

IRONIES OF INDIA'S GREEN REVOLUTION

By Wolf Ladejinsky

FOR nearly five years the "green revolution" has been under way in a number of agriculturally underdeveloped countries of Asia. Its advent into tradition-bound rural societies was heralded as the rebuttal to the dire predictions of hunger stalking large parts of the world. But more than that, those carried away with euphoria at the impending changes saw in them a remedy for the poverty of the vast majority of the cultivators. They were correct in assuming that the new technology stands for vastly increased productivity and income to match. However, the propitious circumstances in which the new technology thrives are not easily obtainable and hence there are inevitably constraints on its scope and progress. Apart from this, where it has succeeded, the revolution has given rise to a host of political and social problems. In short, the green revolution can be, as Dr. Wharton correctly pointed out in *Foreign Affairs* in April 1969, both a cornucopia and a Pandora's box.

This is seen very decisively in India's experience. There, extravagant anticipations have been replaced by a more sober and meaningful appreciation of its accomplishments and of the possibilities for expanding the scope of the technology beyond its current narrow limits. It has become obvious that many more farmers must be drawn in to share the benefits of the revolution. The polarization of income between the rich and the poor farmers and the erosion of the position of the tenantry which has been accentuated by the increases in productivity should not be part of the model of the new agricultural strategy. While self-sufficiency in foodstuffs is indeed a welcome—and likely—prospect for India, concern is rising that for all its technological feasibility it may fall short in helping solve some of the grave problems of a good many village poor. (The views expressed here and elsewhere in this article are, of course, those of the author alone.)

Indian political and economic problems are currently as numerous and grave as usual, but for once food shortages do not claim the headlines. The first two years (1965-66, 1966-67) of the new agricultural strategy were dried away by some of the

worst monsoon failures recorded. Three years later, with favorable climatic conditions accompanying the new agricultural technology, the food position of India is "comfortable." In 1969-70 output of foodgrains was a record 100 million tons, or 11 million tons more than in 1964-65, which was the best year before the revolution. Since agricultural development is the basis of the country's economic growth, this is a very significant gain. The annual rate of growth so far is closer to 2.5 than the anticipated five percent, giving rise to doubts about the attainment of the projected 130 million tons in 1973-74—the last year of the Fourth Five-Year Plan. But statistical trends do not tell the whole story of the program's effectiveness.

Despite the serious social and technological limitations of the new agricultural strategy, one thing is clear: the wheat revolution is a reality, way beyond any expectation. Second, where the ingredients for the new technology are available—new high-yielding varieties, concentrated doses of fertilizers, assured sources of perennial irrigation—no farmer denies their effectiveness. Third, agriculture in the late 1960s has benefited from a guaranteed minimum price for wheat and a general improvement of terms vis-à-vis other sectors. Fourth, the desire for better farming methods and a better standard of living is growing not only among the relatively small numbers using the new technology, but also among countless farmers still outside looking in. This mental attitude, though too seldom supported by the necessary resources, cannot be overemphasized. At long last, in India too the power of ideas to bring about change is being demonstrated. To those concerned with purely physical entities of economic growth, a psychological change of this sort is not subject to numerology and is probably of no moment as a developmental factor. But it cannot be denied that a new, if unquantifiable, factor of growth has been introduced. Finally, the progress in agriculture is a result of major official and private efforts at several strategic points, which have slowly created a milieu radically different from that of the 1950s and early 1960s. These are considerable achievements, regardless of the growth rate.

II

This said, and viewing the new developments as a technological phenomenon, what stands out at this point is the unevenness of their application and the need for patient attention over a

considerable period of time in order to achieve basic agricultural changes. Nothing makes this clearer than comparing the progress made with the two pivotal foodgrain crops of India, wheat and rice.

Whereas wheat has been a success story par excellence, rice can claim no such distinction. Between 1964-65 and 1968-69 all the basic indicators of agricultural growth in rice have remained almost unchanged; in contrast, the respective increases in wheat acreage, production and productivity were 19, 52 and 28 percent. But the character of the technological changes is best seen in the hotbed of the green revolution, in the state of Punjab, India's traditional wheat basket. There, an innovation-minded group of farmers has in a few years succeeded in translating larger crops and income into a new way of life. More precisely, they planted 80 percent of the land with "miracle" wheat varieties; increased the number of tubewells for irrigation from 7,000 to 120,000; virtually tripled the consumption of fertilizers within four years—moving, during the last decade, from a mere two to three kilograms per acre to as high as 40 to 60 kilograms in 1968-69—and almost doubled the yield. For this the Punjab farmers deserve much credit, but they were fortunate in a remarkable set of partners: the Ford Foundation, which pioneered and demonstrated the utility of the new "package of practices" idea; the Rockefeller Foundation, with its invaluable work in developing the Mexican "dwarf" wheat varieties upon which the wheat revolution is based; the Punjab Agricultural University, which has rapidly become the center of dissemination for new varieties; and finally, the great effort of the central and state agencies which in a variety of ways helped to provide the inputs upon which the upswing in productivity rests.

At the moment, the same cannot be said for rice, despite significant pockets of progress in Kerala, Tamil Nadu, parts of Andhra Pradesh and West Bengal. Since wheat accounts for 15 percent of the total acreage in foodgrains as against 31 percent in rice, the latter is most important in determining the overall rate of agricultural growth. If rice productivity had shown anything comparable to that of wheat, India would have been self-sufficient in foodgrains now. The principal reason for the disparity in performance is that tested and proved new varieties are still in the making, and that, generally speaking, rice varieties demand a great number of favorable environmental condi-

tions; they are susceptible to pest and disease, the knowledge of which still is inadequate. The quality of the new strains leaves something to be desired and it markets at a considerable discount. Unlike Punjab, with its successful irrigation program, the lack of irrigation and absence of drainage facilities in some of the major rice-growing parts of the country are serious constraints. In such conditions, with few notable exceptions, the much talked about "miracle" strains from the Philippines and Taiwan have so far met with limited responses. Additionally, the problems of the "new" rice, especially in the eastern belt of the country, extend beyond the technological lag: a much larger proportion of the cultivated rice area is in small holdings whose proprietors lack credit and are often tenants on the land, and these impose limitations of their own. For this very reason, if the improved rice technology could become a reality it would achieve something beyond higher productivity.

Dramatic and speedy solutions to the problems with the existing rice technology cannot be expected. But it would be an error to conclude that they are insurmountable. From the few successes and many more failures much has been learned. The early assumptions about the miraculous performance of the new varieties overlooked the importance of their environment. (Even in wheat, unless the cropping of "Kalyan Sona"—the principal variety—is diversified, there is a danger that rust might affect the entire belt where the variety is grown. Much will depend upon the ability of agricultural science to ward off such setbacks.)

Now, however, Indian research institutions are deeply involved in propagating strains suitable for Indian contexts. They are equally involved in research about soils and water in the huge dry land areas of India. Whatever the time lag, the responsibility for failure to solve these difficult problems quickly in a country as vast as India and as varied in soil, climate and water management cannot be ascribed to the new agricultural strategy itself but only to its vulgarization as a "do-all."

Nor is the green revolution only a wheat revolution, as its critics taunt; this first stage is a spectacular development in itself but more importantly it will serve as a useful organizational testing ground for general changes in agricultural technology. Only a blind enthusiast could have conceived that the passage from traditional to modern agricultural practices would be effected as if by magic—even in the United States hybrid corn

came into its own after much trial and error, and more than a decade after the initiation of the process.

That the changeover is a long-drawn-out affair, or that coarse grains and nonfood crops have hardly been touched by the transformation, or that the total rate of output is still only half of that anticipated is partly in the nature of things and partly a matter for concern. A monsoon failure to which India is so prone might slow down the progress of the new strategy still further, but it would not be fatal. And the most encouraging part about the recent technological developments is not so much the physical output as the use of inputs, or the willingness of the farmers to invest and take risks. Inputs have been sharply and steadily rising, as in the use of chemical fertilizers, improved seed, minor irrigation facilities, plant protection devices, tractors, etc., and the remarkable degree of monetization of the farm economy and the big array of industrial consumption goods increasingly in demand by the farmers. Another sign of the profitability of modern agriculture is the appearance on the scene of a new breed of farmers made up of a motley crowd of retired military and civil servants, doctors, lawyers and businessmen. Not a few of them have "unemployed" rupees acquired through undeclared earnings, and most of them look upon farming as a tax-haven, which it is, a source of high supplementary income free of any tax burdens.

The breakthrough in agriculture is far from a full-fledged revolution. For the time being, however, Indian agriculture has acquired some muscle. All its benefits cannot yet be estimated, but their gradual and cumulative effects on the purely productive side of the economy are inescapable. That for the time being this holds true only for a minority of India's 60 million farm families does not vitiate the significance of the changes in the making. In some parts of the countryside the new sense of initiative and optimism is palpable. That this is indeed so is attested by islands of progress even in a state like Bihar, which is still characterized by agricultural primitivism and almost unrelieved poverty.

III

Without minimizing the significance of the accomplishments, however, one must say that the revolution is highly "selective," even if its spread effect is not inconsiderable in certain areas.

Such revolutions must often go slowly under the most propitious circumstances, which are not present in India. It is enough to recall that three-fourths of India's cultivated acreage is not irrigated, and "dry" farming predominates. If for no other reason, vast parts of the country have not been touched by the transformation at all and equally vast parts can boast only of "small islands within." Even in Punjab, with all its advantages, not every small farmer—not to speak of remaining tenants—practices the new technology and much less so in other developing parts of the country. The green revolution affects the few rather than the many not only because of environmental conditions but because the majority of the farmers lack resources, or are "institutionally" precluded from taking advantage of the new agricultural trends. The changes engendered by the new agricultural strategy have brought these and other handicaps into sharp focus at a time when aspirations for betterment are widespread among all classes of farmers, and when most of them need no persuasion that modernization, which stands for bigger crops and higher income, is good for them. Waiting to be part of it and yet not getting there create potentially disturbing social, economic and political issues. And this is the other side of the coin in any assessment of the course of the green revolution.

In typical Indian conditions of great inequality of land ownership, resources and marketed surpluses, income inequality is the normal state of affairs. The seriousness of the inequalities in income distribution may be judged from the Prime Minister's remark that there are only two genuine majorities in India—the young and the poor. It is estimated that in 1969 out of a total rural population of 434 million, 103 million owned no land at all and another 185 million operated less than five acres per family. Taken together they represented 67 percent of the total rural population, and of these an estimated 154 to 210 million lived in abject poverty, or at a level of 200 rupees (\$21) per capita per year.

If the widening gap between the benefits to large and small holdings is to be reduced and the scope of the new technology enlarged, the less privileged cultivators must be enabled to secure the highly productive new inputs. Since it takes 10,000 to 12,000 rupees to reëquip a seven- to 10-acre holding, it is not normally within the reach of the farmer unless he can secure coöperative credit. More often than not he can get only in-

sufficient credit and, on occasion, none at all, for the distribution of credit and inputs in an Indian village reflects a power structure very much biased in favor of the affluent. But whatever the causes, the argument is not against modernization for making the rich farmers richer still, but against the limited scope and that the growing disparity leaves the poor peasants relatively poorer. Many would-be innovators can be likened to tenants who receive land under a reform but nothing else to go with it. They are excluded from the purview of the green revolution altogether, or participate in a limited way at best. For reasons only partly attributable to the new technology, many farmers in areas of great potential are now pointing enviously to better production, higher income and better living "over there" in their neighbors' fields. India can ill afford any growth in social discontent.

The situation of the multitude of tenants is even more difficult than that of the small farmers. In areas where the agricultural transformation is a potent force—Punjab and the Purnea district of Bihar—the accomplishments are marred by its adverse effects on the already troublesome tenorial conditions. Where the new farm practices are in vogue, land values have risen three, four or fivefold, and unrestricted land control has never been more prized. As a consequence, not only have rents risen from the traditional (though illegal under the reforms) 50/50 to as high as 70 percent of the crop, but security of tenure and other rights in land a tenant might claim have also been perceptibly weakened. Now that green-revolution land is practically invaluable, the owners would like to get rid of tenants altogether and resume the land for self-cultivation, making use of the plentiful supply of hired labor which has no claims on the land whatsoever. There are too many tenants or sharecroppers to deal with them summarily without courting a good deal of trouble, but the old squeeze whereby tenants are reduced to sharecroppers and eventually to landless workers is being accelerated as more of the bigger owners become involved with the new technology. The basic provisions of tenancy reforms are less attainable than before the advent of the green revolution.

And the landless farm laborers, though their lot is temporarily improved, are eventually due for a setback. The new type of agriculture is labor-intensive, employing more labor due to double-cropping and other labor-demanding practices it is introducing. Not surprisingly, therefore, it has been hailed as a

solution of the large problem of unemployment among rural landless. It appears, however, that even in the most advanced state like Punjab this is not as promising as anticipated because the technology is both labor-absorbing and labor-displacing. In recent years, wages have risen sharply, and so to a degree has the number of days of employment; on balance, and despite a steady rise in the cost of living, farm labor in Punjab is somewhat better off. Not so in Purnea, where higher productivity and higher prices have caused a shift in wage payments from kind to cash. This is a distinct disadvantage to the farm laborer, whose wages in kind have insured him a minimum food supply. And looking ahead, additional employment and better wages are not forever, for new farm practices are bringing in a host of labor-saving devices such as tractors and threshers and much in between.

Mechanization in India will never reach the science-fiction dream level where tractors will be guided by remote control. Most "farmer-revolutionaries" are more modest in their expectations, but economy of operation and increasing returns through mechanization are uppermost in their minds. Judging by the scheduled imports and contemplated increase in the domestic production of tractors and other equipment, the advocates of "go-slow" mechanization as a social policy measure have had their last ineffectual word on the subject, certainly for the life of the current Fourth Five-Year Plan.

In short, farm mechanization is as irreversible as the green revolution which fathered it, although much of it will not apply to nearly the same degree in the principal rice areas of India. Events are beginning to catch up with Nehru's lament against farm mechanization as a threat to peasant welfare. Agricultural labor has received none of the organizational and legislative benefits which have helped industrial labor. Even at this early stage of modernization of the bigger farms of Punjab the drive is for more equipment and fewer hands. The estimated 35 to 40 million landless laborers are bound to grow in numbers and their rate of employment in any other field of activity is not promising; thus the outlook is for an overcrowded, low-wage farm market regardless of the scope of the green revolution.

IV

The new technology is not the primary cause of the accentuated imbalances in the countryside. They are the result of all

the social, religious, economic and political forms which govern the village, and which admittedly are mirrored in the shape which the new technology has assumed. It is not the fault of the green revolution that the credit service does not serve those for whom it was originally intended, that the extension service is falling behind expectations, that the village "panchayats," or councils, are essentially political rather than developmental bodies, that security of tenure is not given to the many, that rentals are exorbitant, that ceilings on land ownership are notional, that even rising wage scales are hardly sufficient to satisfy the basic essentials of the farm laborer, or that generally speaking in those conditions economic necessity and social justice of and for the village poor do not ride in tandem.

To a considerable extent these are man-made issues of long standing. Modernization of agriculture should include a combination of technical factors geared to higher production *and* improvements in the institutional framework to benefit the rural underprivileged. The current emphasis is on productivity, to the exclusion of social imperatives: the first will bring India to self-sufficiency; the second is beginning to yield great vexations. Self-sufficiency will also give rise to a variety of technical and economic problems, principally reduction in counterpart funds to finance parts of the country's developmental programs which will accompany the gradual elimination of foodgrain imports under PL 480. A much more serious matter, however, could well be a lack of effective demand for the increased output resulting from the insufficient income of a substantial number of rural people.

Under the leadership of leftist parties, the village poor are not averse to forcible occupation of land, harvesting standing crops and violent attempts to secure better wages. According to the Ministry of Foreign Affairs, in the first nine months of the past year 346 incidents of forcible occupation of land (totalling 100,000 to 300,000 acres) with many murdered and injured have taken place in West Bengal alone. That this could be only a foretaste of an enormous "law-and-order" problem is well understood, and the government of India is deeply disturbed by it. In late November 1969 an emergency conference was held on how to place the agrarian reforms back on the rails. The Prime Minister addressed the Chief Ministers of all the states with an unmistakable sense of urgency, saying: "The warning of the

times is that unless the green revolution is accompanied by a revolution based on social justice the green revolution may not remain green." The Prime Minister wanted the Chief Ministers to "act now when there is still time and hope" to implement the reforms properly as part of the new agricultural strategy, because "no single program so intimately affects so many millions of our people as land reforms." This is the issue and the question is whether at long last the Prime Minister's exhortations will find their mark.

If past performance of the states in legislating and enforcing reforms is any guide to the future, it would be idle to expect smooth sailing for the Prime Minister's modest but useful package of "should-be-dones." In fact, the split of the ruling Congress Party has increased the political hurdles in state legislatures already dominated by the top class of the farmers. The reforms the party could not achieve in its heyday of undisputed authority are much more difficult of attainment now when the bargaining involved and the price paid become crucial to the governing power. It is possible, however, that the conflict of economic and social necessity and the tide of rising tension may force some politicians to rise above politics. Recent legislative enactments in a few states are new straws in the wind, although enforcing them is something else again, and the skeptics may be pardoned if they prefer to wait and see. A positive outgrowth of the new technology is the Small Farmers' Development Agency, which was created to provide some two million farmers with inputs and services which would enable them to share in the benefits of the new agricultural policy. For the first time in the country's agricultural history, members of this particular class of farmers have been singled out for rehabilitation. But in this instance, too, the guiding spirit behind this measure, Mr. B. Venkatappiah, noted that "the Agency will be virtually inoperative in various sectors . . . unless a number of measures are first undertaken . . . in regard to land records and land reforms."

India is not in a position to endow all or most of its frustrated small farmers, tenants and agricultural laborers with suitable means to share in the agricultural New Deal. In the ultimate analysis, the answer lies in the rapid growth of the entire economy *and* a high rate of employment. But to the extent that this lies in the distant future, India, and more particularly the

states of India, could, if they so politically willed, see the present as an opportunity to remedy the worst features of rural inequities, thereby extending also the scope of the new technology. It must be reiterated that the issue is not one of solving all or most of the problems but of obtaining the minimum of security to mitigate the bias against institutional change and point the way to interdependence between technology and socio-economic reform. In practical terms, it would mean providing a large number of farmers willing to innovate with the wherewithal to dig a well, buy fertilizer, obtain credit. This is part of "distributive justice" complementary with the need of growth, factors which cannot be looked at in isolation. Even failing this, an "explosion in the country"—in the sense of peasant rebellion and chaos—is unlikely, for the kind of poverty that wouldn't be tolerated in many another country is still tolerated in India. On the other hand, it cannot be doubted that the festering existing tensions will grow apace, and an agricultural revolution geared only to new techniques and higher productivity, a model extolled by most students of economic development, will unwittingly contribute to that very end.

Whether events will belie this gloomy assessment remains to be seen. But this much may be ventured. While on the face of it a confrontation between progress and poverty may be inevitable, poverty itself is not an immutable Indian condition laid down for ever from on high. Is it not just possible that, in order for India to maintain social peace and provide a measure of economic contentment, at the critical moment the worm may turn after all, and the miracles of the new technology will find the congenial company of political will and ensuing policies and actions bent on a steadfast attack on rural poverty?