

*PATWARI AND CHAUKIDAR:
SUBORDINATE OFFICIALS AND
THE RELIABILITY OF INDIA'S
AGRICULTURAL STATISTICS*¹

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The Report shows inadequate appreciation of the way in which the primary statistics of India are collected. It is the hopeless inefficiency at the bottom, even more than the failure to collate them properly, that renders many of the statistics of India of so little value. In Sind, for example, there is nominally a census of agricultural livestock taken every four or five years. Actually there is no expenditure made on this census, and the figures are evolved by the village accountant out of his own inner consciousness. He takes the figures of the last census, assumes that they must have been correct at the time they were produced, and adds or subtracts what he, only too justly, thinks is a figure which will not evoke comment. The figures of the preceding census were . . . arrived at in exactly the same way, and if the present figures have any relation whatever to the truth, the fact is to be attributed to Providence working in a more than usually mysterious way. . . . For the true interpretation of Indian statistics a knowledge of [the administration of any Indian district] is at least as important as the knowledge of statistical and economic theory.

H. Dow, 'Imperial Secretariat Note' (1934)²

Because they make possible comparisons between nations and comparisons over time, indices of gross national product or per capita income have always fascinated politicians and the public. Our whole interpretation of India's economic history has come to turn on their neat translation of an extraordinarily complex subcontinent's economic condition into 'simple and easily remembered numerals'.³ Was it a history of successful growth or disastrous decline? The statisticians promise to provide the answer. But the entire validity of the national income accounting approach to modern Indian economic history depends upon the reliability of the primary output data, especially the official agricultural statistics, given the agricultural sector's dominance in the Indian economy. Until very recently analyses of these statistics—steadily moving towards greater detachment from, and higher methodological standards than, their polemical origins—were reassuring.⁴

Confidence in the agricultural statistics' ability to provide the answers statisticians asked of them culminated in the most impressive quantitative research on Indian agriculture to date—George Blyn's *Agricultural Trends in India, 1891-1947*.⁵ In the shifting quicksands of Indian historiography, Blyn offered—or appeared to offer—definitive trend rates for agricultural output, availability, and productivity backed by an impressive statistical apparatus, a laborious mass of computation, and painstaking adjustments for the data's eradicable defects.

The fact remains, however, that none of the statisticians who used the official agricultural statistics ever tried to discover the errors (and margins of error) to which they were subject, by consulting the files in Indian archives—or even the published settlement and departmental administration reports—in which the Indian civilians responsible for their collection discussed the agricultural statistics' limitations. Economic historians have only just begun to realize how serious the deficiencies of the system for the collection of agricultural statistics really were. M. M. Islam has arrived at trend rates for Bengal not only substantially different from Blyn's, but subject to the reservation that it may not be possible to arrive at reliable trend rates at all.⁶ It can be argued that the Bengal statistics were exceptionally unreliable; Blyn himself acknowledged their inaccuracy. But detailed research on the collection of agricultural statistics in two other provinces—the Punjab and Bombay—in which they might reasonably have been expected to be most accurate has confirmed that the margins of error involved in the official statistics were so large and so ineradicable that trend rates based upon them must be regarded, at best, as highly approximate guides to India's agricultural growth.⁷ What comparison of a temporarily-settled province like the Punjab⁸ with a permanently-settled province like Bihar⁹ shows is that the sources of error, if not always the margins of error, were much the same all over India.

SOURCES OF ERROR

Crop Areas: The Incompetence of the Primary Reporting Agency

The government are very keen on amassing statistics—they collect them, add them, raise them to the nth power, take the cube root and prepare wonderful diagrams. But what you must never forget is that every one of these figures comes in the first instance from the chowkydar [sic] who just puts down what he damn pleases.

Lord Stamp, *Some Economic Factors in Modern Life* (1929)¹⁰

The accuracy of the official agricultural statistics was directly related to the efficiency of the agency through which they were collected. In temporarily-settled provinces crop areas were reported by *patwaris*, the

village accountants responsible for maintaining each village's land revenue records. In permanently-settled provinces, where the state collected its revenue through large landlords rather than directly from the petty cultivator, the *patwaris* were the landlords' servants; and the state was compelled to collect statistics of crop areas through the only servants it employed at village level—the *chaukidars*, or village watchmen.¹¹ Of the two, the *patwaris*—all authorities agree—were the more efficient reporters of 'agricultural facts'. Both, technically, were village servants; but there was a social gulf between them. The *patwaris* belonged to the highest reaches of village society. They were members of rich peasant families, or the families of successful moneylenders and traders. Their caste status was comparatively high; and their control of the land revenue records (especially in areas where the land revenue fluctuated according to the *patwaris'* reports of harvest out-turn, or disputes between landlords and tenants were settled by the *patwaris'* entries in the village record of rights) gave them power over their fellow-villagers, who found it necessary to bribe them. Above all, they were literate and numerate. As time went on candidates for *patwaris*hips needed ever-higher educational qualifications; while an increasing number of *patwaris* underwent vocational training in special *patwari* schools.

The *chaukidars*, in contrast, were members of economically-depressed families and socially-despised castes. Often they became *chaukidars* because they were too physically infirm to work as labourers, and lacked the capital to set themselves up as tenants. They were illiterate and quasi-numerate; and they made their reports on crop areas orally, at their local police station. They were handicapped by the absence of village maps giving the area of each field. In temporarily-settled areas, all a *patwari* had to do to work out the total area under any crop was add up the areas of all the fields in which it was grown: the area of each field was given on his village map, and again in his village papers. The *chaukidars* had to guess: no one knew the area of the fields in Bengal, and there was no question of actually measuring the crop.¹² There was also less likelihood that the *chaukidars'* guesses would ever be checked. The *patwaris'* immediate superiors were revenue officers—*kanungos* and *tehsildars*—whose ordinary work of revenue collection compelled them to keep in touch with the condition of each harvest, and with longer-term agricultural changes. They were perfectly capable of checking the *patwaris'* work; they were obliged to do so as a matter of administrative routine; and it was comparatively easy for them to do so, by checking the crops growing in selected fields against the entries in the *patwaris'* registers. The policemen who were the *chaukidars'* immediate superiors had neither the opportunity nor the incentive to scrutinize the figures the *chaukidars* reported.

Officials in Bengal (Bihar was part of Bengal till 1912) were acutely conscious that the lack of field surveys and *patwaris* in the province prevented their collecting reliable agricultural statistics; and every time the Government of India pressed them to provide agricultural statistics, they protested against having to perpetrate a fraud. In 1868—when the first uniform returns of crop areas were circulated to local governments—the Board of Revenue and the divisional commissioners, the entire upper echelon of the land revenue administration, insisted that the only data they could collect would be obsolescent or conjectural.¹³ Fifteen years later the Statistical Conference which met to revise the 1868 tables specifically excused the government of Bengal, on the ground that 'reforms in the manner of exhibiting facts can be of no great value in a province where no suitable agency exists for ascertaining facts'.¹⁴ Successive directors of land records and agriculture, after the creation of their post in 1885, fought a rearguard action against the Government of India's weakness for all-India statistical returns, however inaccurate the figures they contained; but the local officials' scruples were finally overridden, and the Royal Commission on Agriculture in India stigmatized the resultant statistics as not merely guesses, 'but frequently demonstrably absurd guesses'.¹⁵

The Bengal Tenancy Act of 1885 made the lack of *patwaris* and village surveys more apparent. The young civilians whose talent and commitment led to abandonment of the traditional policy of *détente* with the *zamindars* appreciated that the rights which the Acts conferred on tenants would be ineffectual unless the tenantry were also provided with incontrovertible legal evidence of the size, rental, and age of their holdings. Public registries of rights in land—the kind of village records of right drawn up in the course of settlement operations in temporarily-settled areas, and kept up to date by the *patwaris*—were the obvious means of enabling the tenant to withstand his landlord's *vakils*, *goondas* and *jeth raiyats*. The first experimental survey intended to test the feasibility of creating village records of right was completed in north Bihar in 1888, and settlement operations (settling rents and rights rather than revenue and rights, as they would have done in a temporarily-settled province) gradually spread to each district of Bihar.¹⁶ This rent-settlement held out the promise of a radical improvement in the quality of the official agricultural statistics. While the settlement of each district was in progress, settlement staff collected figures for crop acreages which were more accurate than any of the *chaukidars'* estimates, being partially based on actual measurement; surveys were made of each village, and maps prepared showing the area of every field; the experimental crop-cuttings were taken to ascertain crop yields. But the full potential of the Bihar settlements was never realized. Because there

was so little they could do with them once they had them, settlement officers were not much interested in collecting reliable statistics of agricultural output: their primary functions—the registration of rights and the adjustment of rents—were too all-engrossing. Their estimates of yield, accordingly, were 'not only incorrect but absurd'.¹⁷

In districts exposed to famine, the Bihar settlement officer was supposed to use estimates of output to work out the amount of relief likely to be required in future scarcities; but it was impossible to do this with any degree of precision, and settlement officers generally relied on past experience to determine how much relief would be required, and worked backwards from that to decide what crop yields should be in the light of a district's economic history. In the 1870s the government of Bengal lacked the agricultural statistics it needed to forecast famines, or gauge the amount of relief required by famine-stricken areas; in the 1940s, at the time of the last great Bengal famine, the necessary statistics were still unavailable.¹⁸ Settlement officers also, nominally, needed reliable figures for output to commute the landlord's share of kind rents into cash. Actually, the great majority of commutations represented compromises between landlord and tenant based on the prevailing cash rents for similar holdings nearby. If either party refused to compromise, the impossibility of discovering how much produce the landlord had taken in the past forced settlement officers to sample the yield of a single harvest; and this kind of spasmodic crop cutting, concentrated in particularly litigious estates, lasting only one harvest, was no basis on which to calculate the average yields of entire districts over long periods.¹⁹ Many districts, moreover, were secure from famine and had few kind rents: in such tracts settlement officers were known to abandon the pretence of calculating the output of each crop.²⁰ Even the data the settlement officers did collect were under-utilized. Sometimes their acreage figures were incorporated in the regular returns of agricultural statistics; sometimes they were not. The field maps were either not issued to the *chaukidars*, or the *chaukidars* were incapable of using them. And all the settlement data—acreage figures, maps, crop cuttings—soon became out of date. Bengal officials mastered the difficulties of an efficient rent settlement; they never succeeded in devising an agency through which the settlement records could be—as the phrase goes—'continuously maintained'.²¹

The first attempts to create an agency capable of keeping the settlement records (and so the agricultural statistics) up to date were directed towards reviving the defunct *patwari* system of Bengal.²² In certain areas—notably Bihar—there were still large numbers of *patwaris* paid by the landlords and appointed and dismissed by the collectors. The regulations requiring them to file annual papers in the collectors'

kutcheries showing the rental and holding of each *ryot* were still unrepealed. Some *patwaris* occasionally filed papers; but they were very unreliable, and no use was ever made of them. What made it impossible for the collectors to compel every *patwari* to file reliable records were the difficulties of dismissing *patwaris* once they had been appointed. The courts in Bengal—always ready to hamper the executive government—decided that *patwaris* had a legal right to their office unless the collector could prove they had systematically neglected their statutory duties, and few collectors were prepared to embark on a whole series of such lawsuits in which they would be required to justify their decision to dismiss up to the hilt. The *zamindars* had a little more influence over the *patwari*, but 'cases are not wanting in which a dishonest *patwari* in collusion with the *raiyats* can do much to defraud the proprietor of his rights'.²³ The *zamindar* might pay the *patwari* his salary: but the *patwari*'s salary was only a fraction of his total income.

His position in the village enables him to get hold of the best lands and to enter them in the rent roll either in his own name, or in that of his relatives. In the case of lands abandoned by their original occupants, he is often able to relet them without the landlord's knowledge and to appropriate the rents. His perquisites are not inconsiderable. He gets a fee called *tahrir*, amounting usually to half an anna in the rupee on the rent paid, for any receipt which he issues to the *raiyats*. A similar amount is levied on the occasion of the *dawat puja*, and frequently on other festivals as well. In every fresh settlement of lands, or entry of a transfer in the rent roll, he gets a *salami*; the amount varying with the importance of the transaction and the position of the parties concerned. The appraisal of crops on land paying a produce rent, the sale of the produce of land cultivated by the landlord, and many other occasions in village life give him opportunities for further adding to his income.²⁴

The system of dual control freed the *patwari* from both his ostensible masters. He was sufficiently independent 'to give evidence and manipulate his papers in favour of the party who will make it most worth his while';²⁵ and his ability to 'play his own hand against both government and landlord' wrecked the first experiments aimed at rehabilitating the traditional *patwari* agency. As the earliest settlements in Bihar got under way in the 1890s, the manager of the largest *zamindari* in Champaran cooperated with the local settlement officer in an attempt to train the estate *patwaris* to maintain the settlement records. Circumstances were especially favourable. The Bertiah estate was under effective management; and its *patwaris* were genuine village officials, because it owned whole villages rather than fractions of villages, grouped together in compact blocks. But the experiment still failed. 'Even among the first batch of men', the settlement officer explained, 'it was found that very few, who were registered *patwaris*, actually worked in the field. They

almost universally sent their relatives to act for them, on the plea that they had urgent work to do for the landlords; and this, too, in spite of the fact that they were allowed 4 annas daily to provide a substitute for their ordinary work'.²⁶ There was nothing the settlement officer could do to compel them to attend: the courts decided that settlement work was not part of the *patwari's* statutory obligations, so no *patwari* could be dismissed; and the majority of landlords were opposed to legislation making settlement work part of a *patwari's* statutory obligations, because it threatened to convert 'their' servant into a government official.

The alternative to reform of the *patwari* was creation of a new agency wholly paid and controlled by the state. Schemes for the creation of such an agency were put forward in the 1870s, the 1880s, and the 1890s: all came to nothing. The great stumbling block was cost. The governments of Bengal and Bihar were the poorest in British India. The permanent settlement froze the largest source of revenue, the land revenue, at levels fixed a century before, and the real value of the land revenue fell when the rupee began to depreciate in common with all silver currencies after 1880. This downturn in income coincided with demands that the provincial administrations assume new responsibilities, or discharge old responsibilities more fully. Each new impost designed to finance these demands provoked violent political opposition, led by *zamindars* who denounced the government's invasion of their tax-immunities as a breach of the sacred contract implicit in the permanent settlement; and the Secretary of State, rather than alienate the most conservative element in Bengali society, twice vetoed cesses which would have paid for a new *patwari* establishment. So the district officers in Bengal-Bihar went on collecting agricultural statistics without subordinating their districts generally with notoriously inadequate establishments. The appointment of 'circle officers', after the report of the Bengal District Administration Committee (1915) confirmed the superficiality of British 'control', marginally improved the situation in Bengal (not Bihar); but the provincial government's (predominantly urban) commitments expanded more rapidly than its tax base. Finally, under the dual stress of war and famine, aggravated by poor communications and weak leadership, Bengal's ramshackle administration collapsed. Seventy years after Sir George Campbell—Lieutenant-Governor in the 1870s—launched his crusade against 'under-administration', the last Bengal Administrative Enquiry Committee repeated his unimplemented recommendations.²⁷

So the Bengali reformers drew a blank: and the broad distinction between the hopelessly unreliable agricultural statistics of the

permanently-settled areas and the less unreliable statistics of the temporarily-settled areas persisted. This difference has always been known: Blyn made specific allowance for the irreconcilable divergences of rice yields in Bengal and Bihar. But what has never been sufficiently recognized is that the *patwaris* of temporarily-settled provinces like the Punjab were not so very different from the *patwaris* of Bihar. If one system of dual control made the Bihar *patwari* indisciplined and irresponsible, another system of dual control gave the Punjab *patwari* a similar independence. Ostensibly the servant of the village community and the state, the Punjab *patwari* eluded both his masters. He was the occupant of an hereditary office regarded as a species of freehold property to be enjoyed, not an efficient civil servant responsive to his immediate superiors' orders. His official salary was the smallest part of his perquisites; and if there were no legal obstacles to the dismissal of a Punjab *patwari*, there were none the less severe practical difficulties in finding suitable replacements. Certainly no Punjab *patwari* was ever dismissed for fabricating agricultural statistics: his official superiors never regarded them as important enough to warrant dismissal. So long as a *patwari* kept his land revenue accounts properly written up, he could fill up the returns of agricultural statistics prescribed by an infinitely remote imperial department in any way he chose, frequently repeating the same figures year after year, without fear of reprisal.

Even in a province as committed to efficient land revenue administration as the Punjab, where the revenue officer's power and prestige stood higher than in any regulation province, the efficiency of the *patwaris* varied enormously, from district to district and from time to time. When the Government of India began insisting on a higher standard of agricultural statistics in the 1880s there was no *patwari* agency proper over quite large areas of the province—the hill districts (Simla, Kangra) and the districts of the North-West Frontier (Hazara, Kohat, Dera Ismail Khan, Bannu).²⁸ These were districts that were always difficult to administer efficiently. Communications, because of the impossible terrain, were poor; and district officers along the frontier, preoccupied by the problem of peacekeeping among the turbulent border tribes, were forced to neglect routine district administration. As a result administrative practices borrowed from the settled districts of the plains remained forms without content. Settling Hazara between 1868 and 1874, E. G. Wace discovered that there had been 'a *patwari* cess, and officials called *patwaris* have been paid from it, and have been nominated to distinct circles, but they have not resided in their circles, and have been for the most part only settlement and revenue clerks kept at the *tahsil* or settlement headquarters'.²⁹ Settling Simla ten years later, he discovered '*patwari* arrangements . . . of the roughest description . . .

The twenty-three Simla villages... had no *patwari*, the Bharauli *ilaga* had one *patwari*, and Kalka had its separate *patwari*, who was paid Rs 10 [about 60p] per annum.³⁰ When Wace tried to recruit additional *patwaris*, he ran up against the shortage of suitably qualified candidates in the more remote districts. There were very few men with the necessary (low) educational qualifications. Members of the commercial castes—the great reservoir of literacy—were reluctant to serve in remote districts, away from the society of their caste-fellows in the towns; and the British were reluctant to appoint them: they tended to be absentees, neglecting their work; and they tended, also, to use their power over the land revenue records to help their moneylending relatives appropriate peasant debtors. Few agriculturalists were attracted by the low salaries and poor promotion prospects held out to *patwaris*, which also made it hard to maintain discipline once men had been appointed. Training successful candidates was a further problem. *Patwaris*, ordinarily, were trained in the course of settlement by the settlement officers; but each district was settled—on average—once every twenty-five years, and if a district missed its chance (often because the provincial authorities refused to sanction the necessary expenditure), its *patwari* establishment could run down for fifty years or more.³¹

The old-established *patwari* agencies of the plains presented equally intractable obstacles to reform. Elderly *patwaris* were often capable of keeping up the basic land revenue accounts; but they were too old and too poorly educated to learn how to fill up the new returns of agricultural statistics after conscientious crop inspections.³² New *patwaris*—younger, keener, better educated men—had to be found to take their place, and were not always forthcoming. 'The supply of men with even the minimum qualifications', the settlement officer of Ambala complained in the 1890s, 'was barely up to the demand, though the schools were literally drained of every eligible schoolboy'.³³ The hereditary claims of existing *patwari* families complicated the process of appointment. The sons and nephews of elderly *patwaris* (especially if the *patwaris* were agriculturalists) were regarded as having strong claims to succeed them in office, regardless of personal merit. The village factions to which aggrieved *patwari* families belonged could make things very difficult for any 'stranger' appointed to office in their village; and British revenue officers hesitated to appoint outsiders, just as outsiders hesitated to accept such appointments. Often particular families—really connections within the commercial castes—built up monopolies of *patwariships* within certain areas. When the same connections also dominated the offices of *kanungo* and *tehsildar* intermediate between the *patwaris* and the British district officers, it was very difficult for a district officer to know what was really happening to the *patwari*

agency, or to exercise effective control over it. No *kanungo* or *tehsildar* belonging to the same connection as one of his subordinate *patwaris* would denounce him for fudging his returns; and every *kanungo* and *tehsildar* belonging to the same faction as a candidate for office would unite in support of his application. Thus in Bannu *patwaris* notoriously fudged the agricultural returns, and were able to go on fudging them because they belonged to Hindu cliques in a district in which the Muslim agriculturalists—90 per cent of the population—were too ill-educated to take their place.³⁴ In Hoshiarpur a single Brahman family of hereditary *kanungos* held thirty-three posts as *patwaris* in one *tehsil* (Una), and five posts as *kanungos*.³⁵ In Gujranwala, when the settlement officer tried to break the Hindu moneylenders' monopoly by appointing agriculturalists, the innovation 'was looked upon by the Khattris, Aroras and Ulemas who had hitherto monopolized these appointments, as well as the *kanungoships* and most of the posts in the district office, as an encroachment on their monopoly, and the *tehsildars* and deputy superintendents were at first apt to be too critical of the new men. It will therefore be necessary for deputy commissioners hereafter to watch carefully future appointments, and see that things do not revert to their old groove.'³⁶ And in Ludhiana the Sials 'held almost every circle within ten or twelve miles of the city, besides nearly all the *kanungo* appointments. The *patwaris* of the Bet were of this tribe, and many of them carried on large moneylending businesses, openly in their homes, with the Muhammedan proprietors. It took a great deal of trouble to break up this clique, which was a very strong one, the Sials being the most clannish tribe in the district, and many of them being high up in government service; and I have no doubt that every means will be employed by them with a view to the recovery of their ascendancy.'³⁷

The effect of these connections was to relax the discipline essential if accurate agricultural statistics were to be collected. They made it possible for the *patwaris* to ignore the instructions regarding their collection painstakingly promulgated by the directors of land records. Where *patwaris* were so undisciplined that they flagrantly defied the British revenue officers by moneylending, or forged the entries relating to mortgages in their record of rights so that they or their relatives could use them as evidence in civil suits expropriating their peasant debtors, it was clearly impossible to compel them to keep up reliable registers of agricultural output.³⁸ It was impossible, in particular, to compel them to live in their circles—as the *patwari* rules obliged them to do.³⁹ Agriculturalist *patwaris* preferred to live in their natal villages; *patwaris* from the commercial castes preferred to live in towns. They paid fleeting visits to their circles, usually timed to coincide with their

superiors' tours of inspections, and did their work in the most cursory way.⁴⁰ 'If a *patwari* with his family lives in his circle, a settlement officer explained, 'he is almost certain to do his work well. Being generally a man of some intelligence, he will, when shut off from the amusements and distractions of the town, where, if allowed, he always chooses to live, necessarily occupy his thoughts with matters around him ... The orders of the supervising officers will be the more readily carried out, because living on the spot of their execution, he finds them more easy to carry out; and he cannot help acquiring an intimate knowledge of his circle and of the circumstances of the *zamindars*, for the daily talk about him will be of little else.'⁴¹ But if *patwaris* were habitual absent-tees, 'crop statements were often filled up without seeing the fields, and instances come to notice of a *patwari* making one crop statement serve for two or more years without even taking the trouble to disguise the trick by a superficial alteration of the figures'.⁴² Settlement officers frequently complained of fraudulent crop returns. In Karnal, for example, the *girdawari* 'was often done in the village guest-house' instead of in the fields; usually 'by simply repeating the entries as to cultivation contained in that of the previous year. Some *patwaris* ... paid the superior revenue establishment the compliment, which was probably undeserved, of supposing that this simple device might be detected, and only made the *jambandis* of alternate years copies of each other.' Not surprisingly, the resultant statistics were proclaimed 'a farce, and the annual papers a fraud'.⁴³

In other areas conscientious *patwaris* found it genuinely difficult to carry out accurate *girdawaris*. It took generations before the whole of the Punjab was accurately surveyed; and village maps soon became misleading between settlements, if cultivation changed. Sometimes the *patwaris'* circles were too large to be easily inspected. This was the case in the hills, where *patwaris* were never expected to inspect every scattered patch of cultivation hidden up a ravine or on top of a hill.⁴⁴ In the desert-like plains, where each revenue estate contained huge areas of wasteland, punctuated by isolated wells;⁴⁵ and in districts where the cultivated area expanded faster than the *patwari* establishment. When irrigation from the Western Jumna Canal spread over Rohtak at the turn of the century, the settlement officer protested that the *patwaris'* numbers were 'insufficient and their abilities much below the average. The increase of irrigation, the reversion of fields of a reasonable size in which the *girdawari* can be a matter of accuracy instead of a farce, and the necessity for improving the standard of the records of the district and preventing a relapse to their normal state, furnished good grounds for asking for an increase in the staff. Unfortunately this was refused ...'⁴⁶

Snow in the hills, heat in the plains, floods in the river valleys were all additional disincentives to accurate field inspections. But the critical factor determining the *patwaris'* accuracy was the quality of the supervision they received. If their returns were regularly checked and mistakes punished, many *patwaris* were capable of compiling accurate statistics of crop areas. But the returns of agricultural statistics, as distinct from the revenue returns, were rarely checked. The *patwaris'* immediate superiors, the *kanungos* and *tehsildars*, had better things to do. They preferred to devote their limited time and energy to efficient revenue collection and maintenance of reliable records of rights. Both had an obvious purpose;⁴⁷ the agricultural statistics—in the eyes of the middle-ranking Indian revenue official—had none. Crop inspections were important only in areas under fluctuating assessments, where the land revenue demand *each year* was directly linked to the harvest. This was the case in the most insecure areas: areas where the crops were dependent on rainfall that might not fall, or river floods that might not rise.⁴⁸ In such tracts, *kharaba* inspections—inspections of the extent of crop failure—determined the amount of land revenue remitted. A different kind of fluctuating assessment was also common in the most secure tracts: those irrigated by the great perennial canals. In the Punjab canal colonies cultivators were charged rates varying with the value of different crops on the areas they harvested. The irrigation department maintained a special *patwari* establishment specifically intended to conduct the crop inspections on which the canal revenue charges were based. But both these forms of inspection had their limitations. They were vulnerable to corruption. It was well worth the cultivators' while to bribe the *patwaris*, so that deliberate fraud—the understatement of matured areas and mis-classification of the more valuable crops—replaced simple negligence. Peasants always resisted the introduction of fluctuating assessments in insecure areas because the knew the bribery it would involve; and the Punjab canal colony disturbances of 1907 were in large measure a peasant protest against the corruption of the subordinate officials with whom they came in contact. There is some suspicion also that, in the irrigated tracts at least, the *patwaris'* normal inclination to under-report the area of crop failure 'to save themselves trouble' and favour government was reinforced by their immediate superiors' determination to conceal extensive failures in case they reflected on their own mismanagement of the water supply.⁴⁹ To what extent bribery overcame this tendency to overstate matured areas is impossible to say.

The fluctuating assessments, moreover, never covered more than a fraction of the total cultivated area. Over the rest of the Punjab the *kanungos* and *tehsildars* never realized their responsibility for the agricul-

tural statistics. In the 1880s, indeed, when the new-style agricultural statistics were first collected, they were generally inefficient. 'There are men', the director of land records wrote of the *tehsildars* in 1886, 'whose custom it has been never to leave their tehsils if they could possibly help it, and these men are very loath to change their habits and begin moving about actively. It is feared that such men, when they do go out, frequently do very little real inspection work; some from ignorance, others from indolence.' The *kanungos* were little better: there was the old hereditary *kanungo*, a man of ease and generally good social position, with a considerable amount of local knowledge which ... can be squeezed gently out of him, but as for hard daily work, it is not at all in his thoughts. He is altogether out of place in the new system, and is simply obstructive. We are getting rid of him. ... Then there is another kind of man, unacquainted with his work, and apparently appointed by mistake; or because he could ride or write a good hand. The director of settlements slays this man at once and rightly. ... The third class is the intelligent *patwari* appointed to act as a *kanungo*. This man knows his work and often tries to do it. Where he fails is in establishing his personal position of authority among men formerly his equals, and who, some of them, are nearly as good as he. He fails, too, sometimes in method, and is apt to keep too much to petty detail. ... The last class is that of men imported from settlement work direct. He is generally superior in knowledge and especially in *style*, added to which he comes with an air of authority. ... We want more men of this stamp.⁵⁰

The agricultural returns prepared under the supervision of these *tehsildars* and *kanungos*, and appended between 1866 and 1884 to the provincial government's annual administration reports, were 'little better than waste paper'—as the reports themselves disarmingly confessed.⁵¹

In the 1880s the government of the Punjab embarked on a programme of reforms intended to improve the quality of the subordinate revenue staff, and so the quality of the agricultural statistics. There were few tenant rights to defend in the Punjab; it was a province of peasant proprietors. But it was hoped that 'a continuous record of agricultural fact' would simplify the process of resettling the land revenue, and show where the state could most effectively intervene to promote agricultural improvement. Conventional revenue settlements dispensed with accurate agricultural statistics; the new type of resettlement that the 'young Turks' of the 1880s wished to introduce depended on them. The theoretical (legal) standard of assessment—'half net assets'—was half the Ricardian rent of each holding: the value of the produce, minus the cost of production. This should have forced settlement officers to work out the value of the agricultural produce (the 'produce estimate'), which would have made accurate statistics of crop yields and areas indispensable. But assessments were based, in practice, on the

prevalent levels of cash rents. Only where cash rents were too rare to represent the 'true letting' value of land was the produce estimate taken seriously; even then it was based on data collected by the settlement officer for a few years during settlement, not on the continuous records of area and yield supposedly kept up by the *patwaris*, which were considered too unreliable. Nor was the produce estimate ever very accurate. Settlement officers were at pains to emphasize the 'speculative' nature of their own data. They were able—and this is the key to the revenue officers' indifference to the agricultural statistics—to assess without an exact produce estimate. They could do this because, in the late nineteenth century Punjab, the pitch of the land revenue was low and falling. They had no need to work out the exact capacity of each estate to pay; they knew the *iamas* they intended to impose were sufficiently low to be easily paid. The only test of a settlement was how easily it worked: if it broke down it was obviously too high, if collections were made easily it was probably all right. Almost all the settlements made in the Punjab in the first fifteen years after annexation broke down. They were unrealistically pitched, and agricultural prices fell. The next official generation, determined not to repeat the same mistake, ran to the opposite extreme. Despite the protests of the Government of India at the sacrifice of revenue, late nineteenth-century Punjab settlements were pitched well below the true 'half net assets' standards and the effective pitch of the initial demand of each resettlement fell rapidly as agricultural prices rose and cultivation extended. It was this fall in the incidence of the land revenue that made it possible for settlement officers to assess on 'general considerations'—increase in cultivation, population, prices, and trade—rather than an exact knowledge of agricultural conditions.⁵²

It was not so much the subjectivity of resettlements, however, that provoked official disquiet as their cost. Large peripatetic settlement parties were necessary, which moved from district to district surveying the villages and bringing their records of rights up to date before the settlement officers finally assessed them. The state had to pay their salaries; and the villagers had to bribe them and feed them. Revision of the record of rights always precipitated a deluge of litigation; and the record, revised at such expense, rapidly became obsolescent when the *patwaris* neglected to maintain it. After plans to extend the permanent settlement to northern India were abandoned about 1870, Sir William Muir (then Lieutenant-Governor of the North-West Provinces) suggested a system of 'self-regulating' settlements intended to simplify and cheapen the process of resettlement. If, Muir argued, accurate records of rights and agricultural output could be kept up between settlements by the ordinary village *patwaris*, the revision of the

record of rights could be enormously truncated, and the new assessments could be 'automatically' calculated on the basis of the agricultural statistics already available in the village notebooks. This work, moreover, could be done by the village *patwaris* under the settlement officer's supervision.⁵³

The desire of other north Indian revenue officers—notably Sir Edward Buck—for a more positive agricultural development policy worked in the same direction, towards the maintenance of more accurate village records.⁵⁴ The famine of 1877–79 radicalized official opinion, heightening the bureaucracy's receptivity to new proposals; and after the Famine Commission reported, a new Revenue and Agriculture Department was set up at the centre, and new Departments of Agriculture and Land Records in the provinces. The Government of India's continuing unwillingness to meet the cost of agricultural research and extension workers, however, compelled the new departments to concentrate on the introduction of 'self-regulating' settlements. The first of these new-style settlements broke down because of the *patwaris'* incompetence.⁵⁵ They proved incapable of revising their own maps and records of rights; special settlement parties had to be sent to their rescue. It was not until the *second* round of resettlements, between twenty and thirty years later, that the improvement in the maintenance of the village records made it possible to rely on the regular *patwaris* to do much of the work of settlement, and utilize their crop inspections between settlements. This improvement, moreover, was far from uniform. It awaited the resettlement of each district. When the *patwaris* were required to survey their villages and correct their records of rights, as well as keeping their routine revenue accounts, a Darwinian selection of the fittest took place. The incompetent were exposed; and on average about half the *patwaris* in each district were dismissed. Despite the difficulties of recruitment, the new *patwaris* were on balance better educated and better trained. They enjoyed higher pay and better prospects of promotion; they were chosen less for hereditary connection and more for personal ability; and they were more closely supervised, making it possible to enforce the rules regarding residence and moneylending.⁵⁶

These changes were gradual, and to a certain extent they were ephemeral. Between settlements the *patwari* agency in each district relapsed. Only the perpetual vigilance of successive district officers could maintain a *patwari* establishment at the high point it reached under the settlement officer's regime; and few district officers could spare the time. Unlike the settlement officers, they had too many judicial cases to try, too many returns to complete, too many reports to write, 'With the ever-increasing burden of criminal and miscellaneous work', the Director of Land Records complained in 1913, 'the supervision of the

land records is becoming yearly less efficient. Collectors generally have not time for more than intelligent direction, but even this is not given in the majority of cases, chiefly owing to lack of knowledge and experience...⁵⁷ 'No systematic check of land record work is undertaken by local officers on the plea of want of time, while government rejects the plea, but does not insist on any definite method or standard of check.'⁵⁸ At the crucial intermediate level—the level of the *kanungo* and *tehsildar*—there was little change. 'The land record work of tahsildars and naib-tahsildars', the same director wrote,

is... exceedingly perfunctory. They spend very little time away from headquarters, preferring to ride or drive out for a few hours, and then return... This is not in my opinion 'camp' within the meaning of... the Land Administration Manual; it wastes time and leads to superficial inspections, as the work has to be hurried through so that the officer may get back to headquarters... It is not, therefore, to be wondered at that the thorough scrutiny of every *kanungo's* and *patwari's* work prescribed by... the Land Administration Manual is never made... *Tahsildar* and *naib-tahsildars*... have time to camp and to perform their revenue duties properly but they do not care about land record work, and so they shirk it, knowing that their neglect of it will in most cases pass unnoticed by over-worked collectors and revenue assistants.⁵⁹

Such was the situation on the eve of the First World War; thereafter it deteriorated. In the inter-war years the land revenue system ran down; and the agricultural statistics—or at least the inspections of crop areas—as an unimportant by-product of the system can hardly have avoided the general decline.⁶⁰ There was no catastrophic breakdown; but the subordinate revenue officials became less disciplined. The first *patwari* strikes in the Punjab broke out after the First World War, when rapid inflation—outstripping belated increases in *patwari* salaries—coincided with the first non-cooperation movement. A decade later, at the height of the Red Shirt movement, control over the subordinate revenue agency in the North-West Frontier Province collapsed completely, and was only incompletely restored.⁶¹ The district officers had less incentive to maintain their efficiency. Land revenue lost its importance as the dominant source of government revenue; new forms of taxation like income tax or the high customs duties imposed after 1916 took its place. In the 1920s the Punjab Revenue Act reduced the maximum pitch of assessments to quarter net assets, and extended the normal duration of settlements to forty years.⁶² At the same time nationalist unrest and 'nation-building activities' distracted the bureaucracy; high flying careers were built on the successful handling of 'political' problems rather than efficient land revenue administration. The effect on the agricultural statistics was apparent to one of the last British settlement officers in the Punjab. 'Lahore', he wrote in 1943,

is a district in which the attention of the collector is continually distracted by urban and political affairs and the result is apparent in the work of the *patwari* and *kanungo* staff which is much below average. Between settlement *tatimma shijras* were seldom correctly prepared and often not prepared at all, mutations were sometimes not entered for years on end, and the statistics in the notebooks were exceedingly unreliable. To put things right an experienced staff of *tahsildars*, *naib tahsildars*, and settlement *kanungos* was needed, but owing to the dearth of settlements in recent years, such men were not available.⁶³

Crop Yields: The Impossible Average

Opinions as to the reliability of crop acreage figures might vary; but no one involved in the collection of yield statistics had much confidence in them. There were two series: the 'normal yields' of each major crop in each district, and the 'seasonal condition factor' by which the normal yield was multiplied to arrive at the out-turn of any given harvest. Supposedly firmly grounded in objective crop cutting experiments, both were in reality largely subjective estimates. The first statement of 'normal yields'—submitted in 1892 in response to a requisition from the Secretary of State, who wanted information to answer questions in Parliament—was not based on any systematic scheme of crop cuttings. Yields were derived, instead, from a strange miscellany of sources. In temporarily-settled provinces the settlement officers' estimates were adopted as the best available; in permanently-settled provinces like Bengal secretariat officials desperately raided old gazetteers and famine inquiries.⁶⁴ Nothing, they discovered, was known of the yields of many crops in a large number of districts, and such data as they did discover had been collected in difference ways at different times, so that the reliance which could be placed upon it varied greatly. The key sources in Bihar were A. P. MacDonnell's enquiry into the foodgrain supply, made after the famine of 1874-75, and the relevant volumes of Hunter's contemporaneous *Statistical Account of Bengal*. MacDonnell had found the 'question of average rates of produce... one of the most perplexing with which I have had to deal. One maund, more or less, per acre may alter the complexion of a conclusion; may make a district look prosperous, while it really gives a bare sufficiency to its people; or make it look poverty-stricken, whilst it is in reality prosperous'.⁶⁵ Hunter supplemented Buchanan Hamilton's surveys—made in the early decades of the nineteenth century—with district officers' estimates based on their subordinates' general knowledge.

So haphazard information up to eighty years old was 'adjusted' according to the personal predilections of the individual official charged with filling up the Government of India's table; and the striking characteristic of the resultant 'mere approximations to truth' is how long they survived unchanged. It was hoped they would soon be superseded

by the results of systematic crop cutting.⁶⁶ But systematic crop cuttings never materialized. The earliest returns of crop cutting experiments were riddled with inexplicable discrepancies, and if these became less obvious over time, it was not because they became more reliable. Rather, the officials who collated them learnt what kind of result provoked enquiry or reprimand, and converted anything out of the ordinary into minor oscillations around conventional norms, which acquired authority through sheer repetition. In the province in which most care was taken with crop cutting:

There is uncommonly little system. There is a vast number of crop cuttings, the area of experimental plots and numberless other data varying at the will of [the] experimenter, who may be anyone from a *mandal* [village officer] upwards. No sort of accuracy is claimed for any of them.⁶⁷

In the Punjab:

Very great differences occurred in the estimates for land of identical quality and advantages situate in adjacent districts. For instance . . . well lands in Jhelum were estimated to yield 300 seers and lands of identical quality and advantages in Rawalpindi 400 seers.⁶⁸

In Bengal:

The data supplied by District Officers was [*sic*] so discrepant and manifestly untrustworthy that the attempts proved wholly fruitless. The statistics recently published by this department are mainly based on guesses, and although they may be useful in showing the relative importance of crop cuttings, they cannot be depended upon in forming estimates of crop outturns. The system of crop cuttings has not yet been adapted to Bengal, and . . . even if the areas under different crops were accurately known . . . the mistake of a few seers in the outturn would lead to an error amounting to several million maunds for the whole province.⁶⁹

When the first quinquennial reports on crop cutting were submitted to the Government of India in 1898, the Imperial Revenue Department decided they could not be used to correct the original estimates of 'normal yield' made in 1892, because they were less reliable than the educated guesses of revenue officers on which the original estimates were largely based. Despite 'sifting' by provincial directors of land records, some blatantly implausible yields slipped through: the average yield of cotton per acre was 68 lb; the highest yield known in America, in the most favourable year on the most favourable soil, was 500 lb; yet Ajmer-Merwara reported an average yield of 908 lb. Such discrepancies cast doubt on the entire return.⁷⁰

The next quinquennial reports (for the quinquennium 1897-1902) met the same fate. 'A close examination of the present figures shows that they do not justify any general conclusions as to the yield of the

several crops,' the Director of Land Records for Bengal wrote in his annual report: 'one officer returned 484 lbs. of cleaned cotton as the average yield and within a few months reduced it to 41 lbs.'⁷¹ When the Punjab director actually altered some of the 1892 yields in the light of subsequent crop cutting, he was denounced by his successor, who compiled the next quinquennial return without reference to them. But the settlement officers' estimates which he preferred were in turn denounced by the Lieutenant-Governor: 'Every settlement report that I have seen has admittedly understated yields . . . The assumed yields should be raised by 25 or even 33 per cent.'⁷² Later directors were similarly frustrated: 'The wheat yield for 1926/7', H. K. Trevasik noted, 'is based on the years 1917/18 to 1921/2. When . . . I recommended that the average should be taken of the five years immediately preceding the year under consideration . . . this proposal was rejected as too revolutionary. I am inclined to think it was too conservative and would have only given a fallacious appearance of accuracy to a system inherently vicious.'⁷³ The next set of quinquennial estimates (for 1927-32) led to an identical apology on yet another director's part.⁷⁴

In Bihar, the directors of land records were content to let the original 1892 yields alone. They pursued a policy of 'frightful candour', returning even the most blatantly absurd results—the outturn of irrigated sugar as 1,854 lb, the outturn of *unirrigated* sugar as 3,229 lb—with the caveat that

no reliable data have yet been collected to justify any modification in the conclusions which were come to in the year 1892. I regret to say that the returns collected during the last year do not afford any reliable information and I cannot recommend their acceptance or any deductions being drawn from them.⁷⁵

In 1917 and again in 1920 the Bihar Director drew the Government of India's attention to the 'enormous variations in the yields reported as average and the absurd results obtained'; and when the Government of India petulantly inquired why the estimated provincial yield of winter rice (by far the most important crop) was so much higher than that returned for the most famous rice growing districts of the United Provinces or Bengal, he stopped all the crop cutting experiments.⁷⁶ Five years later the provincial government discovered what the director had done: 'I am not sure', the provincial Revenue Secretary reassured his superiors, 'that this has done any harm.'⁷⁷ The Government of India was not unduly disappointed when the next quinquennial report failed to arrive; officials inside the imperial secretariat were hardly bothering to discuss the crop cutting experiments' unreliability. 'As financial stringency has prevented adequate attention to crop cutting . . . the vice-chairman of the Imperial Council of Agricultural Research noted, 'this department has no comments . . .'⁷⁸

The crop cutting experiments failed, in part, because their coverage was too limited. In the Punjab they were restricted to 14 out of a total of 30 districts, and to 10 staple crops—and not all 10 crops in each district.⁷⁹ But at least the Punjab experiments formed parts of a coherent scheme: in Bengal the number of cuttings taken, the range of crops cut, and the manner in which the cuttings were made, all depended on the whim of the district officer and his subordinate officials. The real key to the experiments' failure was neglect. The district officers nominally responsible never appreciated the experiments' importance; never conducted experiments themselves; and rarely troubled to supervise their subordinates. Often they forwarded returns to the provincial secretariats without reading the tables they initialised. Even where they appreciated the experiments' importance, it was difficult to supervise them effectively. They could check the crop inspections easily enough; all they had to do was ride round the fields at any point between the *girdawari* and the harvest noting which crop had been sown in which field. But they had to be on the spot at the exact moment of the harvest if they were to check a crop cutting experiment, and few superior revenue officers felt strongly enough about the experiments to make the effort.⁸⁰

Left to themselves to select 'representative' plots, the subordinate revenue officials usually selected above average fields, made their cutting in the middle of the field instead of at the edges (where yields were lower), and harvested the crop with less wastage than the ordinary cultivator (who had to cut and process far larger areas in a limited time).⁸¹ 'They have a notion', the *Settlement Manual* remarked of the *patwaris*, 'that it is as well to make the entry which may be supposed to be most favourable to the interests of government.'⁸² Occasionally two cuts were taken—one where the crop was thinnest, one where the crop was thickest—but the average of the two was still too high. The distribution of yields in a rice field was such that in a field with a true mean of 15 *maunds* it might be possible to find 1/20 of an acre (the standard size of many cuts) yielding 40 *maunds*; it would obviously be impossible to find one with a yield of *minus* 10 *maunds*. 'The method', a Bihar settlement officer tartly remarked 'is not far different from attempting to estimate the average income of a population by taking half the sum of the incomes of the poorest man and the richest man in it.'⁸³

Punjab settlement officers in search of yield data for produce estimates explicitly rejected the inter-settlement crop experiments conducted by the district staff. 'No reliable experiments had been carried out prior to settlement' was the succinct verdict of M. M. L. Currie in Ferozepore in 1915.⁸⁴ Thirty years later, in Gurgaon, the position was the same: 'experiments between settlements are meagre and unreliable'.⁸⁵ In Bihar settlement officers simply made no mention of the

district staff's experiments; they might as well have never been. Crop cutting under the settlement officers' supervision was better, but unless the settlement officer harvested the crop himself

The results are untrustworthy. No native has the least idea of the necessity of minute accuracy; so that if he really does cut down the crop, and does not make simply a paper experiment, the result is sure to be vitiated by his inaccuracy. It is, however, impossible for a European officer to do much in the way of making experiments, especially for a settlement officer, who is constantly on the move and cannot drag his crop around with him. He may be obliged to go to inland tracts just when the river crops are fit to be cut. As regards some crops, such as cotton, sugarcane, hemp and pepper, it is impossible to ascertain by actual experiment what the outturn is unless one gives up weeks to the task. And at the best, only a small portion of the field can be reaped; and it is very unsafe to assume that the outturn of the whole field will be in proportion to that of the small portion, let alone the outturn of a tahsil for a series of years.⁸⁶ Settlement officers' subordinates, no less than the collectors, 'like all native government officers, felt it their duty to favour government by selecting good crops on good land'. They tended 'to look to the better rather than the worse fields'; 'to make insufficient allowance for dry-age'; to ignore 'fields which are planted . . . with paddy and bear no crop at all . . .';⁸⁷ As a test of the success with which average fields were really selected, a Punjab settlement officer conducted a series of maximum experiments in one year concurrently with the average experiments. 'It would only surprise a novice', he concluded, 'to find that the outturns of the bumper fields were usually less than those of the average crops.'⁸⁸

So the results of crop cutting experiments were too high. But too high relative to what? The operative definition of the 'normal' yield varied from time to time and place to place. The 'mature' official definition did little to help: the normal yield was

That crop which past experience has shown to be the most generally recurring crop in a series of years; the typical crop of the local area; the crop which the cultivator has a right (as it were) to expect, and with which he is (or should be) content, while if he gets more he has reason to rejoice, and if less he has reason to complain; or in other words, it is the 'figure which in existing circumstances might be expected to be attained in the year if the rainfall and season were of an ordinary character for the tract under consideration, that is, neither very favourable nor the reverse.' Briefly, it is stated to be the 'average yield on average soil in a year of average character.' This normal or average yield will not necessarily correspond with the average of a series of years figures, which is an arithmetical average.⁸⁹

So vague and prolix a description not only confused subordinate officials, it led to endless controversy within the secretariats. Did this 'soul-stirring and mouth-filling formula'⁹⁰ signify mean or mode?

After twenty-five years there was still no agreement at the highest levels of the administration; while at village level

this standard is and must remain indefinite. The zemindar will inevitably treat the normal on the basis of expectation rather than experience; the normal is for him some crop such as was harvested in the golden age, which he has prayed for every year and seldom seen. This is his standard in ordinary times; where settlement is impending the normal becomes a meagre and unremunerative figure, reflecting the gloom which overtakes the countryside at the suggestion of enhanced revenue.⁹¹

The 'most frequently recurring crop' was an abstraction difficult for anyone, peasant or subordinate official, to visualize: what they could understand was the actual crop, or the actual crop's relationship to a fully-matured crop: the crop they wanted to see.⁹²

Whatever the 'normal' might be, settlement officers found it little easier than their Indian subordinates to select 'representative' plots which would give the normal yield. A tautology was involved: in order to discover what average yields were, settlement officers had to know what average yields would be, in order to select 'representative' plots. It was hard enough to judge the outturn of a single field; it was well nigh impossible to estimate the average outturn of areas as large and diverse as a *tehsil* or a subdivision, when districts were the size of English shires.⁹³ Harvests fluctuated wildly: in Muzaffargah 'there are no true averages, and nature works by extremes, so that there is no standard of outturns, either from year to year or from estate to estate.'⁹⁴ In the *dhara* of Bihar—tracts annually submerged beneath the rising rivers, which left behind a deposit of fertilizing silt one year, and barren sand the next—bumper harvests alternated with total failure.⁹⁵ When 'the produce of former years . . . is just what we do not know', it was difficult to relate the results of a single season's crop cutting to longer-term averages.⁹⁶ The range of soil fertility was wide: in Hazara 'even within the limits of the assessment circle the soils vary so widely from the best to the worst, such estimates, however numerous and careful the crop experiments, must be very largely guess work'.⁹⁷ There were no soil surveys to show the area of each soil, which would have made it possible to weigh the results of individual experiments: so that when experiments on wheat in one small assessment circle gave yields varying from 26.4 to 640 lb per acre, and the probable area under each yield was unknown, striking a meaningful average became impossible.⁹⁸ There were no figures, either, to show the extent of the different varieties of the same crop, although the highest-yielding rice gave many times the yield of the poorest.⁹⁹ Nor was the exact significance of areas recorded as double-cropped clear: sometimes it meant paddy followed by a full crop, sometimes it meant paddy followed by a scratch

crop.¹⁰⁰ 'The method', Sir John Hubback concluded, 'is comparable to estimating the average income of the population of a town by watching the streets for a few days, and then picking out a man, who looked to be in average circumstances and discovering what his income is.'¹⁰¹

Disenchanted with crop cutting experiments, settlement officers sought additional evidence of yields in the opinions of local cultivators, the accounts of landlords realizing rents in kind, and—above all—the yields assumed in previous settlements.¹⁰² Each source had defects of its own. 'It is utterly useless enquiring from the people,' W. E. Purser exclaimed, 'they reply with the most barefaced and self-evident falsehoods. Now and then a man may be entrapped into a damaging confession, or a simple-minded cultivator may blurt out the truth; but such cases are rare.' The peasants of Bihar were no better: 'the statements of the people themselves are of course absolutely untrustworthy.'¹⁰³ Few settlement officers were quite so cynical: but both landlords and tenants had ends to serve. Tenants afraid that their rents would be enhanced or commuted had good reason to understate yields: so had landlords afraid that the land revenue (or the cesses they paid in permanently-settled provinces) would be increased. Landlords whose kind rents were about to be commuted or reduced had a powerful incentive to *overstate* yields. In any event, they found it difficult to give reliable answers. The tenants kept no records; the landlords' records were manipulated by his employees, anxious to conceal their own systematic peculation.¹⁰⁴ Comprehending a measure of area, much less a 'normal' yield, posed problems. 'They could tell me', a Kulu settlement officer wrote, 'how many measures of grain they expected from a measure of seed, and also what measure of seed of each kind was required for the ground that produced a given measure of barley'—but not the area of the ground.¹⁰⁵ Settlement officers, accordingly, relied heavily on the yields assumed in previous settlements. MacDonnell remained a favourite quarry in Bihar; in the Punjab a settlement officer explained in 1929, with no sense of the irony involved, 'The majority of these yields have come down unchanged since the first regular settlement (1870-78), and have stood the test of experience.'¹⁰⁶ These yields were not only highly conservative; they were also far lower than the results of the crop experiments; lower even than the settlement officers believed the true average to be. Concerned to minimize the possibility of accumulating arrears of unrealizable land revenue, to restrict rent enhancements, and to ensure that famines were relieved in time, they preferred to 'err on the safe side'—the phrase runs through the entire settlement literature—by understating output.¹⁰⁷ The ordinary settlement officer may not have worked out his yields by guessing 'at that average . . . which he

thinks is least likely to provoke the criticism of the financial commissioner's clerks, who may never have seen a wheat field in their lives',¹⁰⁸ but he did undoubtedly adjust his yields to fit the assessments he wished to impose. 'A system', the Punjab government decided, 'under which the assessment rates are first devised and the assumed outturns are subsequently determined is open to considerable criticism from a theoretical point of view; but in consideration of the uncertainty of our outturn estimates and the rough manner in which they must be utilised in fluctuating assessments' the procedure was approved.¹⁰⁹

Both sources of data on crop yields—the regular experiments undertaken by the district staff (which were too high, and tried to cover entire provinces superficially) and the yields assumed by the settlement officers (which were too low, and dealt with individual districts at thirty-year intervals)—were fed into the machine that ultimately regurgitated the impressively bound volumes of agricultural statistics. Exactly what happened to them there is difficult to determine. As always, they were never processed in a uniform way. The *tehsildars* at *tehsil* level, the sub-deputy collectors at subdivisional level, the deputy commissioners and collectors at district level, the directors of land records and agriculture at provincial level, all 'adjusted' the data they received from their subordinates in an attempt to arrive at averages for ever-larger territorial units. These adjustments were not statistically sophisticated. To calculate a mode or a weighted average 'would require a statistical agility which is far beyond any tahsildar, and in practice the tahsildar estimates in maunds per acre what he thinks is a reasonable amount . . . The fallacy underlying this procedure lies in the assumption that the term "average yield per district" has any meaning at all.'¹¹⁰ Some directors used the routine crop cutting results; others preferred the settlement officers' assumptions; frequently estimates of normal yields were amalgams of the two. The specific decisions were based on no consistent principle, except perhaps the belief that if only a large enough number of estimates was averaged out, however wide of the mark individual estimates might be, the result would turn out to be the right yield, because estimates which were too high would cancel out figures that were too low. A secretariat official exposed this fallacy: 'Put crudely, it amounts to this: that while $0 \times 1 = 0$, $0 \times 1000 = 950$. If very little reliance can be placed upon an individual experiment, the fact that it is repeated a thousand times does not make it any more trustworthy.'¹¹¹

The seasonal condition factors by which these normal yields were multiplied to arrive at the outturn of any given harvest were, in origin, estimates made by the Punjab *patwaris* and the Bihar circle or subdivisional officers. They were called upon to appraise the harvest at so

many annas in the rupee, taking a 'normal' harvest as 12 annas.¹¹³ In theory the crop could be appraised to within one anna (3-4 per cent), but subordinate officials tended to think in terms of much larger units. Estimates grouped themselves around the 0, 4, 8 and 12 anna marks: so that the maximum margin of error due to the size of the reporting units alone could be over 12 per cent. A further source of error was the *patwari's* alleged pessimism. 'The figure given in the final forecasts for the district', one settlement officer warned, 'is most unsafe as a guide. The average figure . . . for the years 1900-1910 is no where higher than 79%. It should of course be nearly if not quite 100.'¹¹³ But testimony on this point conflicts. Other authorities suggest that *patwaris* under-reported areas of failure to save themselves trouble and that their superiors in both the revenue and irrigation departments minimized failures in case they reflected on their mismanagement of the tract concerned.¹¹⁴ Probably deliberate bias was less important than the sheer difficulty of relating a given harvest to a hypothetical 'normal'. Bowley and Robertson's considered judgement was that *patwaris* tended to report (i) no change from the previous year, or (ii) an average crop, when the yield is moderate, (iii) to underestimate a good crop, and (iv) to exaggerate the fall in the case of a bad crop. This is as near the mark as we are likely to get.¹¹⁵

The estimates of seasonal condition were then subject to the same errors of statistical method as the crop cutting experiments. 'In the Indian procedure', Bowley and Robertson acidly observed, 'the detailed arithmetical methods that would give more accurate results are almost deliberately avoided.'¹¹⁶ Some of the *patwaris* and the *chaukidars*' superiors worked out arithmetic averages of their returns; some chose the figure that occurred most often; a few tried to weight the figures by the areas to which they ostensibly related; many ignored the returns altogether and reported a number on their own judgement.¹¹⁷ 'All that is done', Hubback wrote of Bihar,

is for the local police officers to make a guess, at which in succession the subdivisional officer, the district officer and the director of agriculture guess again. When it is considered that the percentage depends ultimately on the effect of the weather on very various soils, cultivated with varying degrees of skill and enterprise, planted with different kinds of rice, protected by irrigation works of greater or less efficiency or completely unprotected, liable to or immune from crop pests, and finally harvested over a period of nearly three months, it becomes apparent that the guessing ability of the officers concerned has to be remarkable. Unfortunately, too, not one of them has the least chance of finding out whether his guess was fairly right or wildly wrong. Hence the existing statistics of rice production are, I believe, the result of applying to a fairly accurate figure of area an arbitrary standard of normal yield, and a pure guess of the condition of the year.¹¹⁸

Disatisfaction with the 'normal yield times seasonal condition' formula led to its supersession in the Punjab in the 1920s by direct estimates of outturn, as so many *maunds* per acre each harvest. 'Great discrepancies', however, were soon discovered between the direct estimates of 'experienced agricultural officers . . . and it is hopeless to expect anything better from the ordinary untrained reporting agency'. Experiments conducted by the Imperial Council of Agricultural Research to check the accuracy of direct estimation were not reassuring:

Cultivators, whether owners of the crop or their neighbours, consistently over-estimated yield in trying to forecast it from the standing crop, the difference being that the neighbours' forecast was generally higher than that of the owners. The agricultural staff placed the yield at a higher level still. . . . Forecasting by the field staff of the [ICAR sample survey] was slightly better than that of the agricultural assistants, being probably more carefully made. . . . [But] the various correlation coefficients [were] of the same order. This correlation is not high enough to make these forecasts very accurate.¹¹⁹

The influence of the old 'normal yields' persisted in the new direct estimates of each harvest, 'as every official who is concerned with the preparation of forecasts is aware of what the normal is'.¹²⁰

The direct estimates made by the subordinate staff of the revenue and agriculture departments were processed in the same way as the seasonal condition factors.¹²¹ In the district (Lyallpur) investigated by the ICAR scheme, the *tehsildars* arrived at their *tehsil* averages 'on the basis of general impressions and information gained by [themselves] and [their] staff'; while the deputy commissioners adjusted about half their figures, generally upwards, sending on the rest of the *tehsil* figures unchanged. Adjustments of 30-40 per cent were common; changes of 60-70 per cent were not unknown. In calculating the district outturn, the *tehsil* estimates were simply added together: if a weighted average (for the area of each *tehsil*) had been taken, the district out-turn would have been 10 per cent lower. The agricultural assistants in the *tehsils* sent their estimates to extra assistant directors of agriculture, who worked out the district production as a simple average. The fact that the agricultural assistants' original estimates were not revised upwards brought the two departmental series closer together: the *tehsildars*' original estimates being almost always lower than the agricultural assistants'. At the provincial level the director of agriculture compromised between the two sets of data, with a slight bias towards his own subordinates. The actual compromises 'were based on no consistent principle'.

Dissatisfaction with the 'normal yield times seasonal condition factor' in Bihar led to a methodological breakthrough which ultimately revolutionized the quality of Indian agricultural statistics. The technique of random sampling produced *objective* output data: and 'the earliest

crop cutting experiments based on the principle of random sampling anywhere in the world' were undertaken by the Director of Land Records, Bihar, in 1923-24.¹²² Sir John Hubback's greatest contribution to the science of statistics was his pioneer work on the method of calculating the margins of error to which random samples were subjected, and his application of that method to the problem of working out the expenditure required to attain a desired degree of accuracy, or, conversely, the degree of accuracy likely to be attained for a given expenditure. His combination of theoretical originality and administrative ingenuity also resulted in a host of solutions for more practical problems—such as the selection of plots on the ground, the mechanics of cutting, the prevention of fudging.¹²³

Hubback's official superiors were slow to realize the full potential of his experimental surveys. 'His language and technique are completely beyond me', the revenue member of the government of Bihar confessed; they were even 'far over' the Governor's elevated head.¹²⁴ Commendatory letters from eminent British statisticians persuaded the secretariat to trust Hubback's judgement of matters beyond their comprehension, and the usual reluctance to spend money on statistics with no obvious utility was overcome when Hubback promised to conduct his surveys without employing additional staff; but his promotion to higher things¹²⁵ and the financial crisis of the 1930s put an end to random sampling in Bihar. Two settlement officers in the Central Provinces alone adopted Hubback's approach, until the collapse of primary produce prices revived interest in accurate agricultural statistics as a basis for restricting crop production.¹²⁶ Export crops such as jute suffered most from the depression; and they had well-organized trade associations, able to urge the case for restriction on Indian administrators. India had a natural monopoly of jute production; it seemed certain that the restriction of production must drive the world jute price up; and millions of cultivators in Bengal and Bihar depended on the jute crop to meet commitments payable in cash. So in 1935 the Bengal Department of Agriculture tried to organize a sample survey of the jute crop in selected *thanas*—which showed just how easy it was to make a complete mess of a random sample survey. The Director of Agriculture was too busy to solve the innumerable unforeseen difficulties which constantly arose: the Finance Department slashed the original budget allocation; the staff of investigators was badly trained, supervised, and organized.¹²⁷ The following year the government of Bihar sanctioned a plot to plot survey of the jute crop in the one important jute growing district of Bihar, Purnea. Although the ordinary jute acreages were collected through a special system of growers' *panchayats* under the supervision of a small inspectorate, which meant they were more

accurate than the area statistics of any other crop, the 1936 survey revealed such appalling inaccuracies in the ordinary jute statistics as finally to shatter the government of Bihar's confidence in its own returns. The first regular forecast of the jute crop for 1936 was 200,000 acres; the survey showed jute crops covering 453,000 acres. 'It was known', the Bihar revenue secretary expostulated,

that the estimates based on the reports of *chaukidars* were very inaccurate, but it seems almost inconceivable that there should be such enormous miscalculations. In [one] police station the figure according to the police report is only one-third of that found in the survey. In [another] the police report [gives] 172,600 acres . . . and . . . the survey 6385 . . .¹²⁸

So—despite the initial failure in Bengal—the Indian Central Jute Committee decided to persevere with random sampling. Professor P. C. Mahalanobis accepted their commission and his triumphant organization of the 1938 jute survey of Bengal finally established the technique of random sampling in India. He faced obstacles similar to those faced by Hubback: incomprehension in the secretariat; financial stringency; local officials too busy to do more than display 'sympathetic interest'.¹²⁹ He also confronted new problems of scale. He had to organize—recruit, train, control—a huge staff of poorly-paid temporary investigators scattered over a vast province, often in inaccessible tracts. And he had to resolve theoretical difficulties, in both the planning and the computational stages, for which he was elected a Fellow of the Royal Society.¹³⁰ Not all of Mahalanobis' methods have stood the test of time: the ICAR sample surveys of the wheat and rice crops which were initiated during the Second World War 'Grow More Food Campaign' and gradually spread over the whole of India, bar Bengal, used the regular district or revenue staff to take samples, instead of Mahalanobis' special teams of investigators.¹³¹ But the fact that the ICAR surveys were undertaken at all was a tribute to the immense superiority of Mahalanobis' results, compared with the agricultural statistics of the past.

MARGINS OF ERROR

We can never know the exact margins by which the official agricultural statistics erred. We could do so only if we knew exactly what agricultural outturn was; and alternative sources of data, more reliable than the official statistics, only become available—for a few crops, over limited areas—after 1933. Any very general adjustment based on supposed biases in the system of collection founder on the fact that the most notorious biases (optimistic crop cuttings, pessimistic seasonal condition factors, incomplete crop inspections, and incomplete reports of failure) counteract each other; and the net bias could only be calculated if the exact degree of each individual bias was known, which

in many cases it cannot be. Contemporaries occasionally appeared to accept a few poorly-substantiated generalizations about net bias. In the Punjab it was often claimed that outturns were understated by 25-33 per cent: this being the margin it was believed that the great export houses added to the official estimates as a basis on which to arrange their forward dealings.¹³² But there was no great confidence in this figure. Generalized scepticism about the reliability of the statistics was more common. 'The yield of wheat in the Punjab in 1920', the Director of Agriculture confessed, 'may have been four million or five million tons, or some other figure. How are we to find out?'¹³³

Each time the government genuinely tried to find out, the attempt failed. After the famines of 1896-99 the Government of India tried to obtain provincial figures for per capita food production and consumption. The Punjab government duly sent in returns which it candidly explained were underestimates. 'Really close approximation [to reality]', they reassured the Government of India, 'is impossible, except by lucky accident, to attain in an enquiry which must necessarily be guided by hypothetical considerations often of dubious reliability, and in which the smallest variation in the assumptions makes a final difference of thousands of maunds.'¹³⁴ Returns from other provinces were worse; some displaying inconsistencies 'little short of grotesque'.¹³⁵ Both the Government of India and the India Office agreed that the results were too unreliable to be published. A decade later, attempts to calculate the wheat surplus in the Punjab available for export to a war-torn Britain foundered on the unreliability of the official figures for output.¹³⁶ In 1934 Bowley and Robertson wished to include the agricultural statistics in a census of production, only to conclude reluctantly that they were useless for any purpose except warning the government of imminent famine.¹³⁷ In particular, they were useless for working out 'whether or not food is increasing in proportion to population'. Ten years later, as the Bengal famine showed, they were unfit even to warn the government of the advent of famine; and when food rationing was introduced, food controllers complained bitterly of their inadequacy as a basis for food planning. When rice prices began to rise in 1942, there were no reliable statistics of the production, consumption, or stock of the most important commodity in Bengal:

The official estimates clearly indicated a large deficit; and yet we know that the position was not considered serious by Government. The official estimates were evidently disbelieved by the very Government which issued them. . . . It was quite impossible to judge to what extent the present crisis was due (a) to actual physical shortage of rice or (b) to failure of distribution arising from the withholding of the marketable surplus by hoarding and/or profiteering. Appropriate administrative measures could only have been taken on a correct

appreciation of the relative magnitude of shortage and hoarding. In the absence of reliable statistics both official and non-official opinion oscillated violently from time to time between the two alternative hypotheses.¹³⁸

If the full resources of the Indian state found it impossible to arrive at reliable figures for agricultural production or consumption for a single year, it seems inherently improbable that latter day economic historians should be able to calculate precisely-calibrated trend-rates over fifty-year periods.

Comparisons between the official statistics and the independent data available after 1933 are interesting, if not particularly enlightening, because the divergences are so diverse. They fall into few consistent patterns; rather they confirm the random quality of the official statistics. The independent data is of three kinds. In 1933 the Indian Central Cotton Committee initiated an attempt to check the accuracy of the all-India cotton forecasts by working out the *consumption* of cotton. Ten years later, in the aftermath of the Bengal famine, the government of Bengal recruited a special task force of crop recorders, 30,000-strong, to undertake a complete 'plot to plot enumeration' of the province. And from 1943 onwards we have the results of the sample surveys of major foodgrains conducted by Mahalanobis in Bengal, and elsewhere by ICAR.

The Indian Central Cotton Committee's attempt to calculate the consumption of cotton rested on accurate data for net exports and full information on mill consumption, but incomplete data for stocks and a conventional estimate of some 250,000 bales for village retention.¹³⁹ Subsequent enquiries into consumption by a million and a quarter villagers showed this conventional figure surprisingly accurate. Although per capita village consumption varied widely—from 3·832 lb in the Punjab to 0·162 lb in the Central Provinces (a suspiciously low figure)—the all-India average of 0·9798 lb closely approximated the 1 lb per capita figure on which the 250,000 bales estimated was based.¹⁴⁰ Total consumption, calculated on this basis, exceeded the official figures for cotton production (between 1934/35 and 1936/37) by 11–16 per cent. The discrepancies in the Punjab (where the level of village retention was the highest in India, and the expansion of cotton production was most rapid) were so great that the Department of Agriculture was asked to re-examine its yields. This provincial post mortem showed that while the official statistics stated production was 4·63 *maunds* an acre, 4·65 *maunds* an acre were annually ginned and pressed in the cotton mills—without any allowance for village retention.¹⁴¹ If allowance were made, consumption rose to 5·95 *maunds* an acre; which showed the official yields to be 28·5 per cent too low. In the following quinquennium (1932–37) consumption rose to 7·66 *maunds*, and the

degree of official underestimation rose with it, roughly approximating the 33 per cent allowance made by cotton dealers.

The plot to plot enumeration of Bengal in 1944-45 exposed a parallel understatement of crop areas by the official returns: 20·7 million acres of paddy against the Director of Agriculture's five year average (1937-1941) of 15·6 million; and a total cropped area of 38·6 million acres against the Director of Agriculture's 29·5 million.¹⁴² Unfortunately no direct comparison with the official figures for 1944/45 is possible, because they were never published, and official acreage figures *after* 1941 were drastically revised upwards. This is why the development commissioner responsible for the enumeration chose to compare his results with the official average for 1937-41; it gives a far better idea of the traditional degree of underestimation in the Bengal figures. Of course, the plot to plot enumeration itself was far from perfect. The primary reporters—the 24,000 crop reporters—were essentially *patwari* substitutes, paid only Rs 100 per annum and conscious that the job was only temporary. They had to be recruited, trained, and organized in a matter of months, and the basic records on which the accuracy of their inspections depended—the *mauzawari* list of plots and their areas—were often out of date. But the sole function of this huge establishment—unlike the *patwaris*—was the collection of accurate agricultural statistics. The 24,000 crop reporters were chosen from 50,000 candidates according to their conduct of trial inspections; they were trained in 1,000 training camps; and a large proportion of their returns (over 25 per cent) was checked by their official superiors. An independent check by the Department of Agriculture (irritated when its own statistics were shown to be so misleading) revealed errors of only 0·04 per cent in the enumeration of the paddy area and 0·28 per cent for total cultivated area in 14 villages chosen at random.¹⁴³

The plot to plot enumeration, however, failed to provide reliable data on yields. 60,000 crop cuttings were taken; but they were subject to all the traditional limitations. The majority, moreover, were taken 'at a time when the staff had become extremely restless and nervous in consequence of the recommendations of the Rowland Committee [that their employer, the development department, be retrenched], and it is not possible in every case to guarantee a high standard of work'.¹⁴⁴ It was random sampling that made a reality of the mythical 'average yield'. Mahalanobis' pioneer jute survey, sadly, tells us little about the regular agricultural statistics because data on jute output were collected through a unique system of growers' *panchayats*. His subsequent rice surveys of Bengal and two districts of Bihar are comparable. In Bengal in 1944/45 he apparently arrived at an acreage of 22·2 million, compared with the plot to plot enumeration's 20·9 million and

the Director of Agriculture's 15.6 million five year average.¹⁴⁵ In the two Bihar districts the official figure for the total cultivated area (in 1943/44) was 1.283 million acres; Mahalanobis' was 1.423 millions: an official underestimate of 10 per cent.¹⁴⁶ But Mahalanobis also discovered that official yields in Bihar were so high that the official outturns were in fact inflated. This is difficult to reconcile with the ICAR survey, which showed that wheat outturn in Bihar was 20.4 per cent understated in 1945/46, but the figures are not directly comparable and it seems pointless to speculate on their divergence. The margins of error revealed by the ICAR surveys are shown in Table 17.1.

TABLE 17.1. Percentage Over or Underestimation of the Official Estimates of Foodgrain Output and Yields compared with the ICAR Sample Survey, 1945/46-1948/49

I: RICE	Output				Yield
	1945/46	1946/47	1947/48	1948/49	
Bihar	-29.9	-30.7	-34.5	-37.9	-10
Bombay	-4.7	-4.5	+4.8	-7.2	-3
Madhya Pradesh	-5.2	-20.0	-7.9	-9.5	-11
Madras	n.a.	+12.6	-4.1	-0.2	0
Orissa	-21.4	-11.1	-18.2	n.a.	-19
Uttar Pradesh	+10.4	+7.3	+0.9	+2.8	0
Total*	-14.4	-8.0	-12.7	-9.5	

*Includes Assam (1947/48-1948/49) and Coorg (1946/47-1948/49)

II: WHEAT	Output				Yield
	1945/46	1946/47	1947/48	1948/49	
Bihar	-20.4	-19.8	-18.7	-4.3	+38
Bombay	+5.5	+42.0	+19.7	+34.7	+80
Madhya Pradesh	-12.8	-22.2	+2.4	-6.6	-3
Punjab	-19.4	+16.5	-5.2	-8.2	-10
Uttar Pradesh	-1.3	+1.8	+13.0	+9.5	+7
Total*	-8.7	+0.2	+5.2	+2.4	

*Includes Ajmer-Merwara and Delhi (1946/47-1948/49)

Source: Imperial Council of Agricultural Research, *Sample Surveys for the Estimation of Yield of Foodcrops, 1944-49*, (1950, up), Tables 5 and 6.

As might have been prophesied, the margins of error in the official statistics for the permanently settled provinces were high: an understatement of *approximately* 34 per cent in the paddy acreage of Bengal (according to the plot to plot enumeration) or 42 per cent (according to Mahalanobis' survey); an overstatement of the wheat yield in two districts of Bihar of 28 per cent and 43 per cent (according to Mahalanobis), an understatement of the rice outturn in Bihar of 30-38 per cent

(according to the ICAR survey). The margins of error in the temporarily-settled provinces are smaller. This is especially true of the United Provinces. But it should be remembered that the ICAR survey, which shows these small margins of error, understates the margins of error in two significant ways. In the first place, the data for an area was not always obtained through random sampling; it was also collected in temporarily-settled areas through the *patwaris*. So errors regarding crop areas in the official statistics may be replicated in the ICAR data. Secondly, as the ordinary district establishment was employed to conduct the ICAR survey (the great difference between the surveys in temporarily and permanently settled provinces), it may well be that the ordinary official statistics were altered to reduce the differences between them and the ICAR figures, just as acreage figures in Bengal were revised upwards after 1940-41. It is quite inconceivable that regular crop cutting experiments should arrive at *exactly* the same yields as random sampling on rice in Madras or the United Provinces.

The comparisons make possible some rough corrections of the official statistics. Bengal rice areas have to be raised; Bihar yields may or may not have to be lowered. But such corrections can only be made in a limited number of cases, on an *ad hoc* basis. There can be no across the board levelling up or levelling down. After admitting that 'there appears to be little basis for choosing between [the] possibilities of how the error might have been distributed over time', Blyn chose the likelihood that 'there was some improvement in the accuracy of the estimates' as the most probable; K. Mukerji, with equal plausibility, affirmed that the system's inherent conservatism and the deliberate reduction of normal yields found to have been pitched too high led to progressive under-enumeration.¹⁴⁷ Even if we could be certain that the biases apparent in the 1940s bore a known relationship to the errors obtaining in the 1890s, which we cannot, the biases of the 1940s fall into few consistent patterns.

CONCLUSION

There were good reasons why output statistics in India should be unreliable and incomplete. Official enquiries—by the Board of Agriculture in India (1919), the Indian Economic Enquiry Committee (1925), the Royal Commission on Agriculture in India (1929), Professor Bowley and Dr Robertson (1934)—stressed the 'vacuum at the centre': the absence of statistical bureaux in the secretariats capable of continuously monitoring incoming statistics, defining their inadequacies, and supervising the introduction of improvements.¹⁴⁸ So long as the state made no attempt to 'plan' the economy, generalist officials went on collecting statistics as by-products of regular administrative routines at minimal

cost. They achieved some remarkable, even astonishing, results: not least the decennial census. But as soon as the state needed reliable output data as a basis for economic controls, an expert statistical establishment became inevitable.

The earliest attempts to create such a statistical establishment ran up against the same kind of *laissez-faire* opposition as the first essays in planning—and to some extent the more conservative officials' opposition was warranted by circumstances.¹⁴⁹ Low grade Indian statistics were not just a question of poor organization at the centre. They were also a function of India's poverty. A myriad good causes pressed on the slender resources of the state. The great majority of producers were illiterate and incapable of appreciating the significance of a statistical return. In a backward economy units of production were small, predominantly rural, and dispersed over a huge area; subsistence production complicated the problem of measurement and evaluation; there were few trade or professional associations to act as intermediaries. India's vast size and population—the sheer number of units to be enumerated—was a problem in itself: especially when the diversity of conditions made uniform arrangements impossible.¹⁵⁰

For all these reasons, the system through which the Indian agricultural statistics were collected was far more unstable and diverse than the bland prefaces to the published volumes of statistics—with their stereotyped descriptions of uniform procedures rarely operative in practice—would lead one to suppose. It varied from province to province, district to district, even from official to official; and it changed, also, over time. It contained elements of negligence and incompetence, of subjectivity and conservatism, of corruption and absurdity. And in retrospect it seems impossible to reconstruct the system's vagaries—its advances towards reality and retreats towards convention—in sufficient detail or with sufficient certainty to correct their conflicting biases. Perhaps the only valid generalization about the net margin of error is that the system was inherently conservative. Official indifference and genuine perplexity stereotyped yields, in particular, at levels 'which had no basis in observed reality'.¹⁵¹ It was because the system was too sluggish to respond to the sowing of improved seeds that Bowley and Robertson—the most distinguished English statisticians to examine the Indian statistics—believed it 'impossible to ascertain whether the quantity of food produced is keeping pace with the population'.¹⁵² This was the opinion, also, of the most distinguished Indian statisticians to consider the problem, Sir John Hubback and P. C. Mahalanobis.¹⁵³ We simply cannot know, with anything like the accuracy or the authority Blyn implicitly assumes, how rapidly Indian agriculture expanded.

But to say this is far from saying that the agricultural statistics are

useless. They may provide poor answers for the development economists' questions about national growth rates; they may have an unhappy knack of converting the unwitting econometrician's calculations into elaborate sophistries; but they remain an inexhaustible repository of evidence for the historian of Indian agriculture. Even if the unreliability of the data on yields makes it impractical to construct reliable fifty-year trend rates for every crop in every province, the figures for crop acreage in the temporarily-settled areas are still hard enough to show changes in cropping patterns which are invaluable evidence of farmers' response to price movements, to irrigation, to railways, to different tenurial systems, to the whole range of factors affecting Indian agriculture. Provided they are examined (as statistics should always be examined) in conjunction with the system through which they were collected, the official data—with suitable modifications, and suitable reservations—can still reveal the most rapidly developing and the most disastrously deteriorating agricultural regions; the first step towards any historical analysis of the determinants of growth and decline. Disaggregation, here, will be the key; large aggregates conceal too much. All-India averages combine opposing trends—catastrophic deterioration in Bihar with rapid expansion in the Punjab—to give an impression of general stagnation; the averages of super-provinces blend the performances of heterogeneous farming types. The future lies with detailed studies of the agricultural statistics of quite small areas, which can add a quantitative dimension to intensive qualitative studies of the history of distinct farming types and regions.¹⁵⁴ The agricultural statistics of India can be either a butcher's cleaver or a surgeon's scalpel in our hands; and if we choose to use them as a cleaver, we cannot expect comparable precision in the results.

17. PATWARI AND CHAUKIDAR

Abbreviations

Ag	Agriculture Branch
Ag Stats	Head Agricultural Statistics
BIR	Government of Bengal, Revenue Proceedings
BrLR	Government of Bihar (and Orissa), Land Revenue Proceedings
Br	Government of Bihar (and Orissa), Revenue Proceedings
BrSCRO	Bihar State Central Record Office, Patna
EHL	Government of India, Education Health and Lands Proceedings
ICAR	Imperial Council of Agricultural Research
IESHR	<i>Indian Economic and Social History Review</i>
IORDP	India Office Revenue Departmental Papers
IR	Government of India, Revenue Proceedings
JRSS	<i>Journal of the Royal Statistical Society</i>
KW	Keep-with
NAI	National Archives of India, New Delhi
PBOR	Archives of the Punjab Board of Revenue, Lahore
PGRF	Punjab Government, Revenue File
PLAM	J. M. Douie, <i>Punjab Land Administration Manual</i> (Lahore, 1908)
PLRecR	<i>Annual Report of the Director of Land Records, Punjab</i>
PSM	J. M. Douie, <i>Punjab Settlement Manual</i> (third edition, Lahore, 1915)
R	Revenue Branch
Stat	Statistics Branch
SR	<i>Settlement Report</i>
WBSA	West Bengal State Archives, Calcutta

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1. The agricultural statistics to which this paper refers are those contained in the *Reports on the Administration of the Punjab* (1866-84); the *Reports on the Agricultural Statistics of the Punjab* (1884-87), *Bengal* (1891-1911), and *Bihar* (1911-47); the *Reports on the Season and Crops of the Punjab* (1901-47), *Bengal* (1901-11) and *Bihar* (1911-47); the *Quinquennial Reports on Crop-Cutting Experiments in Bengal* (1897-1912); and the relevant provincial sections of the *Agricultural Statistics of India* (1884-1947), the *Estimates of Area and Yield of Certain Principal Crops* (1891-1947), and the *Average Yield Per Acre of the Principal Crops in India* (1892-1947).

2. Government of India (hereafter GOI), Commerce Department, Commerce Branch, file 7-C(12)/36, H. Dow note, 28 September 1934, National Archives of India (hereafter NAI). Cf. G. A. D. Stuart (Director of Agriculture, Madras), 'The Seasonal Factor in Crop Statistics: A Method of Correcting for the Inherent Pessimism of the Farmer', *Agricultural Journal of India*, xiv (1919), p.275: 'A knowledge of the state of the season is not so important as an appreciation of the psychology of the village accountant and the *taluk* clerk, and an estimate of the state of departmental discipline of particular districts. A *taluk* was found recently where no village accountants kept any accounts, and where all figures were invented at the close of the year.'

3. A. L. Bowley, 'Foreword' to V. K. R. V. Rao, *The National Income of British India, 1931-1932* (London, 1940), p.v.

4. E.g., S. Sivasubramanian, 'Estimates of the Gross Value of Agricultural Output in Undivided India, 1900/1 to 1946/7', in V. K. R. V. Rao *et al.* (eds), *Papers on National Income and Allied Topics* (London, 1960); K. M. Mukerji,

Levels of Economic Activity and Public Expenditure in India (London, 1965); M. Mukherjee, *National Income of India: Trends and Structure* (Calcutta, 1969).

5. Philadelphia, 1966. Blyn, astonishingly, never consulted – *inter alia* – Hubback or Mahalanobis's pioneer work on sample surveys. Some of the earlier studies of India's national income were more conscious of the agricultural statistics' defects, e.g., R. C. Desai, *Standard of Living in India and Pakistan 1931/2-1946/1* (Bombay, 1933), pp.1ff; D. and A. Thorner, *Land and Labour in India* (London, 1962), pp.111-12, 124-8. It may be some consolation to know that British and Japanese agricultural statistics have also been attacked: see J. A. Venn, 'An Inquiry into British Methods of Crop Estimating', *Economic Journal*, xxvi (1926), pp.394-416; H. D. Vigor, 'Official Crop Estimates in England', *Journal of the Royal Statistical Society* (hereafter JRSS), xci (1928), pp.1-33; J. I. Nakamura, *Agricultural Production and the Economic Development of Japan* (Princeton, 1966); and H. Rosovsky, 'Rumbles in the Ricefields', *Journal of Asian Studies*, xxvii (1967-68), pp.347-360.

6. M. M. Islam, 'Agricultural Development of Bengal: A Quantitative Study, 1920-1946' (unpublished PhD thesis, University of London, 1972); and 'The Quality of the Official Crop Statistics of Bengal (1920-1947)', *Bulletin of Quantitative and Computer Methods in South Asian Studies*, i (June 1973), pp.23-4.

7. C. J. Dewey, 'The Agricultural Statistics of the Punjab, 1867-1947', *Bulletin of Quantitative and Computer Methods in South Asian Studies*, ii (March 1974), pp.3-14; A. W. Heston, 'Official Yields per Acre in India, 1886-1947: Some Questions of Interpretation', *Indian Economic and Social History Review* (hereafter IESHR), x (1973), pp. 303-32. I am grateful to the editors of the *Bulletin* for permission to reprint some passages from my earlier article.

8. The North-West Frontier Province was carved out of the Punjab in 1901, and the imperial territory of Delhi in 1912; hence the references to Delhi and to Districts subsequently included in the NWFP.

9. Until 1912 Bihar was part of Bengal; from 1912 to 1936 it was part of the province of Bihar and Orissa; from 1936 it was a separate province in its own right. Hence the references to 'Bengal' before 1912; between 1912 and 1936 I have abbreviated 'Bihar and Orissa' to 'Bihar'.

10. Quoted by Sir Henry Knight, *Food Administration in India 1939-47* (Stanford, 1950), p.20.

11. The descriptions of *patwari* and *chaukidar* are based upon the annual *Reports of the Department of Land Records and Agriculture, Punjab* (1891-1905); the *Reports on the Operations of the Department of Land Records, Punjab* (1905-45); the relevant Punjab Government Revenue files (hereafter PGRF) in the archives of the Punjab Board of Revenue, Lahore (hereafter PBOR); the reports on the settlement of districts in the Punjab and Bihar (hereafter SR); the *Reports of the Director of Land Records, Bengal* (1893-1908); the *Reports on the Agricultural Department, Bengal* (1885-1912); and the *Reports on the Administration of the Police, Bengal* (1880-1912). There is some doubt as to the exact role of the *chaukidar*. In his PhD thesis (op. cit., pp.35-7) Dr Islam points out that there are no references to the collection of agricultural statistics in the *Chaukidari Manual* (Calcutta, 1916) and no references to *chaukidars* in the *Manual for the Preparation of Crop Reports and Agricultural Statistics* (3rd edition Calcutta, 1922). He suggests that it was chiefly the *thana* and circle officers who collected the agricultural statistics, but I suspect that the *chaukidars* may have made their returns *through* the circle and *thana* officers, or, alternatively, that the circle and *thana* officers may have been the primary reporters only for certain kinds of statistic (say yields instead of areas). In any event, circle and *thana* officers do not appear to have helped collect agricultural

statistics until the *Report of the Bengal District Administration Committee 1913-1914* (Calcutta, 1915), suggested that they should—three years after the separation of Bihar from Bengal.

12. The jute inspectorate appointed to check the crop areas which the jute growers' *panchayats* reported found it more difficult to measure the crop than the Director of Agriculture anticipated. 'Last year', he wrote, 'the country was dry (but) this year practically every field is under water and . . . for an officer to follow the instructions would mean marching all day long knee-deep in water. To reach most of the villages from the road one would have to wade through quite deep water. Mr. Robinson, deputy-director of agriculture, [tried] to follow these instructions [and] is laid up in bed with fever and a touch of the sun. I do not think that any of the other officers, particularly those who have lost their youthful enthusiasm, are likely to endanger their health in the same manner.' Bihar Revenue Proceedings, Agricultural Branch (hereafter BrR-Ag), May 1916, 21-39, in the Bihar State Central Record Office, Patna (hereafter BrSCRO).

13. Bengal Revenue Proceedings, Revenue Branch (hereafter BIR-R), August 1872, 83-91, in the West Bengal State Archives, Calcutta (hereafter WBSA).

14. Bengal Revenue Proceedings, Agricultural Branch, Head Agricultural Statistics (hereafter BIR-Ag-Ag Stats), February 1886, Collection 1, File 3, serials 1-21, (WBSA); India Revenue Proceedings, Statistics Branch (hereafter IR-Stats), April 1884, 4-23, C. Macaulay, Secretary to the Government of Bengal, Finance (Statistics) Department, to Secretary to the Government of India, 13 July 1883, in the National Archives of India, New Delhi (hereafter NAI).

15. *Annual Report of the Director of the Agricultural Department, Bengal, 1885/6*, pp.1-5; BIR-Ag September 1890, Collection 1, File 7, serials 28-37, M. Finucane, Director of Land Records and Agriculture, circular, 14 March 1889 (WBSA); 'Memorandum on the . . . Agricultural Statistics . . . for 1891-92', BIR-Ag-Ag Stats, January 1894, 87-9; *Report of the Royal Commission on Agriculture in India*, Parliamentary Papers (1928) VIII, p.605.

16. India Office Revenue Department Papers (hereafter IORDP), London, vol. 177, no. 975, 1888. The formulation and implementation of the Bengal Tenancy Act of 1885 are discussed in detail in my forthcoming book *Agarian Policy in India, 1858-1947*. See also D. Rothermund, 'The Record of Rights in British India', *IJESHR*, viii (1971), pp.443-61.

17. BrR May 1917, 5-16, Enclosure 1 to serial 15, J. Johnson, Collector Monghyr, to Commissioner, Bhagalpur, 14 February 1917 (BrSCRO).

18. E.g., C. J. Stevenson-Moore, *Muzaffarpur SR, 1892-1899* (Calcutta, 1901), p.276. Cf. Parliamentary Papers, East India (Report of Famine Commission) C. 3086, Appendix 1, 'Agricultural Statistics—Report by C. A. E. Elliot', p.47 ('in Bengal agricultural statistics can hardly be said to exist'); and *Famine Inquiry Committee Final Report* (Madras, 1945), pp.44-50.

19. E.g., J. H. Kerr, *Darbhanga SR, 1896-1903* (Calcutta, 1904), p.67; P. N. Gupta, *Saran SR, 1915-21* (Patna 1923), p.24; C. J. Stevenson-Moore, *Gaya SR, 1893-1898* (Calcutta, 1898), p.51; E. L. Tanner, *Gaya SR, 1911-18* (Patna, 1919), pp.62, 114-15, 123-4. The first district to come under settlement in which kind rents were common was south Monghyr: see P. W. Murphy, *Monghyr (South) SR, 1905-12* (Ranchi, 1914).

20. E.g., H. Coupland, *Monghyr (North) SR, 1905-1907* (Calcutta, 1908), p.102; H. Coupland, *Patna SR, 1901-1904* (Calcutta, 1907), p.7; J. Byrne, *Purnea SR, 1901-1908* (Calcutta, 1908), p.120.

21. Continuous maintenance was finally abandoned during the First World War: IR-Land Revenue, June 1915, 27-29, (NAI).

22. See *Papers relating to the Land Records Maintenance Act III (BC) of 1895* (Calcutta, 1895).

23. Kerr, *Darbhanga SR*, p.141. Cf. J. H. Kerr, *Saran SR, 1893-1901* (Calcutta, 1903), p.185.

24. Kerr, *Darbhanga SR*, p.141.

25. Kerr, *Saran SR*, p.185.

26. C. J. Stevenson-Moore, *Champaran SR, 1892-1897* (Calcutta, 1900), p.47; cf. Stevenson-Moore, *Muzaffarpur SR*, pp.136-8, 425-6.

27. India Office Judicial and Public Departmental Papers, vol. 161, no. 1582, 1885; vol. 175, no. 768, 1886; IORDP vol. 321, no. 250, 1895; *Papers relating to the Land Records Maintenance Act*, op. cit.; *Report of the Bengal Administrative Enquiry Committee 1944-45* (Alipore, 1945), pp.4, 35.

28. E. G. Wace, *Simla SR, 1881-83* (Calcutta, 1884), pp.19-20; G. C. Barnes, *Kangra SR* (Lahore, 1862), pp. 36-39; J. B. Lyall, *Kangra SR, 1865-72* (Lahore, 1874), pp.214-15; A. H. Diack, *Kulu SR* (Lahore, 1898), pp.30-1; E. G. Wace, *Hazara SR, 1868-74* (Lahore, 1876), pp.271-4; H. D. Watson, *Hazara SR, 1900-1907* (Peshawar, 1907), pp.46-7; H. St. G. Tucker, *Kohat SR, 1875-83* (Calcutta, 1884), pp.208-9; C. A. Barron, *Kohat SR, 1900-1905* (Lahore, 1907), p.76; H. St. G. Tucker, *Dera Ismail Khan SR, 1872-79* (Lahore, 1879), pp.382-6; S. S. Thorburn, *Bannu SR, 1872-78* (Lahore, 1879), pp.240-2; R. I. R. Glancy, *Bannu SR, 1903-7* (Peshawar, 1907), pp.34-5.

29. Wace, *Hazara SR*, p.271.

30. Wace, *Simla SR*, pp.19-20.

31. See, for example, E. Joseph, *Rohtak SR, 1905-10* (Lahore, 1911), p.47.

32. Comments on the *patwaris'* incompetence in plains districts can be found in the following settlement reports (the comments date from between 1875 and 1914): A. Kensington, *Ambala, 1883-93* (Lahore, 1893), pp.7ff; R. Maconachie, *Delhi, 1872-80* (Lahore, 1882), pp.252ff; E. B. Francis, *North Ferozepore, 1884-9* (Lahore, 1890), pp.1-2; M. M. L. Currie, *Ferozepore, 1910-14* (Lahore, 1915), p.33; M. O'Dwyer, *Gujranwala, 1887-94* (Lahore, 1894), p.31; F. Popham Young, 'Commissioner's Review, 8 August 1916', in H. S. Williamson, *Gujrat, 1912-16* (Lahore, 1916); L. W. Dane, *Gurdaspur, 1885-92* (Lahore, 1892), pp.22-3; F. W. Kennaway, *Gurdaspur* (Lahore, 1912), p.15; F. C. Channing, *Gurgaon, 1872-80* (Lahore, 1882), pp.221ff; A. Anderson and P. J. Fagan, *Hissar, 1885-92* (Lahore, 1892), pp.51ff; A. H. Townsend, *Hissar, 1906-10* (Lahore, 1912), p.36; J. A. L. Montgomery, *Hoshiarpur, 1879-84* (Calcutta, 1885), pp.147-9; D. C. J. Ibbetson, *Karnal 1872-80* (Allahabad, 1883), pp.234ff; J. M. Douie, *Karnal-Ambala* (Lahore, 1891), pp.7-9; T. G. Walker, *Ludhiana, 1878-83* (Calcutta, 1884), p.267.

33. Kensington, *Ambala SR*, p.13; cf. Townsend, *Hissar SR*, p.36, and Maconachie, *Delhi SR*, pp.71-2.

34. Thorburn, *Bannu SR*, pp.241-2; Glancy, *Bannu SR*, pp.34-5.

35. Montgomery, *Hoshiarpur SR*, pp.147-9.

36. O'Dwyer, *Gujranwala SR*, p.31.

37. Walker, *Ludhiana SR*, p.267. There were also cliques dominated by money-lending families in Hissar: Townsend, *Hissar SR*, pp.51-2.

38. As in Karnal, Ambala, Ludhiana, Hissar, and Gujranwala: Douie, *Karnal-Ambala SR*, p.8; Walker, *Ludhiana SR*, p.267; Townsend, *Hissar SR*, p.36; A. Anderson and P. J. Fagan, *Hissar SR*, pp. 51ff; O'Dwyer, *Gujranwala SR*, p.31.

39. 'The rule requiring the *patwaris* to reside in their circles was openly disobeyed, and they were in the habit of absenting themselves at pleasure, without

leave, to visit their homes or to attend to their private affairs': Francis, *Ferozepore SR*, p.2.

40. It was said of the *patwaris* of Panipat *tehsil* – members of commercial castes resident in the headquarters town—that they 'used to leave the city by one gate as the tahsildar (their official superior) went into camp by the other': Ibbetson, *Karnal SR*, p.267.

41. Channing, *Gurgaon SR*, p.223.

42. Francis, *North Ferozepore SR*, p.2.

43. 'The area contained within these general confines can only be conjectured': Barnes, *Kangra SR*, p.1; Diack, *Kulu SR*, p.31.

44. J. D. Anderson, *Muzaffargarh SR, 1920-25* (Lahore, 1929), p.11: 'The real trouble [with the *bharaba* inspection of crop failures] is the difficulty of supervising the Parwaris and Kanungos in an enormous district where much of the cropping is scattered, at times of the year when the heat is extraordinary, and where in the summer inspection of much of the country is impossible on account of floods.'

45. Joseph, *Rohtak SR*, p.47.

46. The records of rights were public registries of landownership, and extracts from them were in constant use as evidence of titles and encumbrances in court cases.

47. The history of fluctuating assessments in the Punjab can be traced in J. M. Douie, *The Punjab Settlement Manual* (3rd edition Lahore, 1925) (hereafter abbreviated to *PSM*), pp.224-32; and an interesting note by the settlement commissioner, J. B. Lyall (30 August 1879), among the Lyall Papers (MSS. F. 132) in the India Office Library.

48. Details of the system of fluctuating assessment in the canal colonies (and the corruption to which it gave rise) can be found in an informative note by the first colonization officer, F. Popham Young (dated 11 June 1907), in Punjab Financial Commissioner File 44 (III), (PBOR); and in the *Report of the Punjab Canal Colonies Committee* (Lahore, 1908). The disturbances themselves are the subject of N. G. Barrier's 'The Punjab Disturbances of 1907: the response of the British Government in India to Agrarian Unrest', *Modern Asian Studies*, i (1967), pp.353-383. On the under-reporting of crop failures, see *PSM*, p.163; B. H. Dobson, *Chenab Colony SR* (Lahore, 1915), pp.86ff; H. Davies, *Gujrat SR, 1888-93* (Lahore, 1893), p.22.

49. *Report on the Agricultural Statistics of the Punjab, 1885/6* (Lahore, 1886), p.4.

50. *Ibid.*, pp.1-2, quoting R. Maconachie, Deputy Commissioner of Gurgaon.

51. J. M. Douie, *Punjab Land Administration Manual* (Lahore, 1908) (hereafter *PLAM*), p.104.

52. This paragraph is based on PGRF 1, 'Rules for Assessments of Land Revenue'; PGRF 77, 'Rules under the Punjab Land Revenue and Tenancy Acts, 1887'; *PSM*, pp.24-44; and my general reading of the settlement reports.

53. *IORDP* vol. 32, no. 819, 1881. For self-regulating settlements, see *IORDP* vol. 27, no. 2424, 1882; vol. 63, no. 2762, 1883; PGRF 1 (PBOR).

54. *IORDP* vol. 24, no. 270, 1881; cf. 'A Bengal Civilian', e.g., A. P. Macdonnell, *Agricultural and Administrative Reform in Bengal* (London, 1883); A. O. Hume (Secretary of the Imperial Revenue Department), *Agricultural Reform in India* (London, 1879); *IORDP* vol. 24, no. 270, 1881, especially Richard Strachey's protest, 28 April 1881. Sir John Russell, *Report on Agricultural Research in India* (Delhi, 1936), contains a short history of the Imperial Department of Agriculture.

55. F. W. Kennaway's resettlement of Gurdaspur was probably the first to employ the district *patwaris* successfully: Kennaway, *Gurdaspur SR*, pp.6ff. But

by no means all subsequent settlements were as successful: for example, Williamson, *Gujrat SR*, pp. 8ff.

56. The transition can be traced in the annual *Reports of the Director of Land Records, Punjab* (hereafter *PLRecR*). In the settlement reports, also, the incidence of complaint falls off; some settlement officers even expressing satisfaction with the *patwaris*, at least after they had reformed them: H. C. Beadon, *Delhi SR*, 1906-10 (Lahore, 1911); A. J. W. Kitchen, *Attock SR* (Lahore, 1906), p. 21; Ch. Sardar Khan, *Attock SR*, 1923-27 (Lahore, 1928), p. 26; F. C. Bourne, *Lower Bari Doab SR*, 1927-35 (Lahore, 1935), p. 44.

57. *PLRecR* 1912/13, pp. 6-7; *PLAM* pp. 104-15.

58. *Ibid.*, 1913/14, p. 7.

59. *Ibid.*, 1912/13, pp. 7-8.

60. *Ibid.*, 1922/23, p. 9.

61. See the Punjab Government reviews of *PLRecR* 1919/18, 1920/21, 1931/2, (a ritual recitation of traditional incantations); *Peshawar District Gazetteer* (Peshawar, 1934).

62. India Office Economics and Overseas Department Papers, vol. 1267, no. 6790, 1925. Settlements between 1916 and 1937 took on average 9.05 per cent of the gross value of the produce: A. C. Lall note (in the Darling Papers, South Asian Centre, Cambridge). Data on sources of revenue can be found in P. J. Thomas, *The Growth of Federal Finance in India* (Madras, 1939).

63. G. E. B. Abell, *Lahore SR*, 1935-39 (Lahore, 1943), p. 8.

64. IR-Stats, August 1893, 1-26, W. C. Macpherson, Officiating Director of Land Records, to Secretary to the Government of Bengal, Revenue Department, 14 June 1892; March 1891, 7-8, Keep-with (hereafter KW), 'F.M.W.S.' note, 19 January 1891, (NAJ); BIR-Ag, November 1892, 1-6; January 1893, 4-5 (WBSA).

65. A. P. MacDonnell, *Report on the Foodgrain Supply and Relief Operations in . . . Bihar and Bengal* (Calcutta, 1876), p. iv.

66. The different sets of provincial rules for the conduct of crop-cutting experiments are in BIR-Ag, February 1895, 36-49, (WBSA).

67. IR-Stats, March 1892, 7-8, KW, J. W. P. Muir-Mackenzie marginal note, (NAJ): the province in which most care was taken was Bombay.

68. BIR-Ag, January 1893, 4-5, (WBSA); cf. IR-General, February 1899, 3, Note by J. A. L. Montgomery, Director of Land Records and Agriculture, Punjab, (NAJ); BIR-Ag, May 1898, 13-22, KW, 'N.W.G.' note, 14 March 1898 (WBSA): There were not enough cuttings, even of winter rice, in any one district; 'experiments with important crops have not always been continuous, representative areas and representative crops . . . have not always been selected, and . . . mistakes have often occurred with regard . . . to the state in which the crops were cut'.

69. BIR-Ag, January 1893, 4-5, W. Maude, Officiating Director of Land Records and Agriculture, to Secretary to the Government of Bengal, Revenue Department, 23 October 1891, (WBSA).

70. IR-General, February 1899, 3, KW, J. A. Robertson note, 23 August 1896, (NAJ).

71. *Annual Agricultural Report of the Department of Land Records and Agriculture, Bengal*, 1902/3, p. 16; 1903/4, p. 15.

72. PGRF 208, 'Crop Experiments', B. T. Gibson memorandum, nd, and L. W. Dane note, 3 May 1913.

73. H. K. Trevasik, *The Punjab of Today*, 2 vols (Lahore, 1931), I, p. 200.

74. Note by H. R. Stewart, Director of Agriculture, Punjab, nd but c. Decem-ber 1937 (in the Darling Papers, South Asian Centre, Cambridge).

75. BrR-Ag, April 1913, 35-39, W. B. Heycock, Director of Agriculture, Bihar, to Secretary to the Government of Bihar, Revenue Department, 3-6 BrSCRO, December 1912.

76. BrR-Ag, May 1917, 5-16; August 1920, 32-3; BrLR February 1929, 12-40, KW, R. E. Russell note, 21 July 1927; (all BrSCRO).

77. Ibid.

78. Government of India, Education Health and Lands Department, Agriculture Branch (hereafter IEH&L-Ag), file 17-3/35A, note by the vice-chairman of the Imperial Council of Agricultural Research (hereafter ICAR), 16 November 1934.

79. *PLRecR* 1894/5, p.9; PGRF 208.

80. *Annual Agricultural Report of the Department of Land Records and Agriculture, Bengal*, 1896/7, p.28; 1898/9, p.36; 1903/4, p.15; 1906/7, p.17; BrR-Ag, May 1917, 5-16, H. J. McIntosh, Commissioner Bhagalpur, to Secretary to the Government of Bihar, Revenue Department, 16 February 1917 (BrSCRO); IR-Ag, February 1922, 1-16, KW, G. F. Shirras note, 6 July 1918; May 1909, 50-51, KW, J. O. Miller note, 20 May 1909 (both NAI); *PLRecR*, 1896/7, p.6.

81. Maconachie, *Delhi SR*, p.32; Thorburn, *Bannu SR*, p.180; Ibbetson, *Karnal SR*, p.275.

82. *PSM*, p.163; Joseph, *Rohtak SR*, p.25; Abbott, *Jhang SR*, p.20.

83. J. A. Hubback, 'Sampling for Rice Yield in Bihar and Orissa', originally published in 1927 as *Bulletin No 166* of the Imperial Agricultural Research Station, Pusa, and reprinted in *Samkiya*, vii (1945-6), pp.281-94. References are to the reprint, in this case p.282.

84. Currie, *Ferozepore SR*, p.12.

85. Akhtar Hussain, *Gurgaon SR*, 1938-43 (Lahore, 1944), p.15; cf. Joseph, *Rohtak SR*, p.25; *PSM*, p.165; Trevaskis, *Punjab Today*, p.199, ('the subsequent experiments made by the revenue assistants harvest by harvest are perfunctory and pointless').

86. C. A. Roe and W. E. Purser, *Montgomery SR* (Lahore, 1878), pp.125-6; cf. B. T. Gibson, *Gurgaon SR*, 1903-9 (Lahore, 1910), p.19.

87. Ibbetson, *Karnal SR*, p.58.

88. Joseph, *Rohtak SR*, p.25; Hubback, *Shahabad SR*, p.121.

89. Quoted by Blyn, op. cit., p.46 n. 11, from *Estimates of Area and Yield of the Principal Crops in India*, 1940/41, p.46. An earlier, simpler, version can be found in the *Manual of Rules for the Preparation of Crop Reports* . . ., pp.6-7; and G. F. Shirras, *A Manual of Crop Forecasts in India* (Calcutta, 1916), p.5, which makes it clearer that it was the mode not the mean that was required. Settlement officers seem to have gone on thinking in terms of 'averages'. Other definitions also gave trouble, for example land 'culturable but uncultivated'—which was notoriously difficult to classify consistently.

90. This description of the definition was Sir Frank Noyce's: *Proceedings of the Board of Agriculture in India*, 1919 (Calcutta, 1920), p.24.

91. IR-General, February 1899, 3, KW, notes by G. H. R. Hart, 9 June 1897, D. Ibbetson, 12 June 1897; IR-Ag, February 1922, 1-16, W. M. Hailey, Chief Commissioner, Delhi, to Secretary to the Government of India, Department of Revenue and Agriculture, 22 February 1917 (both in NAI); cf., *Final Report of the National Income Commission*, 1954 (Delhi, 1954), p.27: 'each *patwari* has his own conception of the normal crop for his village and there is no way of relating this to the district [normal]'.

92. IR-Ag, February 1922, 1-16, H. R. C. Hailey, Director of Land Records and Agriculture, United Provinces, to Chief Secretary to the Government of the United Provinces, 19 April 1917, (NAI).

93. As. H. K. Trevaskis pointed out, 'Wheat Forecasts in the Punjab', *Agricultural Journal of India*, xix (1924), p.241; cf. J. Wilson, *Sirsa SR*, 1879-83 (Calcutta, 1884), p.256: 'In a tract where the produce of the fields varies so enormously as it does in Sirsa, it would be very difficult even for a skilled farmer after an inspection of the whole tract to say what fields represented the average of the harvest, and although the fields were of moderate size . . . and were chosen with care . . . the estimate of the average outturn so framed must be only a very rough one.' Maconachie, *Delhi SR*, pp.31-2: 'the great difficulty is to select fields fairly representing the average conditions of the tract under report.' Abbott, *Jhang SR*, p.20: 'The difficulty lies not so much in ascertaining the weight of an ordinary crop in any year, but in determining the average outturn of an average crop as harvested by exercising ordinary care.'

94. Anderson, *Muzaffargarh SR*, p.24.

95. Coupland, *Patna SR*, p.7.

96. Hubback, *Shahabad SR*, p.93.

97. Watson, *Hazara SR*, p.13; cf. R. Humphreys, *Hoshiarpur SR*, 1910-14 (Lahore, 1915), p.25.

98. Trevaskis, *The Punjab of Today*, p.200. Cf. *PSM*, p.164: 'To estimate the average yield of each crop on the different classes of land in a tract as large as an ordinary assessment circle is a task of great difficulty. Since the attempt to record soils with any minuteness has been abandoned, it is quite usual to find the land dependent upon rain in a large circle put into a single class. Obviously, the thousands of acres so classified will vary widely in natural fertility, and the average outturn will be greatly affected by the degree of skill and industry possessed by the cultivators. The yield of different harvests also varies to an extraordinary extent, especially in the case of unirrigated crops.' Ibbetson (who read mathematics at Cambridge) spelt out some of the implications of the settlement officers' problem of 'averaging': 'The distinction between an average crop and an average yield has not always been sufficiently recognised. Take all the land of a certain class under a given crop, and . . . state each different yield that is found to exist, and the average . . . will give you the average crop; but before the average yield can be obtained, the area on which each individual yield exists must be taken into account. . . . Suppose that the rates of yield of a decidedly good, a fair medium, and a distinctly bad crop have been correctly estimated for *goira* and for unmanured soils: these rates must be treated in very different ways to get the average yield of the two soils. . . . In the *goira* a bad crop will be a rare exception, and the fair medium crop will hardly recur more frequently than the distinctly good crop. On the unmanured soils, on the other hand, the medium crop will be the commonest, the distinctly bad crop will be found on a very large number of fields, and the distinctly good crop will be comparatively infrequent. Hence there is always a danger of over-estimating the yield of inferior soils; and this danger is enhanced by the fact that, in thinking of the average crop, one is apt to forget the many instances in which the crop has almost or altogether failed.' Ibbetson, *Karnal SR*, p.276.

99. James, *Patna SR*, p.43; Kerr, *Darbhanga SR*, p.131.

100. Hubback, *Shahabad SR*, p.122.

101. *Ibid.*, p.283.

102. *PSM*, p.165: 'It is hopeless to make in the course of a settlement sufficient experiments to justify an assessing officer in accepting the average results without further enquiry.' Cf., Currie, *Ferozepore SR*, p.13; Husain, *Gurgaon SR*, p.15; Walker, *Ludhiana SR*, p.194; H. N. Bolton, *Dera Ismail Khan SR* (Peshawar, 1906), p.18; Beadon, *Delhi SR*, p.22; H. D. Craik, *Amritsar SR*, 1910-14 (Lahore,

- 1914), p.23; A. H. Diack, *Dera Ghazi Khan SR, 1893-7* (Lahore, 1898), p.15; Gibson, *Gurgaon SR*, p.19; Kennaway, *Gurdaspur SR*, p.17; Davies, *Gujrat SR*, p.21; O'Dwyer, *Gujranwala SR*, pp.52-4; I. C. Lall, *Hafizabad SR, 1902-7* (Lahore, 1908), pp.26-7.
103. Roe and Purser, *Montgomery SR*, p.125; Stevenson-Moore, *Champaran SR*, p.159.
104. Stevenson-Moore, *Muzaffargarh SR*, p.276; Hubback, *Shahabad SR*, p.93; Tanner, *Gaya SR*, pp.62, 114-15, 123-4; J. A. Sweeney, *Champaran SR, 1913-19* (Patna, 1919), p.107.
105. Diack, *Kulu SR*, p.18.
106. Anderson, *Muzaffargarh SR*, p.34; cf., K. Mohmand, *Gujranwala SR, 1923-27* (Lahore, 1927), p.13 (where the yields of the previous settlement were repeated without alteration); Humphreys, *Hoshiarpur SR*, p.25; M. Abdul Aziz, *Jhang SR* (Lahore, 1928), p.37; Kerr, *Saran SR*, pp.61ff; Kerr, *Darbhanga SR*, p.131; Tanner, *Gaya SR*, p.83; Stevenson-Moore, *Champaran SR*, p.160.
107. Wilson, *Sirsa SR*, p.236: 'I took care, always, to err on the safe side by assuming the average outturns as something less than the observations would seem to warrant.' Cf., Watson, *Hazara SR*, p.13: 'It may be said with fair confidence that if errors have been made they have been made on the safe side.' Or PGRF 208, L. W. Dane note, 3 May 1913 (PBOR); A. P. MacDonnell, *Report on the Foodgrain Supply*, p.iii; Kerr, *Darbhanga SR*, p.131.
108. Trevaskis, *The Punjab of Today*, p.200.
109. E. D. MacLagan, Officiating Chief Secretary to Government, Punjab, to Senior Secretary to Financial Commissioner, Punjab, 11 February 1906, reviewing C. M. King, *Sirsa and Fazilka SR, 1900-1904* (Lahore, 1905). When one particularly independent settlement officer (L. W. Dane) made a genuine attempt to base his assessments on true yields, the financial commissioner—appalled at the resultant pitch of the demand—simply reduced his yields: Dane, *Gurdaspur SR*, pp.41-2.
110. Trevaskis, *The Punjab of Today*, p.200.
111. IR-Ag, March 1915, 12-24, KW, F. Noyce note, 4 November 1914, (NAI).
112. The exact number of annas taken to represent a 'normal' crop varied from province to province and time to time.
113. Hubback, *Shahabad SR*, p.93; cf., the authorities listed by Islam in his PhD thesis, op. cit., p.58.
114. Stuart, op. cit., pp.225-8; Trevaskis, 'Wheat Forecasts in the Punjab', pp.241-2.
115. A. L. Bowley and D. H. Robertson, *A Scheme for an Economic Census of India* (Delhi, 1934), p.36.
116. Ibid., p.37.
117. Ibid., p.37; ICAR, *Sample Surveys for the Estimation of Yield of Foodcrops, 1944-49* (np but probably Delhi 1950), p.4.
118. Hubback, 'Sampling for Rice Yield', pp.281-2.
119. *Proceedings of the Board of Agriculture*, op. cit., p.30; V. G. Panse, *Report on the Scheme for the Improvement of the Agricultural Statistics 1954* (Delhi, 1954), p.27: 'eye estimation makes for a general toning down of fluctuations'.
120. Panse, op. cit., p.26.
121. Ibid., pp.26-7.
122. P. C. Mahalanobis, 'Sample Surveys of Crop Yields in India', *Sankhya*, 7 (1945-6), p.269; BrLR, June 1926, 33-59; February 1929, 12-40; (both BrSCRO).

123. Hubback, 'Sampling for Rice Yield'.
124. BrLR, February 1929, 12-40, KW, J. D. Sifton note, 5 April 1928, H. L. Stephenson note, 9 April 1928, (BrSCRO).
125. He retired as Governor of Orissa: his autobiography is in the ICS archive at the South Asian Centre, Cambridge.
126. See the *Report of the Crop Planning Conference* (Delhi, 1934); the IEH&L-Ag files, 381/36A (on crop restriction generally), 53/34A (rice), 154/33A (sugar), 60-4/39A (jute), all in NAI.
127. Bengal Agriculture Proceedings, May 1939, 166-207, Part B, H. Graham note, 21 May 1938, (WBSA).
128. The Bihar government file on the jute survey, BrLR, April 1937, 579-600, Part B, J. W. Houlton note, 18 January 1937. The jute *panchayats* were set up during the First World War: BIR-Ag, August 1911, 1-11; BrR-Ag, November 1912, 29-38; February 1915, 12-18; August 1916, 21-39; all in the India Office Records, London. Random sampling failed to give the reliable figures for the small areas needed to ration planting.
129. Bengal Agricultural Proceedings, May 1939, 166-207, Part B, N. V. H. Symons note, 26 May 1938; Financial Secretary note, 24 May 1938 (WBSA).
130. P. C. Mahalanobis, 'Sample Surveys of Crop Yields'; P. C. Mahalanobis, 'On Large-Scale Sample Surveys', *Philosophical Transactions of the Royal Society of London*, Series B, 231 (1946), pp.332ff; M. N. Murthy, 'On Mahalanobis' Contributions to the Development of Sample Survey Theory and Method', in C. R. Rao (ed.), *Contributions to Statistics* (Oxford, 1965) pp.283-316; Y. P. Sing, 'Historical Survey of the Development of Sampling Theory and Practice', *JRSS*, Series A, 114 (1951), pp.214-31.
131. P. V. Sukhatme and V. G. Panse, 'Crop Surveys in India', *Journal of the Indian Society of Agricultural Statistics*, i (1948), pp.46-50, and iii (1951), pp.112-14. Mahalanobis' Calcutta-based faction won the battle for central government patronage.
132. E.g., Trevaskis, *The Punjab of Today*, p.410; Stewart note, op. cit.; Dane note, op. cit. *The Final Report of the National Income Commission* suggested a margin of error in its estimate of agricultural income of 20 per cent: this seems a considerable understatement.
133. *Annual Report of the Department of Agriculture, Punjab*, 1919/20, p.34; *PSM*, p.162. There are also many expressions of scepticism in the settlement reports already cited.
134. IORDP no. 288, 1902, R. Humphreys, Senior Secretary to the Financial Commissioner, Punjab, to Officiating Revenue and Financial Secretary to Government, Punjab, 6 May 1901.
135. *Ibid.*, T. W. Holderness note, nd; IR-Famine, February 1902, 22-24, KW, A. R. Tucker note, 4 February 1902, J. B. Fuller note, 7 February 1902, (NAI).
136. PGFR 440, 'Measures for the Extension of the Area under Wheat and Foodcrops in the Punjab', (PBOR); Hubback, *Shahabad SR*, p.131.
137. Bowley & Robertson, op. cit., p.35.
138. P. C. Mahalanobis, 'Organisation of Statistics in the Post-War Period', *Proceedings of the National Institute of Sciences of India*, x (1944), p.71; cf., *Famine Inquiry Commission Final Report* (Madras, 1945), pp.44-50. It was a Bombay food controller who provided the quotation from Stamp about *chaukidars* putting down what they pleased.
139. Indian Central Cotton Committee, *Report on the Accuracy of the All-India Cotton Forecasts of the 1934/5 and 1935/6 Seasons*, Statistical Leaflet No. 5, first

issue; *ibid.*, 1936/7, second issue (Bombay, 1937-8); V. G. Panse and G. C. Shaligram, 'Improvement of Statistics of Cotton Production in India', *Indian Cotton Growing Review*, i (1947), pp.119-42.

140. Indian Central Cotton Committee, *General Report on Nine Enquiries into the Village or Extra Factory Consumption of Cotton in India, 1933-6* (Bombay, 1938).

141. Stewart note, *op. cit.*

142. H. S. M. Ishaque, *Agricultural Statistics by Plot to Plot Enumeration in Bengal, 1944/5*, 3 vols (Alipore, 1946-7), I, p.5.

143. *Ibid.*, pp.2-6.

144. *Ibid.*, p.6.

145. *Ibid.*, p.5. After independence Indian statisticians conducted a fierce controversy over the reliability of the *patwaris'* area figures. Those associated with Professor Mahalanobis's Calcutta Statistical Laboratory and the National (Random) Sample Survey denigrated them; another camp—those who had conducted 'complete enumerations' for the Indian Council of Agricultural Research—upheld them. See, for instance, P. C. Mahalanobis and D. B. Lahiri, 'Analysis of Errors in Censuses and Surveys with special reference to India', *Sankhya*, 23 (1961), pp.329-53.

146. P. C. Mahalanobis, 'Report on the Bihar Crop Survey: Rabi Season, 1943/4', *Sankhya*, 7 (1945-6), pp.47-8. Panse and Sukhatme, *op. cit.*, p.46, regarded the margins of error in Mahalanobis's Bihar survey as unacceptably high: 13.2-27.8 per cent for major crops, up to 60 per cent for minor.

147. Blyn, *op. cit.*, p.55; Mukherji, *op. cit.*, p.21.

148. *Proceedings of the Board of Agriculture*, *op. cit.*, pp.21-31, 93-105, *passim*; *Report of the Indian Economic Enquiry Committee, 1925* (Calcutta, 1925), pp.44ff; *Report of the Royal Commission on Agriculture in India* (Bombay, 1928), pp.617-21; Bowley and Robertson, *op. cit.*, pp.1-6. There are short accounts of the development of Indian statistics in Lord Meston, 'Statistics in India', *JRSS* n.s. xcvi (1933), pp.1-20; S. Subramanian, 'A Brief History of the Organisation of Official Statistics in India during the British Period', *Sankhya*, 22 (1960), pp.85-118; Trevaskis, *The Punjab of Today*, pp.192ff; and the *Draft Report of the Inter-Departmental Committee on Official Statistics* (Simla, 1946), pp.61ff.

149. For the imperial secretariat's reluctance to recruit professional statisticians (or economists), see IR-Ag, July 1921, 22-26 (the Board of Agriculture's proposals), IEH&L-Ag, October 1929, 160 (Part B), (The Economic Enquiry Committee), IEH&L-Ag, October 1928, 67 (Part B), (the Royal Commission), IEH&L-Ag, November 1930, 5-6 (the Royal Commission again); and Commerce Department Proceedings, Commerce Branch, file 7-C(12)/36; all in NAI. By 1948 official attitudes were transformed: see R. K. S. Chetty and Rajendra Prasad (finance and agriculture ministers) in *Journal of the Indian Society of Agricultural Statistics*, i (1948), pp.5, 10.

150. See Professor A. R. Burnett-Hurst's 'Note of Dissent' to the *Indian Economic Enquiry Committee Report*, pp.91ff.

151. Mahalanobis, 'Report on the Bihar Crop Survey', p.63.

152. Bowley and Robertson, *op. cit.*, p.89.

153. Mahalanobis's most extensive criticism of 'complete enumeration' on the temporarily-settled model is contained in his 'Recent Experiments in Statistical Sampling in the Indian Statistical Institute', *JRSS*, cix (1948), pp.336-7.

154. Chander Prabha, 'District Wise Rates of Growth of Agricultural Output in East and West Punjab . . .', *IIESHR*, vi (1969), pp.333-50, is a first step in this direction.

GLOSSARY OF INDIAN TERMS

- abwab* cess
adhigari headman of an *amsom* (q.v.)
aghani autumn crop
amildari high pre-British official
amsom a small administrative area in Malabar, a 'parish', usually comprising several *desams* (q.v.)
anna one-sixteenth of a rupee
arethia commodity broker
assarhi pool formed by a dam, used for irrigation in Bihar
assamiwar cultivation on peasant holdings
atit religious mediator
- badlain* rotational cultivation of indigo
bahi khatas traders' or *patwaris'* (q.v.) accounts
bakkal rural trader
bania small trader, moneylender, often in a village
banijara itinerant trader
bazara market place
bazaza cloth dealer
beopari (*beparith*) trader, merchant
bhadoi autumn crop
bhaoli a form of rent in kind
bhat tribe of genealogists and bards
bhit land above the annual flood level
bigha unit of area, 1,600 square yards
boltra Muslim caste
- chabutra* platform in front of a building
chapati unleavened bread
chaudhri headman of a village, guild, or caste
chaukedar village watchman
cheri hut quarter
cottah one-twentieth of a *bigha* (q.v.)
- dacoit* violent criminal, member of a robber gang
dallal broker
dakhilla an advance by a broker on the land revenue
dehat an indigo factory's area of influence
desam a 'village' for the purpose of revenue administration in Malabar
dewat puja worship

- dharma* 'dunning' a debtor by invoking religious sanctions
diara land flooded by rivers
dukan shop, stall
fakir religious mendicant
faria 'huckster'
fariidar Moghal 'police' jurisdiction
firman charter
ghat wharf
ghi clarified butter
girdawari revision of revenue records
golah grain market
gomastah managing agent
goonda violent criminal
gotra clan, sub-clan, or sub-caste
gram pulse
gurikal a Moplah teacher of the use of arms
hak right
hartal closure of business as a form of protest
hath periodic market
haveli large house
hund negotiable instrument
ilaqua administrative area
inam grant of land free of revenue
inamdar holder of an *inam* (q.v.)
jagir grant of revenue or land
jagirdar holder of a *jagir* (q.v.)
janabandi part of a village record of rights
jama revenue assessment on a holding
jati small caste group
jemmi 'landlord' in Malabar
jeth raiyat leading peasant who helps to collect rents or revenue
jethawala commodity storer
jihad holy war
jowari millet
kalwar distiller
kanam mortgage tenure of Malabar
kanamkar the holder of a *kanam* (q.v.)
kans a tough grass
kanungo revenue official in Northern India
kariastan agent of a landlord
kazi Muslim judge

- kharaba* crop inspection or measurement
kehatri trading caste
khot 'landlord' in the Konkan region of Bombay
khurda itinerant money-changer
khushi the system whereby independent peasants grew crops for planters
kisan peasant cultivator
kist instalment of land revenue or rent
kothi village agent of a higher-level trader
kothiwal head of a mercantile house, a money-dealer
kotwal official in charge of a town's police
kulkarni village accountant in Bombay
kurtauli mortgage of a tenant's occupancy rights to a planter
kutchra khandy bale of cotton, the number of bales constituting a unit of dealing
kutcheries offices, courts

lac dye and resin extracted from an insect
lakh 100,000 (usually written as '1,00,000')
lathial armed with heavy staves (*lathis*)

mahajan merchant
mahamandal traditional association, usually of merchants in the same trade
mahant chief priest
malik yeoman, landlord
mandal village headman in Bengal
mandi fall (in the market)
marwari trading caste from Central India
maund unit of weight, 26-82 lbs
melcharh the right to evict a tenant, sold by a *jenmi* (q.v.)
mofussil up-country, the interior
mohulla (mahalla) quarter of a town
mokarrari permanent lease of an estate
muccadam commodity handler
nulla Muslim priest, an expounder of Muslim law
mumin banker's clerk
munsif subordinate judge

naib-tehsildar deputy-tehsildar (q.v.)
nuzzar gift

pakea proper, superior
pan betel-leaf
panchayat council
pandit Hindu priest
pargana administrative area
patel village headman
patta engagement to pay revenue
pattidar (patidar) holder of a *patta* (q.v.)

- patwari* village accountant in Northern India
peddaraiyat leading peasant
pedhi traditional-type office
phatakbandy gated area within a city

qistwala (qiswala) itinerant moneylender

rabi spring harvest
ragi millet
rais notable
rokarhkhata cash ledger
ryot (raiyyat) peasant cultivator
ryotwari land revenue collection from individual *ryots* (q.v.)

sair profits of an estate
sahukar moneylender
salami fee
sarraḡ (sarraf) traditional banker, broker
satta agreement, contract
satyagraha passive non-cooperation, a Gandhian mode of political protest
sayyid Muslim holy man, a descendant of the Prophet
seer one-fortieth of a *maund* (q.v.)
seeth the refuse after indigo is fermented in vats, a fertiliser
shahid Muslim martyr
shamliat village land held in common
shroff same as *sarraḡ* (q.v.)
sonar goldsmith
sowcar (sowkar) same as *sahukar* (q.v.)
swadeshi self-sufficiency
swaraj freedom

takavi loan from the government or a landlord
taluk similar to *tehsil* (q.v.)
talukdar large landlord
tangal descendant of the Prophet (in Malabar)
tatimma shijira part of a village record of rights
tehsil (tahsil) administrative sub-division of a district
tehsildar official in charge of a *tehsil* (q.v.)
teji rise (in the market)
teli oil-presser
thana administrative area
thika contract, lease, of an estate
thikadar holder of a *thika* (q.v.)
tinkathia leases conditional on the lessee cultivating part of his holding for the lessor, usually three *cottahs* (q.v.) per *bigha* (q.v.) of a peasant holding

ulema Muslim priesthood

vakil lawyer

varna caste

verumpattomdar holder of a *verumpattom*, or a simple lease of land

zamindar landholder, large or small

zaripeshgi lease or mortgage of the right to collect rent

zerat land under direct cultivation by the landlord