examinations of the responsiveness of production to change in relative output price are: Raj Krishna's [81] estimation of *acreage* response functions for several crops in the Panjab for the pre-Partition period; Dharm Narain's [121] analysis, stopping short of econometric estimation, of shift in acreage under different crops in response to price change during 1900-39; and Venkataramanan's [173] estimation of jute areas elasticity, with respect to the relative price of jute with rice for 1911-1938. Among the other

⁸³ Minhas and Srinivasan also investigate the effect of share cropping on fertilizer absorption. We turn to this question later in the present section.

attempts in this direction, we should also note: Rath and Patwardhan's [144] estimation of acreage response functions for wheat for 1950-51 to 1961-62, in connection with their analysis of the impact of P.L. 480 imports on the domestic production of wheat; and Jai Krishna and Rao's [79] estimation of alternative acreage allocation functions for wheat in Uttar Pradesh for 1950-51 to 1962-63.

Other contributions of interest in this area, which depart from the focus on *acreage response to price change*, are (1) by Mann [98] who has estimated the price elasticity of *supply* (as distinct from acreage) of *cereals* (as distinct from a single crop) at 0.275 during 1952-63 in the framework of a simultaneous equations model designed to study the impact of P.L. 480 imports of wheat on domestic foodgrains production; and (2) by Hanumantha Rao [64] who has analysed the Farm Management Studies data on crop patterns in the States of Madhya Pradesh, West Bengal, Madras, Uttar Pradesh, Panjab and Bombay to find correspondence between the relative profitabilities of crops (defined in terms of income per acre) and their relative shares in the gross cropped area:⁸⁴ an empirical relationship that is compatible with, but does not necessarily follow from, the assumption that farmers respond to profit incentives.⁸⁵

Quite apart from the differences in the period, area and crops examined, the acreage response studies by Raj Krishna, Dharm Narain and others vary in (i) their methods of estimation, (ii) the specification of the relevant price of the crop, and (iii) the selection of the relevant, *relative*

price. On the method of estimation, for example, Raj Krishna as also Jai Krishna and Rao have used Nerlove-type "adjustment" models which permit separate computation of the short-run and long-run elasticities of response. The other contributors, on the other hand, have used simple, lagged regressions of acreage upon price. As for the specification of the relevant (absolute) price of the crop, different possibilities have been experimented with Jai Krishna and Rao who have tried several alternative prices—preceding year's post-harvest mean and modal prices, three month pre-sowing prices and average of three month pre-sowing and lagged three month post-harvest prices—find, for example, that their best results are with the three year averages of the pre-sowing price of wheat and consider this to be more appropriate in forming the farmers' price expectation than the *post-harvest* prices (used by Raj Krishna and by Rath and Patwardhan) or annual average prices. However, in choosing the most appropriate *relative* price deflator, the general practice has been to take weighted averages of relevant "substitute" crops. The majority of the analyses further distinguish between irrigated and unirrigated acreage, as the substitution possibilities are different for them. Further, many of them introduce overall crop acreage, rainfall and relative yields of the different rival crops as additional explanatory variables.

Among the principal conclusions to emerge from these studies is that Indian farmers vary their acreage under most crops when relative prices change. But can we really claim, with Dharm Narain, that the response is more obvious, and elastic, for pure cash crops than for cereals? The evidence on this issue does not appear to be at all clear. The elasticities of response are certainly large on some of the pure cash crops such as cotton, though not as

⁸⁴ Rao's analysis also differentiates between land-holdings by size-class of holdings.

⁸⁵ Thus, consistent with profit maximization, it is easy to imagine production functions for rival crops which imply that, in equilibrium at any stated commodity price vector, the shares of these crops in total acreage are inversely (rather than positively) related to income *per acre*.

large on others such as jute and sugar cane. Further, on cereals such as rice and wheat, the elasticities estimated by these authors seem to diverge.

Raj Krishna's estimates, for example, are at 0.08 and 0.14 for irrigated acreage for *wheat*, for short-run and long-run periods respectively. In this result, he is supported by Dharm Narain's finding that, in the four major areas producing wheat in India during 1900–1939, no significant relationship could be discovered between acreage under wheat and its relative price.⁸⁶ The work of Jai Krishna and Rao, for the more recent period 1950–51 to 1962–63 for Uttar Pradesh, however, has produced long-run elasticities for wheat acreage which range up to 0.72. Similarly, for *rice*, in Panjab, Raj Krishna's estimates of the short-run and long-run elasticities are 0.31 and 0.59 respectively, indicating again a fair degree of response, whereas Dharm Narain fails to discover significant price-induced shifts in rice acreage for Bengal, Bihar, Madras and Orissa.

The divergent estimates for cereals seem to imply that empirically there is no reason to believe that the acreage response for movements into and out of cereals will be any less than that for the pure cash crops. Nor, indeed, does there seem to be any theoretical reason for such an asymmetry. Indeed, the technological constraints on shiftability of land seem to be the relevant factors in determining the magnitude of the acreage response to price change quite irrespective of the classification of the pro-

duced crops as cereals or pure cash crops. Thus, for example, Dharm Narain did find that for the Aus rice in Bengal, which directly competes with jute for acreage, acreage was indeed responsive to relative price change; and Venkataramanan has estimated the elasticity of jute acreage at 0.46.

We may further observe that if our primary interest is in the elasticity of supply or production response, the acreage response is only an incomplete guide to the total picture. The elasticity of supply response is the sum of the elasticity of acreage and productivity-per-acre responses to price change. Thus the elasticity of supply response is certain to be understated by the acreage elasticity for those crops which have no "substitute" crops landwise but where production can be increased via application of more inputs. Moreover, even if we were to consider a completely neoclassical model with factors (including land) freely adaptable to alternative crop production, a shift to a more profitable crop will generally raise its land productivity if it is intensive in the use of nonland factors and these factors are not in perfectly elastic supply to all crops taken together.

(B) *Production and Size-Class of Holdings*: The focus on production response to prices in the Indian literature has been nearly matched by the economic analysis which has resulted from the finding of the Farm Management Studies (for Uttar Pradesh, Madras, West Bengal, Bombay, Panjab, Madhya Pradesh and Andhra, during mid-1950's) that an inverse relationship obtains between farm size and productivity per acrea. This relationship, which has an obvious bearing upon the policy issues pertaining to land ceilings⁸⁷

⁸⁶ Since Dharm Narain has not undertaken statistical estimation, and his analysis proceeds on the basis of graphical methods, comparison of his work with the econometric results of other authors can only be tenuous. Further, phrases such as "significant relationship" must be construed in a nonstatistical sense when we are referring to Dharm Narain's work. For pertinent criticism of Dharm Narain's omission of statistical techniques, and the dangers of having failed to avoid false conclusions thanks to the presence of serial correlation and an inability to face up to the identification problem, see Lipton's [91] interesting review.

⁸⁷ We may also refer to a rather different type of analytical treatment of the question of land ceilings by Khusro [76] who has ingeniously attempted to examine the efficacy of such a measure in terms of the theory of rationing.

and land grouping under cooperative farming and other forms of agrarian organization, has led to attempted explanations by Khusro [74], Mazumdar [111] and Sen [157] and further empirical work by Hanumantha Rao [66] and A.P. Rao [142], among others.

We may note at the outset that much of the important statistical evidence that is available points rather strongly towards the existence of an inverse relationship between farm size and productivity. The Farm Management Studies indeed yield this relationship, whether grouped by size-classes or taken on an individual farm basis as Hanumantha Rao [66] has done for Bombay. Independent survey for Andhra by Rao has also yielded similar results.⁸⁸

Assuming that the results of the Farm Management Studies are statistically valid, what are the possible explanations? For, the implications for policy would generally vary with the explanation accepted. Whether higher productivity per acre also goes with greater *economic efficiency* of the smaller farms will depend critically on the explanation of the phenomenon of higher productivity.

(1) The explanation offered by Sen [157] of an inverse relationship is based on

⁸⁸ On the other hand, we should note here that a few village studies, in depth, seem to throw up results which are at variance with these. Thus A. P. Rao's [142] study of data for six villages in Uttar Pradesh and Panjab shows for example that, if adjustment is made for the fallow lands and the availability of irrigation, output per acre tends to be constant by size-class of holdings. Further, C H. Shah's [161] study of the small farmers in Kodinar Taluka for 1952-53 shows that, for the principal crops: "yields per acre for the small farmers were, in the year under survey, 12.3 per cent lower compared to that of big farmers. Compared to that of medium farmers they were 7.2 per cent lower. In other words, lands in possession of small farmers were less intensively utilized to that extent." Shah does not explicitly state that this ranking would hold for *all* output and therefore it is not *certain*, although quite plausible in view of these crops covering nearly 75 per cent of the cropped area on farms in *each* category, that his results are contrary to the findings of the Farm Management Studies.

the argument that the smaller farms are characterized by peasant family cultivation and the larger farms by capitalist cultivation. Cultivation is thus carried on the small farms right up to the point where the marginal product is zero (or at least below the ruling market wage) and stops on the capitalist farms at the point where the marginal product equals the market wage. Hence the small farms have higher productivity per acre and are more efficient in the economic sense.⁸⁹

This argument, however, raises conceptual difficulties and is also empirically untenable. If the two agrarian systems *co-exist*, one may ask whether the opportunity cost of peasant family labor is not the wage that the market offers for employment by atomistic capitalist farmers. Thus, if the family is taking a decision on *overall* income derived from input of work-hours by the family as such, then will not the opportunity cost of work on *both* types of farms be equalized and the inverse relationship therefore not explained? The inverse relationship therefore will hold only insofar as we explicitly postulate that the peasant family labor cannot necessarily find alternative employment at the given wage, which is not further flexible downwards, on the capitalist farms and that the probability attached therefore to finding such an alternative employment is less than unity thus making its opportunity cost less than the wage on the capitalist farms. Mere coexistence of the two agrarian systems is not sufficient therefore for the explanation of the inverse relationship.

Furthermore, Sen's argument runs into *empirical* difficulties on two grounds. Several studies show that the small farms, not far from the bottom of the scale,

⁸⁹ The asymmetrical nature of these two agrarian systems, with respect to effects on the efficiency of production, is well known in the trade theoretic literature on domestic distortions and was earlier noted by Bhagwati [8], among others.

themselves hire labor at the margin⁹⁰ and even derive income from employment of family members in other occupations,⁹¹ so that the opportunity cost of labor on the small farm is likely to be very real and cannot be dismissed. Moreover, Hanumantha Rao's work shows that the inverse relationship holds even when the larger (presumably capitalist) farms are ranked, so that Sen's suggested explanation is at best incomplete.

(2) Khusro [74] has noted, in particular, that the decline in productivity per acre is reduced significantly when the acreage is "standardized" on the basis of land revenue ratings (which are presumably related principally to soil fertility). Thus, one of the major explanations advanced for the inverse relationship is that the fertility of the soil is lower on the larger farms.

This argument, if accepted, raises the question whether this fertility difference is exogenous or manmade and hence, in turn, to be explained by the fact that the small farms are more efficient economically. If the fertility factor is exogenous, it could be explained by the hypothesis that the larger farms are put together by purchase of land undergoing "distress sale" and that the poorer lands are sold and the better lands retained: thus making the larger farms less fertile on the average than the smaller farms. Further, if the large farms contain an element of conspicuous consumption, the possession of land itself (regardless of quality within a range) conferring status and psychic satisfaction on these large landowners, then it could also be economically profitable for them to purchase lower quality land from the market. An implausible hypothesis is that historically the *fertile*, large farms may have broken down into smaller farms owing to a

more rapid population growth. Sen, who has put forth this last hypothesis, however, forgets that this argument conceals an important indeterminacy which arises from the fact that the size of the family itself may vary by farms owing to migration or other endogenous factors and, if so, the equilibrium pattern of fertility by size-classes may not be characterized by an inverse relationship between farm size and productivity.

(3) Two other explanations related to the hypothesis of "distress sales" of land resulting in the buildup of larger farms, can be advanced. On the one hand, the enlargement of farms by acquisition of plots of land from such sales could well lead to the larger landholdings being characterized by fragmentation of the cultivated area and its being scattered over large distances, thus adversely affecting average productivity per acre and lowering that of the larger farms.⁹² On the other hand, the possibility that the smaller farms are in distress could lead to their being more efficient in their use of resources, especially labor and management (the alternative being *ruination*) whereas, as Hanumantha Rao [63] has suggested, the larger farms are less efficient from the viewpoint of production, as they trade off marginal profitability against *leisure*.

(4) Another hypothesis, put forth by Khusro, is that "If there are tenurial disincentives resulting in lower input and output per acre among the tenanted holdings and if the proportion of area leased in increases with size, then the decline in output per acre with size could be partly explained by the operation of tenurial incentives" [66]. However, as Hanumadtha Rao notes, the evidence on this issue is conflicting: while Khusro has found evidence in support of this hypothesis to

⁹⁰ This is shown by the Farm Management Studies. See Hanumantha Rao [66] and Khusro [74].

⁹¹ This is shown by the All-India Rural Credit Surveys. For details, see Dandekar [31].

⁹² This hypothesis could be readily tested through village studies designed to estimate the fragmentation of the farms by size-class of landholdings.

the extent that the proportion of land taken on lease rises as the farm size increases, the findings are just the opposite in the Farm Management Studies.

(5) A possible explanation, similar in spirit to the tenancy explanation of Khusro's, is that the larger farms are characterized by *absentee landlordship*, which results in reduced efficiency through inadequate exercise of managerial and entrepreneurial functions. While this explanation will not explain the findings of the Farm Management Studies, which relate to owner-cultivators *in residence*, it may well explain the inverse relationship in other samples.

Since many of the new hypotheses that we have suggested have not yet been tested whereas none of the traditional explanations we have surveyed appear to fit entirely any of the empirical data (wherever tests have been attempted), it is difficult not to be sceptical about the precise policy implications of this area of analysis.⁹³ At an a priori level, however, we may reiterate that the question is of considerable relevance to the problem of the optimal agrarian structure. In this context, we may note that Dandekar [30] has drawn upon Georgescu-Roegen's earlier work [57] to argue that, for India where there is (according to him) overpopulation in the sense that the shadow rental of labor falls below the subsistence (and hence the market) wage, the capitalist form of wage-labor organization will lead to inefficient aggregate output and the peasant family system implied by individual peasant proprietorship would be superior. Ideally, this argument would lead to an agrarian structure based on peasant families owning

⁹³ Further, we should emphasize that the ranking by private and social profitability of the farms by size-classes may diverge from their ranking by acreage productivity. Also the static efficiency of the smaller farms, if demonstrated, may be consistent with their dynamic inefficiency from the viewpoint of savings, investment and innovation.

land in the same ratio as the overall family-land ratio. Such a view however rules out possible indivisibilities, relating to inputs, which may make *cooperation* desirable.⁹⁴ Further, as a policy prescription, it is inadequate as it does not take into consideration the economic problems of the transition from one system to the other. We may further observe that, while such an agrarian structure can be demonstrated to be statically efficient, its effect on long-run growth may be deleterious if induced savings are adversely affected and there are political limits to the governmental ability to tax (as there certainly is in India, especially with respect to the agricultural sector). This may happen via savings in agriculture being directly affected through shift in the internal distribution of income within agriculture or via income distributional changes between agriculture and other sectors as the terms of trade between them change in response to the primary improvement in agricultural output and the possible change in the consumption pattern that may be associated with the changed distribution of income within agriculture under the new agrarian structure.⁹⁵

(C) *Tenancy, Share Cropping and Efficiency of Production*: We have already seen how the literature on farm size and productivity has led Indian economists to focus on the relative efficiency of alterna-

⁹⁴ Dandekar notes, however, that if the cooperative societies act in a capitalistic manner, they will make the system revert to the inefficiency of the capitalist, agrarian system.

⁹⁵ Again, therefore, if we are interested in the related question of what would happen to agricultural output when we have a shift in agrarian structure, we should ideally consider the problem in a *general equilibrium* framework (even if we are considering comparative static analysis). Thus, for example, a primary improvement in agricultural output due to agricultural efficiency could be overcompensated by the secondary reduction in output brought about by an agricultural price reduction induced by a consumption shift away from agriculture, thus leaving us with a net reduction of agricultural output in the new equilibrium.

tive forms of owner-cultivation: the peasant family system and the capitalist employment-for-wage system. Indian analysis of agrarian organization has also been addressed, however, to the question of the effects of tenancy, including certain important forms of it such as share cropping, on the efficiency of production.⁹⁶

In fact, tenancy legislation has been extensively enacted in different States in India, reflecting and in turn stimulating the literature that we presently survey. Indeed, as Dandekar [29] has noted, the Indian planners have increasingly shifted their policy proposals away from the First Plan emphasis on restructuring of land holdings into efficient sized units backed by cooperative organization where scale effects make it desirable (with tenurial, land reform undertaken largely as a transitional means towards this reform of the agrarian structure), towards the Third Plan's exclusive attention to tenurial reform, inclusive of tenancy legislation.

The Indian analytical literature on tenancy has considered, among others, two principal questions of some interest: (i) where the tenant is subject to insecurity of tenure as a result of the threat of possible eviction, does the grant of permanence of tenure by legislation improve efficiency via investment in capital inputs; and (ii) are certain forms of tenancy, particularly share cropping, suboptimal from the viewpoint of efficient factor use?

Among the empirical studies aimed at examining whether the legislative grant of security of tenure to the tenants, where effectively implemented, improves the

efficiency of factor use via investments which would otherwise not be undertaken by the tenant, Khusro's [72] investigation of such land reform in Hyderabad during the period 1948-49 to 1953-54 is noteworthy.⁹⁷ He hypothesizes, among other effects, that the land reform legislation would lead to a narrowing of the gap in the productivity per acre between the owner-cultivator and the tenancy groups of landholdings, presumably as the latter group improved its efficiency via increased investments induced by the tenancy reform. Khusro indeed observes that such a narrowing of the gap had occurred by 1953-54. However, the real test is whether the tenancy group had improved its productivity and it turns out that, as Dandekar [28] has noticed, the narrowing of the gap has occurred through a decline in the productivity of the owner-cultivator farmers instead. Insofar as the latter phenomenon is due to factors applicable *only* to the owner-cultivator group (as would be the case, for example, if other provisions relating to the tenancy legislation may have depressed the incentive to invest by this group of farmers),⁹⁸ then the observed narrowing of the gap would not support the hypothesis being tested. Furthermore Dandekar has pointed to the wide variations in the acreage productivity of the two groups through the period, thus mak-

⁹⁷ Dandekar [28] has critically surveyed Khusro's study and three other similar studies, sponsored by the Research Programmes Committee of the Indian Planning Commission, to investigate the working of land reform legislation.

⁹⁶ There is also a considerable amount of literature on the problems of (1) rural indebtedness and (2) land revenue administration, which we have not considered in this survey. Land reform discussion in India has embraced both these problems. For a reference to the major studies of the latter problem, in the light of the legislation enacted by different States such as Andhra Pradesh and Gujarat to abolish these intermediaries, Dandekar's [28] critical survey is an excellent source.

⁹⁸ Khusro [72, pp. 61-163] himself offers a different type of reason, also specific to the owner-cultivator group, which is of some interest: "It is well known . . . that land reforms had led to a good deal of resumption of land by owners partly because they wanted to cultivate the extra land and largely owing to expectations and psychological attitudes which this reform had led to. If the land so resumed had in fact been resumed with the intention of cultivation with at least the same standards as already existed in owner-cultivated tracts, the productivity of the owner-cultivators would have remained at least constant. . . . On the contrary it is resumed for institutional and legal reasons to safeguard

ing it unreliable to base any conclusions on a two-year comparison. On the other hand, we should note that Khusro's alternative hypothesis that the increased security of tenure would lead to a shift in the *composition* of the tenant-cultivators' investments towards investments maturing over a longer period seems to be consistent with the developments over the period.⁹⁹

Khusro's study and other similar investigations are thus indicative but not entirely decisive in providing evidence consistent with the hypothesis relating efficiency on the tenant-farm to security of tenure and further empirical work seems called for in this area. Furthermore, we may note that the theoretical basis for this hypothesis, plausible as it seems, may be weak insofar as it is possible to argue at a purely a priori level that the implicit assumption that the cash lease tenant must finance the investments while the landlord may evict him from the lands on which he has carried out improvements may be partially or entirely invalidated by either (1) institutional arrangements for compensation to the tenant for these improvements, or (2) financing of these improvements by the landlord himself, with the return to the tenant's inputs being determined by the marginal productivity thereof. This could happen as the net payoff ensuing from such arrangements ought to induce their acceptance; and the probability of such acceptance may be

against future encroachments by tenants. Thus the resumer has no intention of making any investment on the land immediately or growing crops on it with the same efficiency with which he has been cultivating his other tracts. The result is to push up owner-cultivated acreage without simultaneously pushing up the production of this class." However, Dandekar has shown that this argument is not supported by Khusro's data, which register no significant change in the acreage cultivated by the owner-cultivators.

⁹⁹ This may also account partly for the fact that while the investment per acre *does* show a perceptible increase on the tenant-cultivated farms, their productivity per acre remained stagnant over the short period of the operation of the land reform.

high as there would be only two, readily identifiable negotiating parties involved. Whether in fact such arrangements tend to exist in practice and, if so, whether they are extensive is of course an empirical matter on which systematic evidence does not appear to have been collected over a long period and covering much of the country.

A similar theoretical objection applies to the traditional view that share cropping is an inefficient tenurial system, even when the tenancy is fully secure. We have already noted Hanumantha Rao's [67] ingenious defense of the "rationality" of share cropping when the technological possibilities of factor and product substitution are insignificant; and we have already seen how a recasting of such an explanation can reconcile the share cropping system with optimality of factor use. However, even if we were to revert to the traditional frame of analysis, we should not rule out the possibility of suitable arrangements being worked out by the negotiating parties if there is a net pay off to an otherwise blocked act of investment.

At an empirical level, in any case, no systematic attempts appear to have been undertaken so far in India to test for the alleged inefficiency of share cropping. The work of Minhas and Srinivasan [115] which we have already noted, instead tries to *predict* whether, on the assumption of profit maximization and specified technological relationships and prices of output and inputs, the share croppers (with observed shares) will have incentive to absorb fertilizers.¹⁰⁰ In undertaking this analysis, they are careful to note that the uncertainty of the outcome from fertilizer inputs, owing to exogenous reasons (such as weather failure or shortfalls in related inputs such as public sector irrigation) or

¹⁰⁰ This inquiry was prompted by the shift in India's agricultural strategy, with the end of the Third Plan, towards fertilizer-intensive agricultural growth.

inaccurate application of the implied new technique, would have to be allowed for in predicting the fertilizer absorption levels at the assumed prices. This is important particularly since the application of fertilizers may lead to higher average output but greater variance of output. They also assume perfectly elastic supply of credit at a common interest rate for everybody: hence, credit is not related to farm size and status, as is probably the case in practice. Further, in making their prediction, they assume (with other analysts of this problem) that the *tenant* will be making the investments, so that the higher the crop share accruing to him the greater the fertilizer absorption. However this assumption, often made by the proponents of land reform who recommend higher crop shares for the tenant, may be empirically invalid. If the investment decisions are made, and financed, by the landlords—and politically *they* may have control over the governmental lending institutions in the rural areas, for example—then higher shares for the landlord, *ceteris paribus*, would lead to greater, rather than lower, fertilizer absorption. This issue is an empirical one and does not appear to have been treated systematically in the literature.¹⁰¹

The literature on behavioral relationships in Indian agriculture that we have surveyed so far has had direct relevance to the lively policy debate on the appropriateness of the governmental policies relating to pricing, procurement, imports and distribution of food in India. This debate has raised questions, and led to analysis, of considerable interest. It is to these questions that we now turn.

¹⁰¹ Some of the land reform studies, however, have distinguished between investments made by the tenants and by the landlords. See, for example, the examination of the working of the Bombay Tenancy Act, 1948, by Dandekar and Khudanpur, surveyed in Dandekar [28].

Price Policy and Production

With respect to the effects of agricultural price policy on production, two different questions can be distinguished in the Indian debate. On the one hand, the question of agricultural prices, as such, has been discussed, largely in relation to their *stability* and impact thereof on investment. On the other hand, the question of the *relative* terms of trade between agriculture and other sectors and own-inputs has also received attention. We consider each question in turn.

(A) The desirability of having “guaranteed, minimum prices,” announced prior to the sowing season, has been widely emphasised in the Indian literature.¹⁰² Legislative and executive action in this area has, however, only recently begun: with the announcement since 1966 of minimum support prices for several major agricultural commodities such as paddy, *jawar*, wheat and maize, and the setting up in January 1965 of an Agricultural Prices Commission to assist in formulating these prices and the Food Corporation of India in making the necessary purchases to make these prices effective where necessary.¹⁰³

The underlying theoretical basis for the guaranteed minimum price approach seems to have had numerous elements. (1) Dantwala [34], among others, has referred to the “insurance” aspect of such a policy and its resulting elimination, via the provision of a floor price, of that aspect of uncertainty which might deter investment. Whether, however, open market operations in the agricultural market, designed

¹⁰² Cf. Dantwala [34], the Report of the Agricultural Prices Commission on Price Policy for Kharif Cereals for 1965-66 Season [176] and the Report of the 1966, [Venkatappiah] Foodgrains Policy Committee [177].

¹⁰³ As happens with many such bodies, the Food Corporation of India has managed to multiply its activities well beyond this area and has even involved itself in fertilizer distribution. Cf. the Foodgrains Policy Committee Report [177].

to mop up supplies when the price tends to sag below the floor price, is a preferable alternative to an insurance scheme which, among other differences, does not involve direct State trade in agriculture has not been debated in the Indian literature. (2) The notion that the minimum guaranteed price, on the other hand, is part of a *stabilization* policy aimed at evening out fluctuations has also been explicitly developed by other economists, including Dandekar [32]. However, the distinction between price and income stabilization for agriculture or foodgrains has been made all too rarely.¹⁰⁴ Nor has the problem raised for buffer stock operations (on which the proposed stabilization measures must rely) by the *trend* rise in agricultural prices been discussed.¹⁰⁵ In turn, the critical question as to whether private speculation itself tends to be stabilizing or destabilizing in the field of agriculture in general, and specific foodgrains in particular, has not received the attention it deserves. The view that private trade is destabilizing (in some sense) and inefficient (in eliminating spatial price differentials, among other things) seems to have been widely accepted as obvious. In this connection, at least two empirical investigations are of

¹⁰⁴ Dandekar [32, 27] notes the difference but opts for a rather strange solution which aims at *both* price and income stabilization for foodgrains, without considering any alternatives: "... in the interest of the producers, any measures of stabilization of prices such as through operating support and ceiling prices, should be accompanied by measures of income stabilization through appropriate credit and insurance policies."

¹⁰⁵ In deciding on the optimal level of the buffer stock, it would be necessary also to consider the possibility of holding free foreign exchange reserves, with pipelines set up for activating imports when necessary, since instability is likely to arise in respect of commodities other than foodgrains as well. A decision to hold buffer stocks for *each* item (including agricultural produce and foodgrains) where instability will arise may be suboptimal and the holding of foreign exchange reserves instead, or some combination of the two measures, may be superior. This question has been neither posed nor explored in the Indian literature.

interest. Venkataramanan [174], who has examined the data on spot and futures price quotations at the East India Cotton Exchange, which of course represents a fairly developed market, and stocks of cotton in Bombay, has found that the Keynes-Hicks theory of "normal backwardation" is consistent with the observed facts. Moreover Uma Lele [90], who has studied the sorghum trade in Maharashtra State, for five primary markets in Sholapur district and two terminal markets, has found that much of the regional price differentials (where not illusory and accountable by differences in grain quality) can be accounted for by factors such as transportation bottlenecks, freight costs and governmental restrictions and bans on movements. (3) Finally, nearly all economists writing in this area [32] [34] have expressed the view that, in addition to the "insurance" element, the guaranteed minimum prices should include a margin intended to "help in assuring the progressive farmer that additional effort and expenditure for the purpose of increasing output will bring him an adequate return." [177, 54]. This view amounts to arguing, *ceteris paribus* for improved terms of trade between agriculture and other sectors,¹⁰⁶ which would permit the (relative) influx of resources into agriculture. What would be the optimal policy for bringing about a shift in the agricultural terms of trade and what would be their optimal level are issues which this line of policy analysis opens up. These are also the issues which belong to the second class of questions, relating to *relative* agricultural prices, to which we now turn.

(B) Much of the Indian literature and debate has inevitably dealt with this class of problems, although the discussion has

¹⁰⁶ This should include improvement in the relative price of agricultural output vis-a-vis agricultural inputs.

been confined to the question of whether Indian agriculture has been subjected, over the first three Plans, to a *trend* situation of price disincentives. Much of this debate has centered on the behavior of the agricultural terms of trade in general, although the foodgrains terms of trade have been distinguished. Furthermore the question of input prices and the net burden of taxation on the agricultural sector vis-à-vis other sectors has also been raised.

Dantwala [34], in an important contribution which surveys the entire range of governmental policies over the period of the three Plans, has critically examined the prevailing view that agricultural prices have had a strong disincentive element. He finds this view inconsistent with the facts insofar as the recorded time series of the agricultural terms of trade fail to register a deterioration over the period.¹⁰⁷ In fact, relative stability over the period, with the exception of a sharp dip in 1955–56 (which led to a rather slow stepping up of public sector investments), seems to have characterized the terms of trade between agricultural and nonagricultural commodities. On the other hand, if we examine the terms of trade between *foodgrains* and nonagricultural commodities, or between foodgrains and the overall index of wholesale prices, there is certainly evidence of a more distinct deterioration during the first Plan period which is eliminated towards the end of the period.

While these facts are interesting in themselves, they beg the more relevant question as to *which* level of the terms of trade, whether between agriculture and the rest of the economy or between food-

grains and other commodities, should be considered *optimal* and whether, in relation thereto, the recorded terms of trade for agriculture or foodgrains were “unfavorable.” Dantwala raises this issue tangentially when he argues that, in relation to 1939 prices, the cereals index was already 444 (with 1939=100) and the general price index only 380.6 in 1952–53, the baseyear of the new price indices. Hence, *in relation to the 1939 terms of trade*, the evidence over 1951–1966 indicates “favourable terms of trade for agriculture.”¹⁰⁸ Similarly, Dandekar’s [32] contention that the terms of trade for cereals show distinct improvement during the Third Plan largely in the drought years at the end is also implicitly raising the same unanswered question as to the optimal level of the terms of trade.

It is interesting however that the participants in this debate have not come to direct grips with the fundamental question of determining the *optimal* level of agricultural prices vis-à-vis other prices. Thus, for example, there has been no attempt at determining how these internal terms of trade compare with the international rates of exchange between agricultural and other commodities and whether exchange rate and trade policies conferred an excessive, in the sense of suboptimal, incentive for resources to flow into the nonagricultural sector.

At the empirical level, however, greater sophistication has been introduced into the discussion by examination of the relationship between agricultural output and input prices and the net burden of taxation on agriculture relative to other sectors. Dantwala [34], after making the valid point that little empirical evidence is

¹⁰⁷ Dantwala [34] makes the important observation that: “. . . For some commodities like cotton, there has been a statutory ceiling on prices, and though in reality the ceiling has never been operative, the office of the Economic Adviser which prepares the index series records only the ceiling prices. Thus, for commodities like these, the index number under-estimates the rise in prices.”

¹⁰⁸ Dantwala [34] then notes that “This would perhaps, explain why in January 1957, when the [new] cereal price index stood at 95, the Government of India thought it fit to set up a high powered committee “to examine the causes of the rise in prices and to suggest remedial measures.”

available and, where available, it does not indicate a high elasticity of response of agriculture *as a sector* to its terms of trade with respect to other sectors, proceeds to examine the available information for input/output prices for Assam, Panjab, Kerala, Orissa and West Bengal and finds conflicting evidence in relation to 1939, while noting the unusually unreliable character of these series. The information on the relative tax burdens, however, is sound and Dantwala quotes Ved Gandhi's [56] thorough work to show that sectorwise agriculture has received exceptionally favorable treatment. This is particularly because of the direct agricultural taxes amounting on the average to no more than 2 per cent of the value of agricultural production during the planning period.¹⁰⁹

Price Policy, Distribution and Imports

Regardless, however, of the issue as to whether Indian agricultural production was discouraged by governmental failure to provide the optimal terms of trade, the question persists as to whether the entire set of governmental policies, designed to deal with a continuing situation where at constant prices *foodgrains* production was short of the demand fed by income and population growth, were optimal. This question, in turn, has provoked a considerable amount of controversy.

The governmental policy package has essentially involved reliance on largescale P.L. 480 imports to supplement overall supplies of wheat and distribution thereof through a public sector system of fair price

¹⁰⁹ Quite aside from the fact that politically it is difficult to tax the agricultural sector, when the bulk of the votes are in that sector, there may be another problem here. From an income distributional point of view, the agricultural sector possibly has a relatively larger proportion of its income originating on the small farms belonging to an income level which cannot be taxed on equity criteria. On the other hand, this implies that taxation (which is necessarily not lump-sum), and hence incentives on that account, will be biased against the non agricultural sector, *ceteris paribus*.

shops. Further for wheat, and more so for rice where there has been no equivalent P.L. 480 program, internal procurement of foodgrains from the producers has been attempted. Furthermore, since 1964, the country has been divided into several food zones which rule out interzonal free private trade; and the perpetuation of this system has been largely defended by reference to the government's procurement and distributional policies.

The policies just described have been severely criticized by Indian economists. However, while there is general agreement that the governmental procurement of internal foodgrains for public sector distribution to the low income groups was totally inadequate and the reliance instead on P.L. 480 imports for this purpose was excessive, the critics have been divided on almost everything else. Thus, for example, Raj [137] has argued that the zonal system has accentuated the reliance on imports whereas Dantwala [34] and the Foodgrains Policy Committee (which included D.R. Gadgil) [177] have contended that the zonal system facilitates greater procurement, implying that, *ceteris paribus*, it reduces reliance on imports. The zones have also attracted considerable controversy in relation to other issues such as their impact on economic efficiency and political integration: Raj Krishna [84] [176] and Raj have been among the principal critics.

(1) The view that the reliance on food imports was excessive and that India could and should have managed without P.L. 480 imports has been variously argued. Raj [137] has argued that imports could have been moderated, even eliminated, as there was enough foodgrain to go around "if distributed equitably."¹¹⁰ While this is

¹¹⁰ Raj refers to nutritional standards to arrive at an average per capita consumption figure of 13½ ounces as minimum cereal intake and finds that "except in two years (1951-52 and 1952-53), it would have been possible to ensure this from domestic production alone."

a correct statement of fact, it does not rule out the existence of excess demand at a given price for foodgrains, and hence the important question as to whether imports *should* not after all have been permitted (or sought, under the aid program) to moderate a rise in the price. In assessing this question, it is necessary to remember at least two pertinent points: (1) if excess demand for cereals were to be diverted, thanks to rationed distribution for instance, this demand could spill over into other consumption (instead of turning into involuntary savings) and, in turn, cut into exports, for example, and thereby affect the foreign exchange position much as imports of foodgrains would; and (ii) if acceptance of P.L. 480 imports led, in the ultimate analysis, to a *greater* total inflow of foreign assistance, this in turn would be a positive factor in favor of such a policy, *ceteris paribus*. In short, whether self-sufficiency in foodgrains is an acceptable objective of short-term or long-term agricultural policy is itself an issue which must be assessed in the light of a general equilibrium analysis of the entire economic position, including aid flow sensitivity to alternative policies, instead of being regarded as axiomatic.¹¹¹

Raj Krishna's [84] indictment of the governmental failure to step up internal procurement, while imports under the

¹¹¹ Dantwala [34] makes a similar point when he notes, with respect to the possible adverse effect of P. L. 480 wheat imports on wheat production, that: "The major component of P.L. 480 imports was wheat and it is reasonable to assume that these imports affected the prices of wheat or at best also of other substitutable cereals from the consumer point of view, but could not have had much impact on the prices of commercial crops. The expected consequence of this relative shift in prices in favour of commercial crops would be a shift in agricultural inputs for their production. Assuming that this is exactly what happened, would such a development be necessarily injurious to Indian agriculture or the Indian economy as a whole? It is, of course, true that higher foodgrains production is very vital to India's economy, but a stimulated growth of non-foodgrain crops is of no less importance for the overall national economy"

P.L. 480 program continued, raises similar questions. It is indeed true that the facts on imports and local procurement of grains show a greater amount of procurement in the first Plan than in each of the subsequent Plans (when P.L. 480 imports became available), despite the easier food situation during most of the first Plan. And it is also correct to maintain that such a policy violated the public pronouncements with respect to the achievement of self reliance in foodgrain availability. On the other hand, it does not follow that the policies actually followed were suboptimal if one assesses them in terms of economic efficiency rather than in relation to self-sufficiency as an objective.

(2) We have already noted that the question of the effect of zonal arrangements on the food deficit and import levels has been raised, in this connection, by Raj. In fact, this issue leads us directly into the entire range of questions relating to the economic efficiency of zonal arrangements and their role in a national foodgrains policy.

The zonal arrangements in India sprang up largely thanks to the action of the so-called "surplus" States such as Andhra Pradesh, Panjab and Madras whose primary motivation appears to have been to maintain artificially low prices (in a situation of rising prices) within their boundaries by curtailing the normal outflow of grain through private, interState trade. This phenomenon raises the natural, but unexplored question as to whether the rural interests in the "surplus" states, which are thus being denied the advantages of more favorable terms of trade, are really less influential politically than the urban consumer groups to whose interest the zonal policies appear to cater. Two possible explanations, however, may be worth exploring. (i) On the one hand, it is possible for the more influential, larger landlords to make greater profits under

zonal arrangements by getting access to scarce, State-distributed licenses to export their output of foodgrains to deficit States which have higher prices under these zonal arrangements than otherwise. Such a practice also redounds to the benefit of the politicians who thus develop another area of patronage and possibly even direct profit to themselves. There is some evidence that this explanation might have relevance in Andhra Pradesh. (ii) An alternative explanation may be that the political situation is based in the States on a balance of urban and rural interests. Thus, while food prices are kept low by zonal restriction on the outflow of grains, the not-so-poor farm groups are "compensated" by the provision of negligible tax rates on agricultural income.¹¹² The danger in this kind of politico-economic pattern is that ultimately the whole operation would imply that the marginal tax effort, for investment and other purposes, would have to come to rely on the extremely narrow base provided by non-agricultural, urban classes outside of the group sheltered by the Fair Price Shops.

While, however, the zonal system has originated in the actions of the "surplus" States, it has found some distinguished supporters among the economists despite the severe criticism direct at it by several economists. The defence of the system is best summarized in the Foodgrains Policy Committee Report [177]. Arguing that the interState movement in foodgrains should be undertaken only through State operations, and that zonal restrictions on private movement should continue, the Committee have claimed the following advantages for such an arrangement:

First, this is necessary for ensuring equitable distribution to different States;

¹¹² Similarly, the deficit States "compensate" their urban groups by distribution of Central supplies of imported foodgrains through Fair Price Shops at subsidized prices.

trade, if untrammelled, would tend to move the surpluses of one State to points of highest purchasing power in another and not to those of greatest need. Second, it would enable Government to keep prices at levels, which are reasonable for both consumer and producer; private trade, by catering for the well-to-do consumer, would be in a position to push up prices, if allowed to compete with Government. Third, if the trade is allowed to purchase within the State and sell outside it on its own account, it would not be possible to ensure maximum procurement by Government and Government agencies.

These arguments, however, are untenable. While it is true that the market system will not in itself correct an undesirable income or consumption distribution, it is a nonsequitur to deduce that the optimal way of achieving a desired distribution is to eliminate the market system and substitute governmental trade instead. The second argument is also a distributional one insofar as we can make any sense of it, and subject to the same criticism.

The final argument, which constitutes really the central defense of the zonal arrangements, is incomplete, even if factually correct,¹¹³ and must be dismissed if the zonal arrangements are looked upon from the viewpoint of economic efficiency. In order to appreciate this, it is necessary to examine the main features of the policy package advocated by the Foodgrains Policy Committee.

They have recommended that procure-

¹¹³ The argument of the Committee that, thanks to the zonal arrangements, the governmental procurement of rice during the 1965-66 season has been higher than during the 1964-65 season, "in spite of a reduction of 17 million tonnes in foodgrain production caused by drought," surely cannot be accepted at its face value. Indeed, the very fact that there was a drought and hence a great demand for fair priced cereals during 1965-66 might have prompted more procurement of rice (as distinct from wheat, where we may note that P.L. 480 imports were undertaken instead); whether the procurement would (as also *should*) have been more or less if the zonal arrangements had not existed remains an open issue.

ment of foodgrains must be undertaken, apart from buffer stock purchases, for distribution at fair prices to certain classes of low income consumers in both rural and urban areas. Furthermore, they have argued that the procurement must be undertaken at prices *below* the market prices in order to prevent the government having to find the resources for financing the subsidy that would otherwise be entailed. Thus the Committee's recommendations effectively involve subsidizing the foodgrains consumption of certain low income groups and financing this subsidy by taxation of the farmers producing these cereals, this taxation being implicit in the fact that procurement would be at less-than-market prices. In this context, the restrictions on private interzonal trade are looked upon primarily as a means of making this procurement "easier," presumably because the apparent element of taxation would be smaller, *given* the fair-price at which procured foodgrains are to be sold, if the open market price in the "surplus" States (where procurement will presumably be carried out) is kept lower by ruling out interzonal private trade.

This view of the policy package, which seems to rationalize the zonal restrictions, is however open to serious objections. There are two particular aspects of this policy which are controversial: (i) the method of subsidising the low income groups; and (ii) the method of financing the subsidy.

Concerning the former question, it is not clear that an outright financial subsidy to the specified low income groups, index-linked to the cereals price index, may not be a less expensive system than a distributive system based on Fair Price Shops, governmental trade and distribution.¹¹⁴ In assessing this question, we would have to con-

¹¹⁴ Identification of recipients eligible for the "dole" would be as difficult or easy as their identification for a ration card.

sider (i) the relative efficiency of a public distribution system, from the viewpoint of waste in storage for example;¹¹⁵ (ii) the administrative costs and feasibility of either system; and (iii) the possible, though not necessarily considerable, advantage of having a State distributional system which can be readily exploited to handle sudden emergencies such as the Bihar Famine of 1967, when an enormous operation to shift foodgrains to this area had to be mounted.

The question of the optimal method of financing the subsidy to the low income groups raises still more complex issues which have not received the attention they deserve. Before we discuss these alternatives, however, we may note the objections to the Foodgrains Policy Committee's assumption that, if one is to levy an implicit tax on the farmers to pay for the subsidy, zonal restrictions make this task "easier." Raj Krishna has argued, in a brilliant note of dissent to the Agricultural Prices Commission's 1965-66 Kharif Cereals Report's similar ideas, that this view focusses merely on the fact that procurement in the surplus States (by the Centre) would be cheaper but ignores the fact that *more* would have to be procured since, with interzonal private trade removed, "the responsibility of meeting the *entire* deficit of deficit States falls on the Central Government." [176, 38]. Raj Krishna has in mind the possibility that politically the deficit States would have to be "compensated" for the eliminated, private inflow of foodgrains. But even if we rule out such a direct "compensation," the problem remains. For as open market prices in the deficit States rise to levels higher than what they would have been if zonal restrictions were eliminated, demand for

¹¹⁵ Sundaram's [168] careful analysis of the suboptimality of the existing P.L. 480 landings at different Indian ports, given the ultimate destination points, is also of relevance in assessing this issue.

foodgrains would be diverted to the Fair Price Shops, thus raising the offtake from these shops and hence also the need for procurement. This would happen insofar as those entitled to access to these shops are not already utilizing it fully in the non-zonal-restrictions situation: as is indeed likely to be the case.¹¹⁶ Furthermore, even if this were not the case, the rise in the open market price level could certainly lead to politically effective demands to let more income groups have access to the Fair Price Shop system facilities. However, against this, we must balance the fact that, in the surplus States, demand would be diverted *away* from the Fair Price Shop system; hence the *overall* need for procurement, to service the Fair Price Shop system, may reduce rather than increase—a possibility which is ignored by assuming unrealistically that the Fair Price Shops system applies only to the deficit States. The question as to whether procurement will be “easier” under the zonal restrictions system is thus a complex one and cannot be answered unless the analysis takes into account the strength of the low income groups and demand diversion to, and away from, Fair Price Shops as a result of the zonal restrictions in *both* surplus and deficit States: a priori, it is impossible to rule out the possibility that the quantities to be procured will increase under the zonal system.

But, even leaving this question aside, the zonal arrangements conceived as an instrument for securing procurement involving a hidden tax element represent a method of levying taxation that is ethically inequitable, economically inefficient and politically injurious to national integration. Raj Krishna [176] has correctly pointed out that there are “surplus” farmers and not “surplus” States. A policy

¹¹⁶ There seems to be evidence that only the extremely low income groups generally utilize the Fair Price Shops even though more groups have the right to do so.

which aims at concentrating tax-element-inclusive procurement in surplus States, while ignoring the fact that prosperous or surplus farmers exist even in deficit States, is an inequitable one. Moreover, the tax-element-inclusive procurement of foodgrains which are demanded by the low income groups is economically inefficient insofar as it discriminatorily taxes farmers who happen to be producers of these specific commodities and thereby pulls away resources, *ceteris paribus*, from the production of these commodities. Even if tax-element-inclusive procurement is considered to be the only *feasible* method of taxation,¹¹⁷ to finance the subsidies for the low-income groups, there is no reason why it should be confined to the commodities which happen to be demanded by the low income groups.¹¹⁸

Finally, the zonal system, on which such a procurement system is grafted, must inevitably lead to political disintegration. The cynical reluctance of the surplus States to let their grain be procured for transfer to Bihar during the 1967 famine is only an extreme example of the inward looking approach of these States to a national food policy. A condoning of the

¹¹⁷ This is often asserted in the Indian policy debates. However, it is by no means clear that where procurement has succeeded, the price paid has always included a tax element or, when such tax element is present, an alternative form of agricultural taxation would not have been feasible (and possibly preferable on efficiency grounds). This is an important, neglected area of empirical research. We may also mention in this context, while we are essentially discussing alternative forms of agricultural taxation, that Dharm Narain [119], Sen [154] and Bhagwati [4] have discussed the Preobrazhensky-type problem of how the terms of trade between agriculture and industry could be adjusted in order to extract a “real” surplus from agriculture to “finance” capital formation in industry.

¹¹⁸ We may also note the further point, made by Khusro [75], that, even if the zones were not accompanied by tax-element-inclusive procurement, they would have adverse allocational effects by discouraging the production of foodgrains in the surplus States (which presumably have comparative advantage in such production) and encouraging it in the deficit States.

zonal system would only accentuate these fissiparous tendencies. In fact, as Raj Krishna had predicted, the zoning system has spread to *within* States, with districts turning into *de facto* zones in States such as Madras and Kerala. The argument of the Food Policy Committee [177] in this connection is interesting:

Another criticism of the restrictions on inter-State movement of foodgrains is that they undermine the unity of the Nation. We do not consider this to be a valid criticism. The system does not envisage a ban on the movement of the surplus from the surplus States to the deficit States. What the system implies is that the inter-State transfers will be effected on a regulated basis by a public agency which is amenable to social control and discipline. In a situation of overall shortage, if inter-State movement of foodgrains is allowed to be undertaken in an unregulated and uncontrolled manner, it would indeed create scarcity conditions in the relatively poorer regions of the country. Such a development can have a far more damanging influence on the unity of the Nation.

This argument, however, has little practical relevance. In practice, for the very reasons that the surplus States have pushed for zonal restrictions, they have frustrated the Central Government's attempts, via the Food Corporation of India, to procure foodgrains for shipment to deficit States and have generally forced the Central Government to resort instead to P.L. 480 imports for such supplies (thus lending substance to Raj's argument that the zones have led to increased imports of foodgrains). To argue therefore for a zonal policy, knowing fully well that the chief supposed advantage from it contradicts the very purpose for which it is politically designed and adopted, is somewhat naive and has inevitably, even if unwittingly, strengthened the interests op-

posed to a truly national food policy.¹¹⁹

In fact, it is significant that the move to abolish, or at least enlarge, food zones to include *both* deficit and surplus States in single zones, has come from many surplus States themselves during the bumper crop of 1967-68. With prices sagging in these States, there has been a reversal of their attitudes: the producer pressure groups appear to have become more important and have sought freer access to the deficit State markets. At the same time, procurement has been permitted only at exceptionally favorable prices, leading to an exasperated critique of politicians by the leading zone supporting economist, Dantwala [36]. Clearly, the political assumptions that the zonal system would permit procurement at *tax-element-inclusive* prices, in the interest of a *national* food policy, have been shown up to be, at best, tenuous. However, instead of taking this opportunity to eliminate the zonal restrictions altogether, the Central Government is now in the role of zone supporter, opposing several surplus States' desire to let the zones widen or perish.

Existence of Surplus Labor or Disguised Unemployment

Prior to concluding our survey of the Indian literature on agricultural policy, we must examine the important issue as to whether there is surplus labor (or disguised unemployment) in the Indian economy. The assumption that this is indeed the case has formed the basis, as we have already seen, for much analytical thinking in India.

¹¹⁹ In this connection, however, we may note (1) that the Central Government's ability to force the surplus States to fall into line and eliminate zonal restrictions might have been seriously inhibited by the fluid political situation within the Congress Party and the critical role played in Prime Ministerial successions, by the Chief Ministers of these States; and (2) the fact that, even if these zonal restrictions were abolished, we could not have ruled out altogether the imposition of numerous clandestine restrictions, on export of foodgrains, by the recalcitrant, surplus States.

Although the existence of surplus labor is regarded as almost self-evident by many Indian economists, and was discussed in early writings of economists such as Bhabatosh Datta, the unorthodox view of Schultz [151] who has used Indian data to argue that the phenomenon does not exist, has prompted renewed interest in the subject. In reviewing this literature, we must begin by differentiating among the numerous alternative definitions of, and hence presumed evidence in support of, the presence of surplus labor which are to be found in the literature in this area.

There are many alternative definitions, sometimes explicit but often implicit, of "disguised unemployment" in the literature, which do not necessarily coincide in scope even within the context defined by the Indian economic and institutional structure. (1) We have the definition due to Arthur Lewis which defines disguised unemployment as a situation under which it is possible to get a supply of labor from agriculture to the industrial sector at a constant real wage. (2) We also have the definition of disguised unemployment as a situation under which the social marginal productivity of labor in a sector such as agriculture is less than the wage rate at which labor can be hired: the wage rate is inflexible downwards because of the biological subsistence requirements. (3) Disguised unemployment has also been defined as a situation where the private marginal productivity of labor is zero in agriculture, so that the withdrawal of labor from agriculture would result in a fall in agricultural output. Even here, it is necessary to make a distinction between a *ceteris paribus* withdrawal and a *mutatis mutandis* withdrawal, as these two alternative varieties of withdrawal would lead to different effects on agricultural output in general. (4) Finally, disguised unemployment may be defined simply as a situation where, given the social objective of maxi-

mizing the value of current income, the combination of techniques and resources is such that the shadow wage, and hence the social marginal productivity (SMP), of labor is zero. Our analysis will be concerned with this specific definition: we will review the Indian literature on surplus on the assumption that the objective of the analysts is to discuss and test the proposition that, in the Indian context, the SMP of labor is zero.

Note first that zero social marginal product (SMP) will not necessarily involve zero private marginal product (PMP). If we assume a single sector (e.g. agriculture), a peasant family system of farming and a system of allocation of labor time which involves maximization of family-group income (even if the division of product may be on different principles), zero social marginal product will naturally lead to zero private marginal product. On the other hand, if we were to assume a capitalist system of farming, where landless labor is hired for a wage which institutionally exceeds the zero shadow wage, we would observe a positive marginal product (which would equal the market wage).

Similarly, zero SMP will not necessarily imply that, if the labour force were reduced in a sector, that sector's output would fall. Thus in a model where the real wage of agricultural labor is institutionally fixed in terms of a constant utility level derived from consuming both agricultural and manufactured goods, factors are immobile between sectors, there is capitalist farming in agriculture, and the SMP of agricultural labor is zero (with income distribution keeping the unemployed alive), a reduction (say, by influenza) in the agricultural labor force would have no primary impact on agricultural output. On the other hand, it would imply that the expenditure otherwise made by the deceased labor force would now be made by others. If, as a result of this implied income redis-

tribution, the demand for, and hence the relative price of, manufactures falls, we would then have a reduction in the binding nature of the institutional wage constraint and hence greater output of agriculture in the new equilibrium. Conversely, it is possible to show that, even when there is positive SMP in agriculture, the effect of reduction in the labor force may well be to maintain agricultural output constant.

Furthermore, zero SMP does not imply that the supply of labor from the sector where this is so will necessarily be perfectly elastic at some real wage. Thus, for example, if zero SMP (and zero PMP) obtains in a peasant family agriculture, with individual rather than group income maximization such that each individual will equate his average product on the farm with his marginal product in manufactures (à la Arthur Lewis), then successive supplies of labour to manufactures will raise the average product on the farm, consistent with zero PMP and SMP in agriculture continuing, and thus the marginal cost of labor supply from agriculture will continually rise (instead of being constant).

Finally, we may note that the common assumption that surplus labor must be in the agricultural sector, leading to predictions such as the elastic supply of labor to the nonagricultural sector and the constancy of agricultural output as labor moves out of agriculture, is itself restrictive. In essence, we can think of labor carrying a zero shadow wage for the economy *in toto*. If we look at the empirical situations, it is not unrealistic to postulate an economy with a common, institutionally determined wage (which exceeds the zero shadow wage) at which employment is undertaken in capitalist agriculture and capitalist manufactures. In practice, it is also possible to find in fact the coexistence of "family" and "capitalist" modes of production in *both* agri-

cultural and urban areas: so that, in this instance as well, zero SMP may obtain with respect to *all* sectors.

The institutional features of an economy thus have a critical relevance to the manner in which zero SMP "accommodates" itself in the system. Hence, the "tests" and "measures" of surplus labor, which have been devised in the Indian and other contexts, have to be treated with great care.

(1) Thus, for example, it has been argued that there cannot be surplus labor in India because labor is hired at a positive wage in all farms, whether small or large. This argument presumes implicitly that the surplus labor is to be found on the peasant family farms and ignores the possibility that capitalist hiring of landless labor at an institutionally determined wage on all farms is compatible with zero SMP.

(2) Schultz's [151] famous test, on the other hand, has proceeded along a different route. He takes the influenza epidemic in India during 1818-19, arguing that the sudden and significant reduction in the labor force that it entailed provides a laboratory type experiment to discover surplus labor in India. On finding that agricultural acreage (and output) declined in consequence, in the year 1919-20, Schultz concludes that labor was not in surplus in agriculture.

Schultz, however, has another supplementary argument at this stage. He hypothesizes an agricultural production function of the following type:

$$(34) \quad Q = A \cdot (L)^\alpha$$

where

Q = output
 L = labor force
 A = technological constant
 α = "labor coefficient"

Arguing that certain unpublished sample studies indicate the value of the "labor

coefficient" to be 0.4, Schultz further fits a regression equation on the data for the reduction in acreage (taken as proxy for output) and in labor force during 1919–20 in ten different States to find that the indicated labor coefficient is 0.349, and the hypothesis of 0.4 lies well within the confidence interval based on twice the estimated standard error of this estimate. Schultz further seems to derive greater confidence in this coincidence (between the values of the labor coefficients in his regression and in the unpublished sample studies) because a study of the share of agricultural income going to labor in Panjab during 1947–48 yields the figure 0.34 which happens to be consistent with the competitive implications of the hypothesized production function for agriculture. How does this argument strengthen the first argument which depends exclusively on showing that agricultural acreage (output) declines with the decline in the labor force? Clearly, if Schultz can produce evidence that the data for the ten States are consistent with the hypothesized production function with coefficient $\alpha > 0$, then he can argue that surplus labor *cannot* exist at all since labor would *always* have a positive (social) marginal product in agriculture. Thus, the second argument is aimed at a stronger hypothesis (namely, that surplus labor cannot exist at all in India, with the given technology) than the first argument (which would only show that, for the range of variation in the labor force which the influenza epidemic entailed, there was a decline in output and hence there was presumably no surplus labor).

At the empirical level, Schultz's argument is tenuous on at least two grounds. (i) The coincidence of results at different points of time (such as 1919–20 and 1947–48) and for different parts of India (which are not exactly integrated in terms of their land or labor markets) does not necessarily reveal a regularity. (ii) Furthermore, Sen's

[159] recalculation of the Schultz regression, adjusting for three omitted States and for errors in estimation of the labor force, yields a labor coefficient which does *not* coincide with the coefficient in the unpublished sample studies and the estimate of labor share in agricultural income. On the other hand, if Schultz is willing to concede the irrelevance, to his 1919–20 test, of the evidence produced for sample villages and different periods, it would be possible for him to contend that his evidence is consistent, as it stands, with the hypothesis of an agricultural production function of the type: $Q = A \cdot (L)^\alpha$ ($\alpha > 0$), so that the Indian experience during the influenza epidemic (even when corrected for statistical errors and omissions) is consistent with there being no surplus labour (for any labor-level altogether). In this connection, it is relevant to note Harwitz's result, cited in Schultz [152], that if these Indian data are examined for the null hypothesis of zero marginal product of labor, the null hypothesis is rejected because "the observed data have one or two chances in a hundred of having come from an uncorrelated population, under the rather conservative test of the null hypothesis"; and Schultz's conclusion is valid (only) up to a 5% level of significance on this test.

Furthermore, there are serious objections to Schultz's use of the influenza epidemic as an *experiment crucis*. (1) The influenza epidemic naturally raises doubts (considered to be unimportant by Schultz [152] in light of "medical judgments" obtained, but contested by Reports written at the time) about the debilitating effects on those who survived. This doubt is particularly enforced when we recognize that the epidemic continued, in some degree, into 1919–20 itself. (2) It is also a matter of judgment, left unsettled by Schultz, whether the lapse of just a year, with some continuation of epidemic conditions, was adequate to obtain an adequate test of

whether the “disorderly conditions” still continued and therefore a later year might not have provided a better guide to the required comparison.

Quite aside from these two rather obvious objections (both anticipated by Schultz), which render the conclusions drawn from the experiment fairly tenuous, there are two major critiques which can be advanced against Schultz’s conclusions. (3) Shakuntala Mehra [112] has made the significant statistical finding that, if we break down the post-epidemic agricultural year into the two major Indian harvesting seasons, *rabi* and *kharif*, then there is ample evidence that the immediate harvest (*kharif*) after the epidemic registered no significant decline in the output (acreage) level, whereas the decline was concentrated in the later, *rabi* harvest (which, in any case, fluctuates widely owing to seasonal factors). It would appear therefore that Schultz’s inference that Indian agricultural output declined with the influenza epidemic is, at best, dubious. In any event, Schultz’s failure to take the two seasons into account, and the absence of systematic quantitative analysis of the two harvests, make it impossible to attach any significance to Schultz’s conclusion that the Indian agricultural output declined with the epidemic. (4) There is also an analytical difficulty with the argument that decline in the agricultural output with the decline in the labor force implies that surplus labor is zero: the argument is just a nonsequitur, as a general proposition (as we have already seen). Thus consider the case where there is peasant family farming, co-existing with capitalist farming. Let the total labor supply be such that the shadow wage of labor is zero: so that we have “surplus” labor in its fundamental sense. Let further the peasant family work under the rule that the average product of an individual member is equated with the marginal product on the capitalist farms: and let the PMP on the peasant family

farms be zero. If then the labor force declines on the peasant family farms, due to influenza, but the shadow wage of labor still continues to be zero, we would have a higher average product on the family farms, therefore a higher real wage at which labor will be employed on the capitalist farms, therefore a reduction in the agricultural output on the capitalist farms, and hence a reduction in the total agricultural output. Thus, we have again shown the compatibility of a zero shadow wage for labor and decline in the agricultural output as the population (labor force) declines.¹²⁰ Nothing can be concluded, therefore, about the existence of “surplus” labor without a careful investigation of the institutional structure of the sector within which surplus labor is assumed to inhere.

(3) There have also been *direct* measures of surplus labor in India, following the classic methods of Paul Rosenstein-Rodan

¹²⁰ Admittedly, this result depends on the twin assumptions (1) of the division of the given supplies of land (and other factors) into two groups: peasant family farms and capitalist farms, and (2) that the individual, rather than the group, on the family farm maximizes income. If we were to relax the second assumption, for example, and assume that the group maximizes income, then the market would equalize the marginal products on both sets of farms and, with the supplementary assumption that each peasant family has sufficient income for subsistence from own-farming, the wage could fall to zero with zero SMP. In such a case, the Schultz test would be perfectly adequate, of course: zero SMP would imply that a decline in the labor force would not affect agricultural output.

We might touch incidentally upon one particular critique of Schultz’s test [159] on the ground that the effect of influenza in causing a decline in the labor force is indiscriminate whereas, with a selective withdrawal of the labor force (from farms where there is surplus labor presumably), there might have been no effect on agricultural output. This argument does not seem to be valid. The assumption here is that the withdrawal of labor (in *some* fashion) with zero impact on agricultural output is necessary or sufficient evidence that there is zero SMP to labor in the economy. But, in the particular example that we have used in the text, labour withdrawal *cannot* but help reduce output even though there is zero shadow wage for labor: and it will make no difference to this qualitative proposition whether the reduction in the population (labor) occurs in the capitalist or the peasant families. Conversely, the fact that labor

who ranks (with Arthur Lewis and Ragnar Nurkse) as the early proponent of the notion of surplus labor. The procedure involved is to take detailed surveys of agricultural output and occupations at the village level, with a view to finding out whether, with unchanged agricultural techniques, and taking full account of the seasonal peaks in demand for labor during harvesting seasons, there exists an excess of labor availability over labor requirements.

This kind of exercise, in essentially the fashion described here, has been deployed in the Indian context by Bhattacharjee [15] for the State of Bihar, during 1957-58 in the course of comprehensive farm management investigations. His estimate of "surplus" labor, fully allowing for the seasonal demand for labor at peak level, runs up to 8.6 per cent of the labor force for North Bihar and 19.8 percent for South Bihar, on application of the Rodan method to male labor alone.

The advantage of this method over the others (insofar as it takes into consideration all opportunities for raising output) is that it goes *directly* to the relevant question: namely, whether there is too much labor in relation to existing availability of techniques (which is what zero SMP or

can be reduced on some farms without affecting their output may merely reflect the fact that they are totally isolated from the rest of the economy with own factors of production which are not mobile, and the shadow wage of labor for the sector as a whole may be positive (implying "absence of surplus labor").

We may finally note, in reference to the Schultz test, that on examination of the labor force and agricultural output data for the period of the Second World War, for districts in Panjab where there was a significant military draft resulting in declines in the labor force, there appears to have been (according to unpublished work of Manmohan Singh) no impact on the agricultural production in these districts. Clearly, a careful study of this experience (adjusting systematically for trend growth of output resulting from mechanization and impact of possible improvements in the agricultural terms of trade during the War) would be more fruitful than of the influenza episode with its possible complications from factors such as the impact of the epidemic on efficiency.

shadow wage of labor means). The real difficulty with the method, on the other hand, is in identifying labor requirements and (in particular) labor availability. The determination of labor availability raises the tricky question of how many hours of work should be fed into the exercise: this is not an easily identifiable technological datum. And the problem could become empirically intractable if we introduced the notion of elastic supply of labor services with respect to rewards.¹²¹ In practice, the estimates have involved adjusting for holidays, festivals, environmental constraints (e.g. "in the month of May the extreme heat makes it physically impossible for any worker to work more than six hours per day in the field" [15]), and then estimating an approximate number of hours which may be expected to be "normal" as far as work is concerned. Shakuntala Mehra [112] has adopted essentially the same approach, in making her estimates of surplus labor in India (from data on labor utilization for 1956-57 and on labor availability for 1961): the only difference consists in explicitly taking her "normal" hours from the "large, capitalist" farms where such normalcy is assumed to obtain (on the ground that surplus labor, and resulting work-sharing, would arise only on the small farms without hired labor). Her estimates also point to the existence of significant amounts of surplus labor in different States (with the exceptions of Gujarat, Maharashtra and Andhra Pradesh). We might note, however, that her actual method is likely to understate the amount of surplus labor, in relation to Bhattacharjee's [15] application of the

¹²¹ In this context, we may note that Rosenstein-Rodan and his followers have always noted explicitly that, if those "left behind" did not in fact work the number of hours postulated, in view of "preference for leisure" or on "status" grounds, the actual removal of the estimated surplus labor would reduce output. The recent explorations of the preference-for-leisure hypothesis [158] were thus clearly foreseen by these economists.

Rosenstein–Rodan method at village level, because she estimates the amount of surplus labor on the farms alone: insofar as the landless labor also work less than the postulated “normal” hours, *their* “surplus” labor would be missed out.

Having thus reviewed the literature relating to the major issues in Indian agricultural policy, we now proceed to the final section of our Survey, addressing ourselves to the foreign trade sector.

III. *Foreign Trade*

The Indian policy literature with respect to the foreign sector has been concerned primarily with issues raised by foreign aid, private foreign investment, and trade and exchange rate policies.

(A) *Foreign Aid*

We have already discussed, in Part I, the major issues raised in the Indian literature, relating to the implications of foreign aid for planning investment allocations. The use of “aid to end aid” by a specified time horizon has been the framework within which some important planning exercises have been cast. The political counterpart to such economic analysis has been the appealing notion of ultimate “self reliance”; its conflict with the view that foreign aid must continue as long as the income gap between the affluent and the underdeveloped countries is not drastically reduced has not been noticed. At the same time, economists such as Sengupta [160] have plausibly argued that there is little evidence that the Indian planners have taken seriously their continually receding terminal dates for the net inflow of aid to cease. Both the savings and the trade implications of such a program have been shown by Sengupta to be unrealistic.

The Indian literature has also been concerned with the question of aid tying, by project, by commodity and by source. The prevalence of excess industrial capacity since the Second Plan has been attributed

by many economists, including Reddaway [145], to the fact that the foreign aid to India was excessively tied to projects and thus led to creation of more capacity even when the existing capacity was not fully utilized.¹²² On the other hand, since the devaluation of June 1966, several Indian economists have felt that there has been too much nonproject, and too little project, aid: a viewpoint which emphasizes that the efficiency of the aid flow may be jeopardized as soon as the aid is tied, whether to projects or to “maintenance” imports.

The source tying of aid has also been widely considered wasteful, although analytical work on this issue is only recent. While there are as yet no quantitative estimates for India, of the cost of source tying when switching possibilities have been exploited, Lal [89] has recently shown, using data supplied by the Imperial Chemical Industries, that these costs may be quite significant in the chemicals sector. Moreover, at an analytical level, Bhagwati [13] has argued that (i) measuring the costs of aid tying by source via estimation of the excess cost of the actual bundle purchased may under–or over–estimate the “true” cost in the Hicksian sense of compensating variation; and (ii) a sharp distinction needs to be drawn between the observed costs and the *minimum* costs that would have been incurred if the recipient country were to exploit fully its switching possibilities (as, in practice, it rarely does). Thus, for example, with reference to the latter point, Bhagwati has argued that India’s import licensing system, which specifies items on licenses by source and then makes these licenses totally nontransferable in all respects, results in *double* tying (by source *and* specification) even

¹²² On the other hand, other economists such as Bhagwati and Padma Desai [14] have pointed to other, domestic policy induced factors which may have also accounted for such excess capacity. We discuss these factors later, when we survey the trade policy literature.

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