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Land Distributive Justice and Its Consequences

Vasant Autkar, S.L. Deshpande and Chhaya Vyawahare*

An attempt has been made in the paper to study the impact of land reforms on labour absorption, employment and income distribution in Akola district of Maharashtra. To examine the effect of land reforms on labour absorption, the district census data for the year 1971 and 1981 were used. To study the consequences of land reforms on employment and income distribution, data were collected from a sample of 126 beneficiaries who were purposively selected from seven villages in Akola district wherein tenancy and ceilings laws were effectively implemented. The data pertained to the year 1989-90. The findings of the study are as follows. The labour absorption coefficient showed a marginal decline to 1.77 in 1981 from 2.27 in 1971. The study of the impact of land reforms on employment pattern and the position per farm worker presents a gloomy picture. The beneficiaries depended on others' farms and on employment guarantee scheme (EGS) for employment. A male worker was unemployed for about 41 per cent of the days and a female worker for 47.6 per cent of the days in a year.

Farm business income is a major income of source of the beneficiaries, accounting for 48 per cent of the total income per family, followed by wage income (28.52 per cent) from others' farms, income from livestock (13.84 per cent) and income from EGS (9.63 per cent). The magnitude of inequality in income distribution of the beneficiaries after fitting the Lorenz curve showed that the income distribution was towards the line of equality. Land reform measures adopted have strong bearing on policy implications. The equitable distribution of land can only be achieved if the resource base of the small and tiny holdings is improved. The programme of land reforms should include not only the policies designed for effective utilisation of land by small and marginal farmers but also for effective combination of institutional, technological and organisational factors in the context of changing agrarian structure in the country.

Adoption of Modern Technology and Agricultural Productivity - An Evaluative Study

B.K. Pattanaik†

The paper makes an attempt to investigate the adoption of high-yielding variety (HYV) practices and productivity disparities among the tenant, small and large farmers in the green revolution belt and dryland belt in Orissa. The study is based on data collected from a sample of 150 farmers - 75 each from the green revolution belt and dryland belt - in Puri district of the state. The analysis of data revealed that the large, small and tenant farmers in the green

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revolution belt have adoption index of 87.71, 86.12 and 81.33 per cent respectively, while their counterparts in the dryland belt have adoption index of 31.17, 29.67 and 21.54 per cent respectively. The productivity efficiency of rice in the green revolution belt was 119.55, 111.83 and 107.63 per cent for large, small and tenant farmers respectively. Conversely, the large, small and tenant farmers in the dryland belt have productivity efficiency of 57.8, 51.17 and 42.62 per cent respectively. The calculated 't' values are significant at 0.01 and 0.05 levels on probability, which show that the adoption and productivity efficiency of farmers in the green revolution belt are significantly higher than those of the farmers in the dryland belt. The correlation coefficient between adoption and productivity in the green revolution belt is 0.94 which shows that higher level of adoption of HYV seeds and package of practices has led to higher production. The 'F' values of tenant, small and large farmers both in the dryland belt and green revolution belt are not significant which revealed that farm size has not produced any significant difference in productivity in both the areas. The main conclusions of the study are: (1) Adoption of HYV seeds and package of practices is associated with increased productivity on tenant, small and large farms. (ii) It also increased productivity in the green revolution belt, thus widening the productivity gap between the two areas. (iii) Farm size is neutral to productivity variation in both the areas.

Production Relations, Technology and Agricultural Development in India (1946-47 to 1985-86): An Inter-Regional Analysis

Hem Chandra Lal Das*

Production relation in agriculture, which stands for the institutional framework of agriculture, primarily includes three institutional factors, namely, land tenure, land tenancy and land revenue. All these factors are inter-woven and inseparable from one another. On the basis of different modes of agrarian production relations prevailing in different parts of the country on the eve of Independence, the agricultural economy of India has been delineated into four regions: Zamindari, Ryotwari, Mahalwari and Jagirdari. The performance of Indian agriculture in different states/regions has been measured in terms of agricultural efficiency, represented by the composite index based on the total vector of five indicators, namely, crop intensity, irrigation intensity, per agricultural worker availability of net sown area, per cent of commercial crops in gross cropped area and per hectare productivity, each indicator having different values across the states in India. During the period of 40 years from 1946-47 to 1985-86, the mahalwari region had the highest index of agricultural efficiency (121.31), followed by the ryotwari region (112.09) and the zamindari region had the lowest index of agricultural efficiency (87.94), as compared with the jagirdari region (103.31). The coefficient of regional variation was 13.36. Waiving the regional boundaries, the agricultural economies of Bihar (zamindari region) and Punjab (mahalwari region) seem to be situated on the two extremes, with the former and the latter having the lowest and the highest indices of agricultural efficiency respectively.

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While a negative relationship was observed between tenancy and agricultural efficiency, the relationship between the size of operational holdings and agricultural efficiency was found positive. The regression coefficients of agricultural efficiency in relation to per cent of area irrigated, availability of institutional farm credit, fertiliser consumption per hectare and area under HYV seeds in the triennium ending 1985-86 were found to be lower than the corresponding values in the triennium ending 1975-76. The diminishing dependence of agricultural efficiency on technological inputs itself emphasises the increasing significance of institutional factors in agricultural development. For agricultural development in India, institutional reforms should precede the technological change, or at least, both should go side by side. Institutional reforms and technological changes both are necessary.

Changes in the Land Concentration in India

S.K. Lal,† Ravikesh‡ and T. Srinivas†

An attempt has been made in the paper to analyse the changes in the concentration of land in different states of India at two points of time, namely, 1976-77 and 1985-86. Two measures of inequality, i.e., Gini coefficient of concentration and Atkinson's Index have been used to study the changes in the concentration of land. The study revealed a downward tendency in the concentration ratio of operational holdings for almost all the states excepting Maharashtra and Meghalaya during 1985-86 as compared to 1976-77. It was found that during the seventh and the eighth decade, the structural distribution of operation holdings has undergone considerable changes for most of the states and the concentration was found to decline which shows a tendency of gradual approach towards equitable distribution. Atkinson's welfare index revealed that the inequality is higher among the lower decile than among the upper decile. Further, Atkinson's index yielded the highest value during 1976-77 corresponding to each different parameter 'e', also confirming a decline in disparity during 1985-86 over 1976-77.

Rural Employment in the Context of New Agricultural Technology: Emerging Trends and Future Prospects

V. Prasad, R.N. Yadav and B.K. Gupta*

The paper examines the emerging trends in rural employment in the agricultural sector in the context of new agricultural technology in India for the period 1972-73 to 1987-88. It also attempts to explore the possibilities for increasing employment opportunities in agricultural and non-agricultural sectors of the economy by analysing the trends in the

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distribution of workers by major sectors and growth rates of employment in the agricultural and other sectors of the Indian economy. The distribution of workers by major sectors revealed that there has been some sectoral shifts away from the agricultural to the non-agricultural sector during the period under study. The workers engaged in agriculture and allied occupations declined from 74 per cent in 1972-73 to 65.5 per cent in 1987-88. Even within rural areas, there has been a decline in agricultural employment from 85.5 per cent in 1972-73 to 77.8 per cent in 1987-88. As regards growth rates of employment by major sectors, almost all the sectors of economic activity, except agriculture, experienced a rate of growth of employment higher than 3 per cent per annum during 1973-88. Agriculture, in which two-thirds of total employment is generated, registered an average rate of growth of 1.37 per cent per annum only. Construction, mining and electricity which together accounted for about 5 per cent of total employment, registered a high rate of growth of employment of more than 5 per cent per annum, while manufacturing, transport and services registered an annual rate of growth of employment at 3.61 per cent, 4.65 per cent and 3.05 per cent respectively. When the growth rate of employment for different periods is examined, it showed a declining trend in agriculture from 2.32 per cent per annum during 1973-78 to 0.65 per cent per annum during 1983-88, while in mining and construction an increasing trend was observed. The declining trend in the growth rate of employment in the agricultural sector may be mainly due to the limitations in the improvement in irrigation and hence the spread of high-yielding varieties, intensity of cropping along with mechanisation of manual farm operations.

However, despite an overall declining trend in employment in the agricultural sector, there appears to be considerable scope for raising employment generating capacity of agriculture in many regions of the country. An acceleration in the rate of growth of agricultural output and employment in the lagging and poorer regions would have to come obviously from an increase in yield levels of individual crops, increase in cropping intensity and changes in cropping pattern in favour of high value crops. The most important factor contributing to such changes would be the availability of assured irrigation, followed by provision of modern inputs and appropriate price and wage policies. Diversification of agriculture into high labour using high value crop assumes crucial significance. In terms of demand and potential, vegetables and fruits are the most labour intensive crops. Besides crop enterprises, the potentials of animal husbandry for income and employment generation can hardly be over-emphasised. In the long run, it is not only desirable but necessary that rural economy gets diversified into non-agricultural activities to provide productive employment to the growing labour force. With suitable promotional policies, including those relating to location and infrastructural development in rural areas, considerable expansion of rural industries with high potential for employment generation for rural workers could be expected.

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Impact of Consolidation on Technology Adoption and Agrarian Economy in Himachal Pradesh

A.S. Saini, K.D. Sharma and T.V. Moorti†

This paper examines whether the Consolidation of Holding Act, 1953 of Himachal Pradesh, which was effectively implemented during the early seventies, had really contributed to accelerate the technology adoption, production, farm income, investment, expenditure and reduce disparities among farmers in the state. The study is based on analysis of data collected from a random sample of 140 farmers - 80 small and 60 large - selected from 19 villages in three districts of the state at two points of time, 1974-75 (before consolidation) and 1986-87 (after consolidation). To examine the impact of consolidation on the dimension of inequality, Gini concentration ratios (GCR) were worked out. To make the estimates of income, investment and expenditure comparable over the two points of time, the analysis was done using current prices (1986-87).

Three important conclusions emerge from the study. Firstly, with the consolidation of holdings, the number of fragments, in general, decreased considerably which accelerated the rate of adoption of modern technology to a reasonable extent but not to the desired level. Secondly, the consolidation has exerted positive and significant impact on the overall development of the agrarian economy of the selected farms in Himachal Pradesh as all the developmental parameters, viz., productivity of major crops, investment in productive assets, farm income, standard of living (as evidenced by the increase in expenditure on consumption, education and health, etc.) in general signalled appreciable enhancement in the post-consolidation period. Thirdly, the disparities/inequalities in the distribution of land, income and expenditure on education and health (except consumption expenditure) decreased quite satisfactorily especially on small farms, which is an indicator of socially desirable impact of consolidation in the state in general and the study area in particular. It is suggested that land reform measures in general and land consolidation programmes in particular should be rigorously enforced in the country so as to achieve higher growth in agriculture with equity and social justice. It is further suggested that technological development must be consistent with the size of holding and region-specific. For this, efforts should be made to develop or modify technologies appropriate for smaller land holdings, particularly for hilly areas. Otherwise, there will be wastage/under-utilisation of resources as in the case of unsuitability of large tractors/combine harvestors in hills having undulating topography and tiny holding size.

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Production Relations and New Agricultural Technology: Prognoses and Evidence

H.R. Sharma*

With the onset of new agricultural technology in Indian agriculture in the mid-sixties, it was hypothesised that the concentration of land and the proportion of landless households would increase, the magnitude of tenancy would decline consequent to the resumption of erstwhile leased-out land for self-cultivation by the landlords, the terms of tenancy would change with share tenancy giving way to fixed rent tenancy, the proportion of agricultural labour households would increase, and so on. The paper puts these prognoses to empirical scrutiny using macro and micro evidence emanating from the National Sample Survey data and numerous field studies. The available evidence throws up a mixed picture. While area owned seems to be getting slightly deconcentrated, the incidence of landlessness, from the point of view of area owned, seems to have witnessed a steady increase over time. Again, the proportion of agricultural labour households increased continuously, both in agriculturally progressive states such as Punjab as well as in agriculturally backward states such as Bihar; in fact it was significantly higher in Bihar compared with Punjab. There is some evidence, both macro and micro, to suggest that the spread of new agricultural technology prompts large farmers to participate in the lease market as lessees leading to an increase in the concentration of operational holdings. This promotes self-cultivation and causes the incidence of traditional tenancy in general and share tenancy in particular to decline.

Reduced Size of Ownership Holdings and Increased Incidence of Reverse Tenancy in Nellore District, 1969-1993

M. Atchi Reddy†

The paper analyses some features of the changing agrarian relations in Nellore district of Andhra Pradesh in terms of the size of holdings and tenancy between 1969 and 1993. For this purpose, nine villages were selected at random, one each from the nine taluks. Both official and unofficial data and information were analysed. The effects of the green revolution are not so profound in this district as its agriculture had been devastated by frequent cyclones. The land reforms resulted in the fast declining size of ownership holdings while the technological changes required larger operational holdings for achieving economy and efficiency of agricultural production. The result was the growth of concealed leases and 'reverse tenancy'. Owner-operators of uneconomic holdings leased in some land from still smaller holders so as to improve their production efficiency through increased production units. Since a number of tiny holders (the allottees) have also got their traditional occupations, or

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opted to do agricultural labour, a large portion of their fields remained fallow, or used as pastures, leading to an overall decline in the net sown area of the district between 1969-70 and 1992-93 by more than 50,000 hectares.

Changing Land Distribution Scenario in Haryana

U.K. Pandey, K.S. Suhag and V.P. Manocha*

The paper examines the changing land ownership pattern amongst farm sizes, the effects of demographic pressures on the access to land and the tenancy status of scheduled caste farmers in Haryana. Districtwise secondary data pertaining to the ownership of land holdings in Haryana for the years 1970-71, 1980-81 and 1985-86 as well as the distribution of number of holdings and area operated, leased-in area as per the terms of leasing by scheduled caste farmers according to tenancy status for the year 1980-81 were collected from the Directorate of Land Records, Haryana. For the purpose of analysis, the eastern zone districts of Haryana are grouped under region I while the southern zone districts under region II. Besides percentages and averages, Gini concentration ratios were worked out to measure the extent of inequality in the distribution of land holdings. The analysis of data revealed bottom concentration of land holdings in all the categories both across regions and state. The land ownership, however, was mainly concentrated among semi-medium and small farmer categories. The average size of operational holdings (access to land) across regions and the state has a declining trend during 1970-71 and 1985-86 in all the categories. Accordingly, over the period the inter-class access to land and thereby command over other inputs in both the regions and the state declined. The most popular term of leasing-in land amongst scheduled caste farmers is the 'share of produce' followed by 'fixed money' in the state and across regions. The policy implications of these findings are: (i) In the process of bottom concentration of land ownership concerted efforts are needed to create viable holdings. (ii) The demographic pressures on land require the creation of off-farm employment opportunities in the state. (iii) The leasing-in of agricultural land which acts as a short-run land market requires legal regularisation.

Water Use and Problems in Implementation of Groundwater Regulation Policy in Gujarat

Ila K. Shah, Premji M. Patel and Rekha M. Kotak†

An attempt has been made in this paper to examine the utilisation of groundwater and to find out how far the government legislations and restrictions and financial institutions have succeeded in groundwater management in the districts and regions of Gujarat. Eighty-two per cent of the area in the state is irrigated by groundwater (wells and tubewells) and 18 per cent of the area by surface water (canals and tanks). Among the districts, Mehsana

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(65.80 per cent), Amreli (57.22 per cent), Rajkot (53.23 per cent), Junagadh (47.64 per cent) and Jamnagar (44.37 per cent) have used up their groundwater. The area irrigated by tubewells was the highest in Mehsana which accounted for 64.69 per cent of the total irrigated area in the state and Banaskantha accounted for 13.13 per cent of the total irrigated area with surface wells, which is highest in the state. Looking to the area and use of groundwater, the balance of underground water is unfavourable in the regions of North Gujarat, Saurashtra and Kutch. Some talukas of these regions have been listed as dark and gray areas due to overdrawing of groundwater. Tubewells are dug by large farmers, because small and marginal farmers could not afford this costly affair. Therefore, the underground water is generally exploited by large farmers. The regulation act of groundwater management has not been widely enforced. Restrictions imposed by financial institutions and electricity board have not helped much in this regard.

A Study of the Impact of Green Revolution on Agrarian Structure in Agra District of Uttar Pradesh

Balishter and S.K. Dwivedi*

The paper attempts to examine the impact of green revolution on farm size, fragmentation and tenurial relations in Chauhatna village of Bichpuri development block in Agra district of Uttar Pradesh on a census basis during 1963-64 (pre-green revolution) and 1990-91 (post-green revolution period). All the farm families owning land in the village are included in the study and categorised into four size-groups on the basis of owned holdings. The number of farm families was 56 in 1963-64 and it increased to 104 in 1990-91. The results of the study indicate that during the period of about 28 years the marginal farmers have gained in both number as well as area, however, their gain in area is more than the percentage gain in their total number. The small farmers gained in area though they lost their percentage share in total number. The medium farmers have lost their share in both the total number and the total cultivated area, however, their share in the area is less than the loss in their share in the total number. The large farmers have lost in their number but not in their cultivated area. This indicates that despite a decline in the proportion of the medium and large farmers during the period, both these size-groups have tried to retain the average size of their holdings. For the sample as a whole, the average size of holding was 2 hectares in 1963-64, which declined to less than one hectare in 1990-91. The average size of holding of marginal farmers declined by about half from 0.86 hectare to 0.45 hectare, it declined by about 20 per cent in the case of small farmers and by about 28 per cent in the case of medium farmers but the decline in the average size of holding of large farmers is only by 9 per cent during the period under reference. Such a change in the holding structure may not be conducive to efficient land use in the case of marginal farmers. Over time not only the number of farm families has been increasing fast, but the average size per family also shows an increase. This growing population against the fixed land base results in a sharp decline in the availability of land per capita. This situation is bound to result in accentuating poverty

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of the farm households and rural sector at an increasing pace unless a substantial part of the farm population is shifted away from the farms and the burden on land is reduced considerably. The number of plots per holding shows a declining tendency during the period under reference. In 1963-64 about 41 per cent of total number of farmers were engaged in land-lease but in 1990-91 their proportion was only about 15 per cent. About 39 per cent of marginal farmers, 64 per cent of small farmers and about 18 per cent of medium farmers were engaged in land-lease in 1963-64 while the corresponding figures during 1990-91 were 4, 24 and 14. None of the large farmers was engaged in lease transactions during both the periods. Not only the percentage of farmers engaged in lease transactions has declined markedly with the adoption of new technology but there has also been a marked decline in the area under lease from 27 per cent in 1963-64 to about 14 per cent in 1990-91. In the post-green revolution period (1990-91) the marginal farmers because of tiny holdings leased out land while the medium farmers leased in land to increase the area of operation due to availability of tractor facility on their farms. Thus the new technology has discouraged the practice of leasing of land in the village and farmers are more interested in self-cultivating the land in order to take advantage of new agricultural technology. Prior to the introduction of new technology the entire area under lease was in crop sharing system. But in the post-technology period there has been a shift from crop sharing to fixed land rent system as about 62 per cent of the total leased land was under fixed rent system. This shift in favour of fixed rent system is due to certainty of production and income due to adoption of new farm technology.

Critical Appraisal of Tenancy Reforms in Madhya Pradesh

Rajesh Jain and H.C. Jain†

A broad assessment of land reform measures implemented in Madhya Pradesh reveals that the intermediary tenures have been completely abolished. In respect to the policy that land shall belong to the tiller, oral and informal tenancies are still prevalent. Tenancy is not totally banned legally. Not only certain categories of land holders have been exempted from the tenancy legislation but once in three years, any land holder can give his land area on lease. As regards the performance of ceiling legislation, the state's picture is also in no way different from the national performance. The declared surplus land is found to be much less than what was estimated by the surveys and census conducted in the state. The entire declared surplus land could not be taken into possession for one reason or the other. The proportion of surplus land distributed was even much less. What is even more disturbing is that the ceiling law is implemented in a half hearted manner which has permitted dispersal of a very substantial area by large landowners with a view to circumventing the ceiling legislation.

The analysis of agricultural census data reveals the skewed distribution of operational land holdings in the state. The changes in the pattern of distribution of operational holdings show that marginalisation of the poor peasantry has been going on at a fairly faster rate, while there has been no serious dent on the effective concentration of land in a few hands

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in spite of the implementation of land ceiling legislation in the state. It does appear that the state has not taken up effective measures for plugging the loopholes in the existing law and has not geared up the administrative machinery for unearthing concealed surplus land. Hence, the progress of land reforms in the state has been less than expected.

The analysis of agricultural census data in the state reveals that about 90 per cent of the operational holdings both in number and area were under wholly owned and self-operated tenure. The remaining operational holdings were under other types of tenures. Tenancy in part or pure form is not of much significance. According to the Agricultural Census 1985-86, the pure and part tenancy commanded over about 0.30 per cent of the total operational area of these holdings. The percentage decrease in area in 1985-86 over 1970-71 was also about 26 to 28. The medium and large farmers resorted to maximum leasing-in of area in the state but the marginal farmers were maximum in number among wholly leasing-in holdings. In tenancy arrangements, the 'other term' representing combination of money with produce is the predominant practice followed by all social groups to the extent of 60 and 80 per cent in the case of part and pure tenancy respectively. Hence, tenancy in the state is not of much importance. But the informal, insecure and oral tenancies in the form of concealed tenancies were reported. The unearthing of these concealed tenancies prevented slippage of land from the pool for distribution to the needy. The detection is difficult in the absence of proper entries in the revenue records. It is, therefore, necessary that updating of records of rights should be taken up on an urgent priority basis.

Changes in Agrarian Pattern in India - An Overview

Rama Kant Singh, G.N. Singh and S.D. Singh Sengar*

An attempt has been made in the paper to examine the changes that have taken place in the agrarian structure of India as a result of adoption of different land reform measures, on the one hand and law of inheritance and family partition, on the other, at two points of time. The data of Agricultural Census 1980-81 and 1985-86 have been used for the purpose. The analysis revealed that the agrarian structure has undergone a change in 1985-86 as compared to 1980-81 because of adoption of land reform measures, distribution of surplus land among the scheduled castes and scheduled tribes and law of inheritance. The number and operated area of marginal, small and semi-medium groups have gone up while those of medium and large holders have declined. Similarly, the average size of holdings has declined from 1.84 hectares in 1980-81 to 1.68 hectares in 1985-86 because of increase in the number of operational holdings and shifting of large holders into smaller ones due to partition of families. Not only the number of holdings of the scheduled castes and scheduled tribes increased over time but also their share in the total number of operational holdings and total operated area has gone up from 19 to 20.2 per cent and from 17.2 to 18.3 per cent respectively because of distribution of surplus land among these social groups. Many landless people belonging to the weaker section of the rural population now enjoy the privilege of being

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land holders.

However, the new land holders and marginal and small farmers having very low land base of poor quality suffer from poor resources and low productivity which calls for urgent remedial measures under agrarian reforms. In this context, our future agrarian reform should be based on social equality, infrastructural development, efficient input supply and greater emphasis on higher adoption of modern farm technology by marginal and small farmers for an overall agricultural development of the country in the context of changing agrarian structure.

Impact of Agricultural Technology on Farm Economy

K.P. Sharma and D.C. Pant†

An attempt has been made in the paper to examine the impact of agricultural technology on farm economy in relation to different size-groups of holdings. For this study primary data were collected from 90 farmers in four villages of Chittorgarh district of Rajasthan during the agricultural year 1991-92. The selection of the district was done on purposive basis while tehsils, villages and farmers were selected randomly. The technology was quantified by construction of a technological index. The holdings were then grouped into three classes based on the level of technology worked out for each farm, viz., I level upto 50 per cent, II level from 50.01 to 66.67 per cent, and III level from 66.68 per cent and above. The study revealed that a fairly large number of farms (about 39 per cent) were in II level while about 32 per cent and about 29 per cent farms were in I level and III level of adoption of improved technology respectively. The number of small farms was maximum (41.38 per cent) at III level while a maximum number of medium (40 per cent) and large farms (51.61 per cent) were at II level of technology adoption. The percentage of irrigated area has shown no relation with the level of technology on small farms while it has shown positive relationship on medium size farms and negative relationship on large farms. The average level of technology adopted was the highest on large farms (40.89 per cent) at I level, it varied from 58.11 to 60.92 per cent on different size-groups of farms at II level and it was highest (82.15 per cent) at III level on medium farms.

The average number of workers per hectare in I and II levels of technology decreased with the increase in the size of holdings while it has not shown any trend in III level. The marginal value productivity (MVP) at I level of technology was positive and significant for human labour and fertilisers-manure, it was positive at II level of technology and significant for bullock labour, machine labour, irrigation, fertiliser and fixed cost. At III level of technology, the MVP was positive and significant for irrigation and the investment on fixed capital. This favours the increased use of these factors at the respective levels of technology to increase the output.

The net income per hectare increases with the level of technology. On small farms the net income per hectare was more than on medium and large farms in all the three levels of

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technology. The per hectare utilisation of human labour was more on small farms (103.11 days) than on medium (81.93 days) and large farms (82.23 days). A similar trend was also observed in different size-groups of holdings at various levels of technology. Per hectare use of human labour also increased with the level of technology. It was estimated at 80.27 days, 86.11 days and 88.71 days per hectare at I, II and III levels of technology.

The technology was, however, found neutral to the size of holding as the technology has been adopted by all classes of farmers. The adoption of technology even by the small farmers may be due to the efforts to promote the technology through various target group oriented programmes. Therefore, it implies that if efforts are made then the existing technology can be popularised among the small farmers and may prove neutral to the size in practical sense. The promotion of existing technology in the region is fully justified as net income and employment have shown positive relationship with the technology.

Instability in Groundnut Production and Change in System of Sharecropping in the Context of the New Technology of Orissa

S. Jena, J. Sahoo and A.K. Mitra*

The paper discusses the effect of new technology on groundnut production and the instability arising therefrom in Orissa. For the purpose of study, the districtwise relevant data on area, yield and production of groundnut for a period of 38 years, constituting a pre-techno period of 18 years (1954-55 to 1971-72) and a post-techno period of 20 years (1972-73 to 1991-92) have been considered through suitable production function models. It seems that neither the time factor nor the introduction of new technology has played any role in increasing the production of groundnut which is solely due to greater coverage under the crop. This is further strengthened by the results obtained from the study of instability. The results also revealed that the instability in both area and production was convergent in nature except in the *kharif* season in Dhenkanal and Ganjam districts, and in the *rabi* season in Puri and Sambalpur districts. Surprisingly, the yield status has remained stagnant over the years except in the Sambalpur district where it decreased in the *kharif* season, which is rather disappointing. It is also observed that the rent paid to the owners for the leased-in land in sharecropping system is decreasing year by year which also adds to the instability. It has been found that the very objective of the new technology for increasing the production through yield augmentation programme has not been achieved so far. The study also reveals that the theory of instability could be fruitfully utilised for projection of different parameters.

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Land and Water Distribution Pattern in Madhya Pradesh

B.L. Mishra, P.K. Mishra and R.M. Sahu†

The paper examines how land and water resources are distributed among operational holdings in Madhya Pradesh by analysing the Agricultural Census data for the years 1970-71, 1975-76, 1980-81, 1985-86 and 1990-91. The number of operational holdings in the state increased by 58.5 per cent from 5.3 million in 1970-71 to 8.4 million in 1990-91 and the total operated area increased marginally by 4.3 per cent from 21.19 million hectares to 22.1 million hectares during the same period. In 1990-91, marginal (0-1 ha) and small (1-2 ha) holdings accounted for 60 per cent of the total number of farm holdings, operating only 19 per cent of the total area. Thus there is a great imbalance in the distribution of land in the state despite various land reform measures implemented during the plan periods.

The distribution among the size-groups with respect to the number and area of holdings is still deplorable. There has been a drastic rise in the number and area under marginal and small holdings with a consequent fall in both these parameters in the case of large holdings (over 10 ha). The distribution of land according to social groups such as scheduled castes and scheduled tribes representing 37 per cent of the total population has also been found to be highly skewed indicating social injustice in regard to the ownership of the land resource. The scheduled tribes outnumbered the scheduled castes with respect to the number and area of holdings occupied by them. The degree of social justice among different size-groups and social strata was examined by Gini concentration ratio which was very close to unity, indicating skewed distribution of the land resources. There has been a gradual but slow improvement in the distributive pattern of land in the state which may be attributed to the legislative measures carried out in the past within the package of land reforms. There is enough scope for improving the land distribution among different size-groups and social classes for which serious political commitment is called for. The ceiling limits of land will have to be lowered keeping in view the increasing population pressure and social justice.

The distribution of irrigation facilities during 1970-71 to 1985-86 also revealed malallocation among various size-groups as shown by the magnitudes of Gini concentration ratio which is close to unity. Emphasis on minor irrigation in the past and implementation of rural development schemes have brought about a positive change in the irrigated area among small holders which need to be further pushed up to avoid concentration of water resources among few large holdings.

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Economics of Shallow Tubewell Irrigation and Its Financial Viability in Hilsa Block of Nalanda District - A Case Study

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The study aims at analysing the economics of shallow tubewell installation and its financial viability in an agriculturally developed district (Nalanda) of Bihar. It is based on primary data collected from 45 shallow tubewell owner farmers in a purposively identified village of Hilsa block in the project area. The analysis of operated area of the sample households revealed that a majority of them had an operated area of less than 4 hectares each. The average size of operated holding of the small farmers (upto 2 ha) was 1.54 hectares and it was 2.57 hectares for the medium farmers (2.4 ha). Shallow tubewells are quite common on medium and small size of farms in the project area. On an average, the installation cost per shallow tubewell was about Rs. 12,220; it ranged from Rs. 11,560 on small farms to over Rs. 14,000 on large farms. The variation in the installation cost was mainly due to the use of better quality pipes and machines on large farms as compared to the other size-groups. The annual use of tubewells for own purposes was the highest on large farms (556 hours), followed by medium farms (381 hours) and small farms (206 hours) but the trend was just the reverse for hiring out of the shallow tubewells, with small farmers hiring out their tubewells to other farmers to make these viable to the maximum extent (420 hours) in a year, as they could not utilise the tubewells fully on their small sized farms.

Financial analysis of shallow tubewell installation showed positive net present value (NPV) in all the size-groups of farms, indicating its viability on even small sized farms in the project area. It is worth mentioning that the NPV was relatively higher on small farms (Rs. 1,052) than on medium (Rs. 1,044) and large farms (Rs. 991). The benefit-cost ratio also indicated a similar trend, that is, it declined with the increase in the size of holdings. The internal rate of return (IRR) was more than 13 per cent in all the size-groups of farms. Since the IRR was more than capital cost which the farmers are required to pay for making any investment by taking loans from the financial institutions, it may be inferred that the installation of shallow tubewell is beneficial in the project area.

Distribution of Land Holdings and Its Inequality in India

Sudhakar Tripathy†

An attempt has been made in the paper to study (i) the pattern of distribution of land holdings in India, (ii) the dimension of inequality of land holdings distribution and (iii) the impact of average size of holdings, inequality index and level of inputs on agricultural productivity. The study is based on Agricultural Census data for 1970-71, 1976-77, 1980-81 and 1985-86. The study reveals that the number and area operated by the marginal, small

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and semi-medium holdings had increased whereas a reverse trend was observed in the case of medium and large holdings. The marginal holdings recorded the highest percentage increase in number as well as area followed by the small and semi-medium holdings. The increase in the number and area of marginal and small holdings was attributed to fragmentation of holdings due to inheritance and distribution of surplus land among weaker sections of the population. The effect of these has led to a decline in the medium and large sized holdings.

The dimension of inequality of land holdings distribution was examined by computing inequality indices by three measures, namely, Gini coefficient, Theil's index and Atkinson's index. The empirical results of the study indicate that over a period of time, concentration of land holdings has declined. Across states, Gini ratios have decreased in Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal between 1980-81 and 1985-86. The results of regression analysis reveal that the average size of holdings and inequality index adversely affected per hectare yield of foodgrains. High-yielding varieties area and irrigated area had positive and significant impact on per hectare yield of foodgrains.

Changing Perspectives of Land Distribution in India

K.N. Rai, S.P. Singh and D.B. Yadav*

Land is the primary resource on which agriculture is b[redacted]p of the asset has to be just and rational to secure growth wit[redacted]er, the distribution of land is an important determinant in any strategy for agricultural development. An attempt has been made in this paper to analyse the land distribution scenario on three fronts, viz., the holders, the holding size and the changes in the pattern of ownership of land in the case of schedule castes. The data for the study were obtained from various secondary sources covering the period 1970-71 to 1985-86. The Gini concentration ratios were worked out to assess the structural changes. The results of the study revealed that over the period, there has been changes in the pattern of ownership, leading to lessening in inequalities in the distribution favouring the marginal, small and semi-medium farms. Interestingly, in all the states except Punjab, the percentage increase in the total number of holdings has exceeded that of total area and as a result the average size of holding has declined. Barring very small variations, the pattern of ownership in Maharashtra, Orissa, West Bengal, Gujarat, Haryana, Tamil Nadu, Madhya Pradesh has considerably changed in favour of the less privileged, viz., marginal, small and semi-medium farm holders. The case of Punjab seems to be rather an exception, indicative of economies of scale. The changes in land holding pattern in the case of schedule castes show that the area of operational holdings increased, except in Punjab and Madhya Pradesh, irrespective of size-groups. Moreover, the area under medium and

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large holdings in general has increased over the years. A close look at the Gini concentration ratios substantiates the tenet that within broad classes, area concentration has declined resulting in more even distribution of area among the holders.

Changing Size, Status and Use of Common Property Resources in Himachal Pradesh

G.D. Vashist and M.S. Pathania†

Common property resources (CPR) in developing countries continue to be a significant component of the land resource base of the rural areas. They directly or indirectly play an important role in enhancing income, employment and sustenance of the people. The farmers of Himachal Pradesh have always depended upon forests and pasture to supply fuel, fodder and other needs. The expanding population has put increasing pressure on the lands resulting in a decline in the size of CPR. Further reduction in CPR has taken place due to several development activities. The paper makes an attempt to examine the changing status and use of CPR and their future prospects. The relevant data were collected from secondary sources for the years 1966-67 to 1989-90. The study reveals that the area under culturable waste and permanent pasture has remained constant over the years. There has been an increase in the number of small and marginal holdings. The marginal holdings accounted for 63 per cent of the total holdings as against 4 per cent area occupied by large holdings resulting in more pressure on CPR. The CPR land per capita and per adult cattle unit has decreased during the period under study. The decline in CPR can be attributed to the rapid population growth compared with the increase in the area under CPR. Livestock population has registered about 28 per cent increase during the period. The increase in the population of sheep and goats also mounted pressure on public lands. The grazing incidence has decreased from 0.25 ha/unit in 1966-67 to 0.20 ha/unit in 1989-90. This was about 0.30 ha/unit lower than recommended by the Grazing Advisory Committee of the Himachal Pradesh Government. The reasons attributed to this decrease are the increasing livestock population, bringing more area under agriculture, closing the existing grazing lands by the forest department for soil conservation and other measures.

The study suggests that there is a need to increase the productivity of CPR lands. Higher productivity of CPR lands play an important role in inducing their better management. There is need for looking into the problems of shepherds. It is suggested that sheep and goats should graze in rotation on grazing lands so that productivity of such lands is not damaged and the plantation could be saved. Also, in order to meet their fodder requirement, it would be necessary to study the traditional practices of these communities and draw policy implications for grass and fodder development projects. The problems of weaker sections in relation to their use of CPR, i.e., fuel, fodder and minor forest products should also be taken into consideration. For this, a balanced emphasis on promoting multipurpose trees, popularisation of non-conventional energy sources, promotion of quality grass will go a

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long way in mitigating the fuel and fodder problems of the state. The minor forest products add to the income and employment of the people, but excess extraction of medicinal herbs causes degradation and soil erosion on CPR lands. Therefore, suitable technology should be developed for optimum extraction so that CPR lands are properly managed. Since the pressure on CPR has increased with an increase in the number of marginal holdings and increase in human and livestock population, there is a need to increase the productivity of CPR lands. Village wood lots should be developed on community lands consisting of fast growing fuel and fodder yielding species.

Management of Common Production Resources for Sustainable Agricultural Production in Haryana

Vijay Paul Sharma, B.L. Gajja and Deepak Shah*

The paper addresses the issues related to the dimensions, causes and consequences of groundwater over-exploitation and land degradation and strategies for managing the common production resources like land and water in Haryana. The results indicate that fresh groundwater areas comprising Karnal, Kurukshetra, Ambala, Yamunanagar and parts of Kaithal have witnessed comparatively high rate of groundwater exploitation. The over-exploitation of groundwater in sweet water belt of the state has largely been due to the more intensive cultivation of land, large-scale shift in cropping pattern towards rice-wheat due to its high profitability and low yield variability and installation of a large number of private tubewells. Rainfall and canal irrigated area have a significant negative effect on groundwater exploitation. Rainfall acts as a direct source of water supply to plant root zone and groundwater reservoir. Therefore, a good rainfall should induce an upward movement in the groundwater level.

Some of the immediate consequences of over-exploitation of groundwater are: (i) decline in the water table forcing the farmers either to deepen the well or abandon it depending upon the accessibility of financial resources, (ii) adverse effects on equity issue, and (iii) farmers abandoning agriculture itself and becoming agricultural and non-agricultural labourers. Therefore, for sustainable use of groundwater based farming systems, there is need to conserve the groundwater resources and simultaneously explore ways and means for enhancing groundwater recharge. Conservation is best achieved by restricting the demand for groundwater. Use of sprinklers and drippers is quite effective in achieving the economy in groundwater use. Also appropriate pricing of electricity used in pumpsets is needed to discourage over-exploitation of groundwater. Changing high water requirement crops like paddy and sugarcane with those which require less water, is necessary.

Since the problems of land degradation and waterlogging are posing a serious threat to the sustainability of agricultural production, the possible strategies to control salinity and waterlogging are suggested. These include (i) provision of drainage, (ii) conjunctive use of

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groundwater and surface water, (iii) lining of canals, distributories and channels to reduce canal seepage, (iv) use of advanced irrigation methods like sprinkle and drip irrigation systems and (v) effective involvement of farmers in management for improving operational efficiency and financial viability of public irrigation systems.

Temporal Analysis of Changes in Land Distribution and Tenancy in Maharashtra

M.R. Alshi and C.K. Joshi†

An attempt is made in this paper to examine the changes in inequality in the distribution of land holdings, changes in tenure and tenancy status and the policy implications of the changes in land distribution and tenancy status in Maharashtra. For this purpose, secondary data on operational holdings relating to the size and tenure system have been used for the four Agricultural Census years, 1970-71, 1976-77, 1980-81 and 1985-86. The main findings of the present study are as follows: The number of operational holdings in Maharashtra increased by 63.6 per cent from 49.51 lakhs in 1970-71 to 81.01 lakhs in 1985-86 and the area under operational holdings declined by 0.90 per cent between 1970-71 and 1976-77 and increased by 0.82 per cent between 1980-81 and 1985-86. The marginal and small holdings together registered the highest increase in their number (116.60 per cent) and in the area operated by them (134.50 per cent) between 1970-71 and 1985-86. The number of and area under medium and large holdings together however declined by 10.80 per cent and 29.15 per cent respectively. The average size of holding also declined from 4.28 hectares in 1970-71 to 2.64 hectares in 1985-86 due to the ceiling legislation implemented by the State Government and sub-division of land.

The number of marginal and small holdings together in 1970-71 was 43.83 per cent of the total holdings and they operated just 8.8 per cent of the total area. The medium and large holdings above four hectares constituted 35.21 per cent of the total holdings and they operated 76.43 per cent of the total area. Thus a skewed distribution of operational holdings prevailed in the state in 1970-71. The inequality of land holdings in the state increased marginally over a period of time, as judged by the Gini coefficient of concentration which increased from 0.80 in 1970-71 to 0.85 in 1985-86. The percentage of owned and self-operated holdings increased from 91.86 in 1970-71 to 98.92 in 1985-86. The operational area of owned holdings increased from 89.51 per cent to 98.36 per cent during the same period. The proportion of wholly leased-in holdings decreased from 3.06 per cent to 0.54 per cent and the area operated by them also decreased from 2.32 per cent to 0.65 per cent. The proportion of leased-in area under partly owned and partly leased-in holdings also declined from 2.77 per cent in 1970-71 to 0.39 per cent in 1985-86. The higher proportion of self-operated owned area and the lower

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proportion of leased-in area over a period of time indicate a healthy system of land tenure. The study has far-reaching policy implications. Rising concentration ratio of operational holdings over the period is a matter of concern for the policy makers. The problem of progressively increasing number of marginal and small farmers has to be tackled through more effective redistribution of land.

Dynamics of Punjab Agriculture in the Context of Production Relations

Inder Sain, A.S. Joshi and A.S. Bhullar*

In this paper, an attempt has been made to examine the changing relationships in regard to the structure of land holding, diversified enterprises, income distribution and production behaviour in the Punjab agriculture over different stages of the green revolution. Three stages of the green revolution period, selecting the mid-year of each stage (i.e., 1975-76, 1981-82 and 1991-92), are designated as early, peak and post-green revolution stages respectively. The weighted averages, percentages, Gini's distribution and functional analysis are used to arrive at the objectives. The analysis of the results clearly showed that the structure of land holdings changed significantly from the early stage to the post-green revolution period indicating a substantial reduction in the leasing-in component and size of holdings. The major share of owned land retained for self-cultivation increased in the peak stage of green revolution. The analysis of changing relationship of different enterprises showed that dairy enterprises became more popular in the post-green revolution stage specifically on smaller farms, contributing a substantial proportion of their income. However, the cropping enterprise dominated over the peak period. The income-holding size distribution showed that diversified enterprise system in the post-green revolution period improved the share of income of the smaller farms as compared to the peak stage where the larger holdings gained the most from cropping enterprise. The production function analysis indicated the role of land and human labour as more important and hence identified as the potential factors in increasing the output in the future. The role of irrigation which was negatively significant in the early stage turned to be positive and significant in the peak stage and became neutral in the post-green revolution stage. Thus the policy implications of the analysis highlighted that the size of land holdings cannot be improved in the future. The only way to improve the lot of farmers is to diversify the enterprises which can increase their income. Further, this diversification would help to improve the distribution of farm income in an equitable way favouring more the smaller farms.

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The Changing Structure of Land Holdings in the Context of Modern Technology in Andhra Pradesh

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The study analyses the changes in the structure of land holdings and attempts to project the emerging farm size distribution in Andhra Pradesh by the year 2000 A.D.. It also analyses the extent of potential exploitation of available technology in agriculture in five farm size-groups in Northern Telangana Zone of the state. The first objective was studied through the estimation of Markov transition probability matrices and minimisation of mean absolute deviation. The latter objective was tested by Kendall's coefficient of concordance and Friedman's test on inter- and intra-farm categories. For the case study, a sample of 150 farmers, 30 each from marginal, small, semi-medium, medium and large, was selected from the Northern Telangana Zone during 1993-94.

The results indicated a continuation of the trend towards marginal and semi-medium sized farms. It is estimated that by the turn of the century, 69 per cent of the area will be under holdings of less than 4 hectares and about 28 per cent of land holdings will be reduced to uneconomic sizes of less than one hectare in Andhra Pradesh. Further, it is revealed that by the year 2000 A.D. marginal and semi-medium farms will emerge as the large group occupying about 54 per cent of total cultivated area. The case study of Northern Telangana Zone indicated that all the five land groups are not in correlation with each other in exploiting the potential of developed technology. Further probe into intra-group adoption of recommended technology in the study region revealed that the first three size-groups, i.e., marginal, small and semi-medium were not catching up fully with the recommended technology. The study further leads to the following policy suggestions. The emerging land holding structure calls for mission mode approach for the development of technology suitable to the needs of the small farms of less than 4 hectares. Attempts should be made to consolidate the fragments under the supervision of the Government, and collective farming on sound commercial lines needs to be explored.

Designing Institutions for Self-Governing System of Common Pool Resources

Dinesh K. Marothia*

Using concepts of institutional design, this paper makes an attempt to analyse management system of common pool resources adopted under Nartora Watershed Project (NWP) in Raipur district of Madhya Pradesh. The total watershed area is 704 hectares. The NWP is the catchment of Kodar nala and it covers three villages, namely, Nartora, Kulharia and

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Saraipali. Each village is represented by a sub-watershed. In the first phase of the project, Nartora and Kulharia villages were considered for the watershed management. However, most of the development activities have largely been confined to the village Nartora and hence this study was carried out in Nartora village. The required information was collected from the project offices located at Raipur, Mahasamund and Nartora village respectively. The major activities undertaken in the NWP were finalised by CRIDA, Hyderabad, Departments of Agriculture, Horticulture, Forest and Veterinary of the State Government of Madhya Pradesh and Indira Gandhi Agricultural University, Raipur. Organisational and administrative structure of the NWP was formed at three tier levels, namely, Coordination Committee at the state level, Project Implementation Committee at the district level and Village Resource Development Committee (VRDC) at the project level.

Institutional analysis was used for analysing the management of common pool resource in the NWP. The key attributes of the framework for institutional analysis include characteristics of a resource, attributes of community, institutional rules or decision-making arrangements, pattern of interaction and outcomes or pay-offs. Using these key attributes and their sub-characteristics, analysis of the activities undertaken for the development of land and water resources in the NWP under common property regime was carried out. It can be inferred from the findings that due to well defined institutional rules and their effective implementation by VRDC, the management of community based resource could lead towards self-governing system in terms of efficiency, equity and sustainability. The basic requirement for effective management of community based resource is an authority system that can guarantee the security of expectations to the resource users. In the case of the NWP, the VRDC has been playing an effective role in upholding the users' rights. The paper suggests that institutional designing is a vital procedure which facilitates and enhances community based resource management systems. The analytical framework recently conceptualised by the researchers for designing institutions for self-governing system is capable of providing meaningful directions to community institutions, non-governmental organisations, government agencies and multilateral institutions. Nartora model of watershed management seems to hold high promise as an appropriate approach for the management of common pool resources and it can be replicated in other parts of the country where resources are managed by the community based organisations. The NWP experiences suggest that common pool resources under common property regime with well defined institutional rules could provide a fascinating option to private and state property regimes and offer bright signals that traditionally proven village level authority can direct the designing of new institutions for self-governance.

Implications of Changing Agrarian Structure in Himachal Pradesh

N.K. Sharda and T. Raman†

During the last two decades, as a result of changes in the agrarian structure, the margina-

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lisation of the poor and small farmers, especially that of the socially deprived sections, has accentuated in most of the states of our country. Against this background, the paper seeks to examine (i) the changing pattern of distribution of land across various farm size categories, (ii) the relative distribution of land among the scheduled castes, scheduled tribes and other farming categories; and (iii) the implications of changing land distribution in Himachal Pradesh. Land is a scarce factor as far as cultivation is concerned in the state as the net area sown constituted about 17 per cent of the total reported area (1991). The percentage of net area sown irrigated was also 17 per cent. Thus agriculture in the state is rainfed and rains are mostly scanty and scattered. The number of marginal and small holdings witnessed a significant increase during the last two decades. But this increase in number was not accompanied by a corresponding increase in the area owned by them. On the other hand, although the proportion of large holdings to the total number has declined, still there exists skewness in the distribution of land in the state. The average holding size decreased appreciably, i.e., from 1.53 hectares to 1.20 hectares between 1971-72 to 1990-91. The average holding size was lower in the case of scheduled castes compared to the other categories during the last two census periods. The marginalisation and landlessness resulting from the change in agrarian structure has been responsible for a higher dependency of both human and livestock population on forests, pastures and common property lands. The degradation of these lands gives support to the forces causing unsustainability of the fragile ecosystem of this hilly state. The agrarian structure as it has emerged at present in this hilly state is neither conducive for mechanisation and adoption of new farm technology nor has it contributed to the increased productivity. More importantly, it has only added substantially to the ranks of unviable holdings. The continuance of this trend is likely to have serious social and economic repercussions and it can pose a serious threat to the sustainable development of this state. There appears to be an urgent need to implement land reforms with a greater zeal and political will and ensure participation of local people in the management of forests, grazing land and other common property resources to check their further degradation and ensure sustainability of the ecosystem in the state.

Impact of Redistributive Land Reform and Tenancy Regulation on Land Distribution and Level of Living of Farmers

A.K. Giri and D.K. Sain*

Imposition of land ceiling, distribution of ceiling surplus land, conferring tenancy rights and regulation of rent through the registration of sharecroppers (Operation Barga in West Bengal, Land Tribunals in Karnataka, etc.) with the help of farmers' organisation are the important facets of land reform measures presently undertaken by different states. The paper attempts to assess the impact of such land reform measures on land distribution and level of living of the farmers. For this purpose, National Sample Survey data of the 37th Round,

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pertaining to the year 1982, Agricultural Census data for the years 1976-77, 1980-81, 1985-86, Rural Development Statistics 1992, etc., were extensively made use of.

The states like West Bengal, Kerala, Andhra Pradesh and Karnataka were seen to be far ahead of other states with respect to the implementation of redistributive land reform measures and conferring tenancy rights together with regulation of rent. These measures resulted in a steady and gradual decline in the concentration ratio for distribution of operational holdings in West Bengal and Kerala. The extent of inequality in the consumption of cereals and total food in different expenditure classes among households employed in agriculture, agricultural labour households and rural labour households was higher in West Bengal and Kerala despite considerable equity in the distribution of operational holdings brought about by redistributive land reform measures. The variation in average monthly per capita expenditure on 'cereals' among the three categories of households was more pronounced in West Bengal than in other states, implying that all sections of the rural areas were not equally benefited from land reform measures. The variation in average monthly per capita expenditure on total food among the three categories of households, on the other hand, was less pronounced in Maharashtra and Gujarat than in Punjab, Haryana, Kerala and West Bengal, signifying their superiority in bringing about equality in food consumption through the emphasis put on development of sectors other than agriculture. A substantial decline in variability in monthly per capita total expenditure among different expenditure classes in West Bengal and Maharashtra was observed over the period 1982 and 1985-86. In Punjab it has increased during the same period.

It is thus observed that equity in land distribution is not always an appropriate instrument to remove imbalances in the level of living within a group of households and among different groups of households unless the purchasing power of the vulnerable sections of the rural sector was raised through creation of job opportunities within and outside the agricultural sector. Creating job opportunities in the non-agricultural sector as in Maharashtra and Gujarat led to equality in food consumption. Progressive agriculture with unequal land distribution as in Punjab and Haryana helped to accentuate disparity in the level of consumption and thereby in the level of living.

Trends in Fragmentation of Land Holdings in Punjab

J.S. Chawla†

The paper attempts to examine the trends in fragmentation of land holdings in Punjab since 1961-62. The specific objectives of the study are (i) to discuss the effect of consolidation of holdings on the size and number of plots per holding, (ii) to analyse the changes in holding size and number of plots and (iii) to suggest an appropriate policy to promote farm efficiency. The required data for 1961-62 and 1979-80 were taken from secondary sources and the data for 1991-92 for seven categories of farms were collected through a schedule. The study covered Tarn Taran tehsil of Amritsar district. It was found that consolidation led to improvement in the size of holding and reduction in the number of plots

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per holding. At the same time, the area per plot improved. However, the effects of consolidation were nullified due to sub-division and fragmentation embodied in the law of inheritance. Population pressure also contributed to this trend. Since 1961, the average holding size consistently decreased whereas the number of plots per holding went up uninterruptedly. Likewise, the area per plot diminished over the years. Among the groups, the first four groups (0-5, 5-10, 10-15 and 15-20 acres) exhibited a greater tendency towards fragmentation as compared to the last three groups (20-30, 30-50 and above 50 acres), probably because the latter did not want their holdings to split on account of different types of technologies (which require a minimum size of operational holding). The study suggests either the fixation of minimum size of holding or modification of the law of inheritance or transfer of inefficient marginal and small cultivators to non-agricultural activities via massive investments by public and private agencies to mitigate the problem of sub-division and fragmentation of land.

Size of Farms and Labour Absorption in the Context of Technological Status

P.M. Sharma*

The paper attempts to examine the relationship between size of holdings and levels of technology and the association of labour absorption with different levels of technology in the humid South-Eastern Plain Zone of Rajasthan, consisting of the four districts of Kota, Bundi, Jhalawar and Sawai Madhopur. The relevant farm data required to prepare technological index were obtained from a sub-sample of 50 holdings drawn from the sample of cost of cultivation studies of principal crops of Rajasthan and the National Demonstration Scheme. The technological index was prepared considering the technological inputs like fertilisers, irrigation and use of high-yielding seed varieties, which contribute to the major portions of technology. To examine the relationship between size of holdings and levels of technology, the selected sample farms were classified into three size-groups, according to the criterion of area limit. Tabular analysis was done with different aspects like distribution of sample holdings, average size of holdings, and average technological indices of different size-groups and at different levels of technology. To examine the association between size of farms and technological indices Chi-square test, simple correlation and graphical presentation were made.

The analysis relating to human labour absorption as associated with different levels of technology suggests that with technology some element was associated which was of labour displacing nature but the statistical non-significance of coefficient of correlation indicated that there was no relationship between labour absorption and the technology used on the farms. The curvilinear relationship between technological adoption and farm size pointed out that adoption of technology was the highest on medium sized farms. Neither too small nor too large size of farms were found suitable from the stand-point of technological adoption

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in practical sense. This may be due to better combination of resources including managerial input. In fact, these findings have bearing on the policy measures of land redistribution. In the light of these findings it can be suggested that, on the one hand, there is need for effective implementation of land ceiling measures and, on the other, provisions and efforts are equally important to protect and achieve the desirable floor size of holdings. There is no sense in distributing the surplus marginal land in tiny pieces to large numbers of landless labourers.

Effect of Fragmentation and Scatteredness of Holdings on Adoption of New Technology for Wheat Production in Uttar Pradesh Hills

M.L. Sharma, Chandra Dev and R.S. Tripathi†

The paper attempts to find out the extent of fragmentation and scatteredness of holdings, to examine the relationship between fragmentation and adoption of new crop technology, and also to estimate the economics of wheat production on various sizes of fragmented holdings under different situations of hill farming system. A sample of 62 farmers in three groups of farms, viz., farms having less than 30 plots per holding, 30-60 plots and more than 60 plots, was drawn from three situations, namely, valley (less than 1,000 metres mean sea level [MSL]), mid-hill (1,000-1,600 metres MSL) and high-hill (more than 1,600 metres MSL) of Chamba block in Tehri Garhwal district, Uttar Pradesh.

The problem of fragmentation and scatteredness was more serious in the valleys (55 plots/holding) and high-hills (48 plots/holding) than in the mid-hills (27 plots/holding). The adoption pattern of modern crop production technology showed that the use of new farm technology was limited to high-yielding variety (HYV) seeds, chemical fertilisers and nominal quantity of plant protection chemicals in the study area. The use of HYV seeds of the crops grown on the sample farms was the maximum in the valleys and the minimum in the mid-hill situation. The use of HYV seeds (64 per cent of the area) and fertilisers (40.98 kg/ha) was remarkably higher on farms having less than 30 plots per holding. This indicates that the fragmentation of holdings has an adverse effect on adoption of HYV seeds and fertilisers in the hilly areas.

The highest impact of fragmentation was noticed in high-hill farms where the use of fertilisers was about 128 per cent higher on farms having less than 30 plots as compared to those having more than 60 plots per holding. The use of total fertilisers ranged from 41 kg/ha on farms having less than 30 plots in the valleys to 7 kg/ha on farms having 30 to 60 plots in the mid-hill situation. The use of plant protection chemicals was not common on farms in the study area, only few farmers used these chemicals in a very limited quantity.

The use of human and bullock labour increased with the increase in the number of plots due to wastage during crop operations and also in approaching the fields located at many directions in all the situations. All the costs, i.e., cost A_1, A_2, B_1, B_2, C_1 and C_2 were the highest for the most fragmented holdings, i.e., more than 60 plots and the lowest for the

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least fragmented group, i.e., less than 30 plots per holding. The net income received from the production of wheat crop was much better in the least fragmented holdings as compared to that in more fragmented farms. In general, the wheat production provided positive net income over cost A_i but on the basis of cost C_2, it provided a good amount of net loss to the farmers. These results clearly indicate that increase in the number of fragments in a holding not only increases the cost of production but also reduces the net income of the farmers in the hill farming system.

Linear multiple regression analysis was done to estimate the relationship between seven parameters of fragmentation and scatteredness, viz., size of holding, number of plots per holding, average size of plot, minimum size of plot, maximum size of plot, number of location of plots and average distance of plots from the residence (as independent variables) and adoption of HYV seeds/use of fertilisers/yield of wheat crop (as a dependent variable). The regression analysis shows that the holding size and number of plots have favourable impact on the use of HYV seed and fertiliser whereas the average size of plot and maximum size of plot influenced adversely the use of these modern farm inputs. The analysis further shows that the holding size has positive and favourable impact on the yield of wheat crop. The average size of plot, number of plots and minimum size of plot have remarkably adverse relationship with the yield of wheat at the existing level of resource use pattern.

Changes in Input-Output Relations: The Post-Green Revolution Experience of Punjab Agriculture

Bant Singh and H.S. Bal*

A study was conducted to examine the changes in productivity, resource use pattern and input-output relations on different size-groups of farms and regions in Punjab during the post-green revolution period from 1971-72 to 1987-88, as a result of advances in farm technology and changes in input-output prices. The data at two points of time under study, 1971-72 and 1987-88, were taken from the Comprehensive Scheme to Study the Cost of Cultivation of Principal Crops in Punjab. The state was divided into three regions homogeneous with respect to soil, climate and crops grown. Region I includes the north-eastern districts of Gurdaspur, Hoshiarpur and Ropar; Region II includes the central districts of Amritsar, Kapurthala, Jalandhar, Ludhiana, Patiala and Sangrur; and Region III consists of south-western districts of Bathinda, Ferozepur and Faridkot.

The study has brought out that aggregate productivity on an average farm in the state has increased by about 70 per cent and input use by over 64 per cent over the years from 1971-72 to 1987-88. Because of capital intensive nature of new farm technology, the productivity has increased more on large farms than on small farms. The size-productivity relationship, which was inverse in the early green revolution period (1971-72), turned out to be direct in the later period (1987-88). The aggregate productivity on the Punjab farms has increased partly because of increase in cropping intensity as a result of increased level of mechanisation and increased irrigation facilities, and partly because of increased use of

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farm inputs. The intensity of inputs use has increased more than productivity increase in Regions I and II, indicating that farming in the state has become capital deepening and cost pushing. The significant decrease in the elasticities of important variables like fertilisers and insecticides/weedicides and irrigation water indicates excessive use of these inputs by the farmers. Therefore, there is a constant need to guide and educate the farmers to make rational use of these resources. At the same time, easy and liberal credit facilities/subsidy must be given to the small farmers to make full use of the new farm technology and thereby to increase their farm income.

Co-operative Management of Common Pool Resources (A Case Study of Reservoir Fisheries)

S.K. Chauhan†

The paper mainly focuses on co-operativisation as a system of management and examines the organisational structure, management, collaboration with other departments and performance of reservoir fishery co-operatives. The study is based on primary and secondary data collected from nine out of 12 fishery co-operatives for the period 1976-77 to 1990-91. The findings of the study reveal that the fish production in the state rose at an annual growth rate of 12.95 per cent. This increase was due to the contribution of reservoir fisheries, which was about 25 per cent of the total fish production in the state during 1990-91. The study further reveals an annual growth rate of 20, 24, 23 and 23 per cent in the number of co-operative societies, their membership, fish production and productivity per hectare respectively over the study period of 15 years. During this period, the revenue earned by the government increased to Rs. 14.12 lakhs in 1990-91 from Rs. one lakh in 1976-77. The annual average fish catch of the fishery co-operative society and per fisherman was 720 quintals and 8.58 quintals and the average annual returns were Rs. 19,313 and Rs. 7,539 respectively. Income from fishing accounted for 76 per cent of the household income. In the process of fish marketing the net share of the fisherman in the consumer's rupee was 52 per cent. The marketing margins earned by the wholesaler and retailer were 12 per cent and 10 per cent respectively.

On the whole, it can be concluded that the fishermen's co-operatives have succeeded in increasing the membership of fishermen, fish production, productivity and profits over the years. Their success is attributed mainly to three factors, viz., adequate infrastructural facilities, an efficient regulatory mechanism, and an efficient marketing mechanism. The important components of the mechanism devised consisted of refusal to issue more licences beyond the carrying capacity; a set of rules for protection and regulation of fisheries stipulating the fish size, mesh size, prohibition of wanton and wasteful methods of killing fish; and a complete ban on fishing during the breeding season. Besides, a close linkage as well as collaboration between the State Fisheries Department and the co-operatives was another

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important feature of the management mechanism. The study suggests that efforts should be made by the fishery co-operatives to market the fish in various markets so as to increase the fisherman's share in the consumer's rupee. It is also highlighted that such co-operative models should be introduced in other common pool resources (water resources) to enhance fish production and ultimately raise the living standards of the poor fishermen.

Production Relation in West Bengal Agriculture

R. Mukherji*

The development of the agricultural sector in the West Bengal economy is even now based on small-scale, individual and scattered forms of cultivation with an increasing number of agricultural holdings (6.5 million) and handloom production chiefly relying on family labour and increased area of agricultural operation during 1970-71 to 1991-92. Large-scale agriculture with more hired wage labour employment for commodity production has remained conspicuously absent and, therefore, does not form the main organisation and its relation in agricultural production. The dominant form of production organisation is the small-scale agriculture with strip farming with more reliance on family labour and its ownership and management determining the distribution of product over time. The emergence and development of social labour is hindered by the caste-oriented labour practice and property relation in a rather static and hierarchical society of India.

Within this age-old nexus, the new technology [irrigation, high-yielding variety (HYV) seed and chemical fertiliser] has been gradually making its impact and this has influenced different areas and holdings since the mid-seventies. This extension process does not as yet seem to have completed because of the inefficient production organisation and as much as 40 per cent of the area under rice cultivation in the state was outside the HYV coverage until 1991-92.

The Land Reforms Act imposing a ceiling on family holding size obviously militates against the large-scale production, individual's initiative, enterprise and incentives for higher and better output with economy of scale. The violent and coercive market forces hound the numerous subsistent marginal, small and middle farms and thwart their development. Under the circumstances, despite the spread of money economy, pure capitalist production organisation and its own relations of production have not emerged with their new possibility. The mode of production in West Bengal agriculture is still very much structured and circumscribed by the vestiges of the past with bias for and predominance of the semi-feudal relations of production largely surviving with and aided by the use and gradual extension of new technology in the state's agriculture, a part of the Indian economy, which is being increasingly influenced by more globalisation of the domination of international capital.

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Impact of Technological Change on Employment and Production Relationship in Rice Farming in Balasore District, Orissa

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The paper attempts to assess the impact of technological change in rice cultivation on employment and production relations in different farm size-groups in Balasore district of Orissa. The study is based on a stratified random sample of 211 farmers - 103 growing high-yielding varieties (HYV) and 108 growing local varieties of paddy. The data pertained to the year 1992-93. The results revealed that the use of different inputs and output at mean levels differed significantly between different levels of technology. The productivity of farms using the HYV technology was more than two times those using local technology. The new technology farms employed more labour per hectare compared to the traditional ones. The results of disaggregate analysis revealed that under the new rice technology, the per hectare use of labour was more by 33.4 per cent, 36 per cent and 49.7 per cent on marginal, small and large farms respectively as compared to that under the traditional technology. The labour use in new technology farms increased with the increase in the size of holdings. The results of the production function analysis indicated significant structural break in shifting from local (old) technology to new technology. In other words, with the given level of inputs more output can be produced by HYV technology or the said output level can be produced with less use of inputs by applying new technology.

Evaluation of Ceiling Surplus Land Distribution in Five Districts of Madhya Pradesh

M.C. Athavale, S.K. Gupta and Ashutosh Shrivastava*

The paper seeks to examine the impact of distribution of surplus land on the socio-economic conditions of the allottees, the problems faced by the allottees in getting possession of land and the problems of dispossession and its restoration in Madhya Pradesh. The study was conducted in the five districts of Vidisha, Jabalpur, Seoni, Shivpuri and Betul covering a total sample of 200 beneficiaries. Of the total population of 1,150 persons, about 51 per cent were workers. Scheduled castes and scheduled tribes who were the poorest castes groups depended to a larger extent on wages. On the other hand, backward and other castes groups were less dependent on wage employment.

The total land allotted among the selected 200 beneficiaries was 236.62 hectares or 1.18 hectares per beneficiary. The average size was the highest (1.74 hectares) among other castes

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beneficiaries and the lowest (0.98 hectare) among backward castes beneficiaries. It was observed that 169 beneficiaries (84.5 per cent of the total) got physical possession of the allotted land. The remaining never got physical possession. Of the 169 beneficiaries getting physical possession, 160 had effective possession and nine had only ineffective possession. Of the nine cases of ineffective possession, eight sold their land and one leased it out. The proportion of the number of beneficiaries with effective possession to number of allottees was the highest (93 per cent) in the case of backward castes beneficiaries and the lowest (74 per cent) in the case of scheduled castes beneficiaries. The proportion of land given possession to land allotted also followed a similar trend. It was noted that in the case of 150 beneficiaries out of 169 (88.76 per cent), the time gap in allotment and physical possession was less than one year.

Unculturable and other land constituted 25 per cent of the land under possession. Lower percentage of land under irrigation and high percentage of unculturable and other land pointed to the inferior quality of land distributed as ceiling surplus land. Land development measures were undertaken by the beneficiaries themselves. As the surplus land had very meagre irrigation facilities, the cultivation of crops depended on rains. The net income per hectare was the highest (Rs. 4,584) in the other castes group, followed by the backward castes group (Rs. 3,383). It was low in the scheduled castes group (Rs. 1,647) and in the scheduled tribes group (Rs. 1,407). Income per beneficiary household from allotted land was Rs. 3,008. Income from other sources was Rs. 7,392 per household. It is clear that income from other sources was higher than the income from allotted land in regard to all the castes groups and districts.