Vol XXVII
No. 4

ISSN 0019-5014

CONFERENCE
NUMBER

OCTOBER-
DECEMBER
1972

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS

INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
BOMBAY

RAPPORTEUR'S REPORT

ON

INCOME, SAVINGS AND INVESTMENT IN AGRICULTURE

RAPPORTEUR: M. T. R. SARMA

Director
National Council of Applied Economic Research
New Delhi

I. *Introduction*

Although there was some discussion on the topics of income distribution, savings and investment or capital formation at the Annual Conferences held in 1969 and 1970, it was felt that we could discuss again the following questions on the basis of empirical data:

(*a*) The concepts of savings and investment used in the Rural Credit Survey and the Debt and Investment Survey of the Reserve Bank of India (RBI) and in the surveys of National Council of Applied Economic Research (NCAER).

(*b*) Method of recording funds or resources in kind received from all sources and used for all purposes during a year, in order to estimate savings and investment and the alternative of recording *changes* in physical and financial assets and liabilities in a year to estimate savings and investment.

(*c*) Changes in the composition of assets in which savings and investment are embodied.

(*d*) Estimates of farmers' savings function either with cross-section data or, if possible, with time-series data.

(*e*) Changes in average and marginal saving and investment rates over time and between different classes of farmers.

(*f*) Any discernible differences between the saving and investment patterns of (*i*) farmers among different regions, (*ii*) farmers with and without irrigation, (*iii*) farmers in different size-groups, social groups, tenure groups, technology groups, etc.

After reading all the 23 papers submitted for the present Conference, one gets the impression that the writers are more pre-occupied with problems at the micro-level and with the analysis of cross-section data. None of the papers submitted for discussion deals with the estimates of savings and investment in the agricultural sector at the macro-level or with the analysis

of time-series data. A brief review of the salient points from the papers submitted for this Conference will be attempted first, before we present the issues for discussion.

II. *Concepts*

Conceptual and measurement problems in the estimation of savings and investment in agriculture were not discussed at all in the majority of papers. There seems to be some confusion with regard to the concept of income also.[1] There will be less confusion if agricultural economists agree that the concepts and definitions of economic variables such as income, saving and investment used in the analysis at the micro-level (farm household or family) should conform to the concepts and definitions normally used for macro-analysis (*i.e.*, in the National Income Analysis). Although the All-India Rural Credit Survey (AIRCS) conducted by the RBI 20 years ago and the All-India Rural Household Saving Survey conducted by the NCAER ten years ago have defined the concepts of income, saving and investment, and although economists in the profession have discussed these concepts on several occasions in the past, it appears from reading the papers submitted for this Conference that there still exists some confusion in the minds of some agricultural economists. For example, A. S. Kahlon, H. S. Bal and Gurbachan Singh state that "The farm family gross income was obtained by adding all the incomes from farm, non-farm resources and *borrowings from institutional and non-institutional resources.* The disposable income was compiled by deducting production expenditure from the farm family gross income. The investment included farm, non-farm and household investments. The farm family savings were derived through asset account method." In the paper of S. S. Miglani, Jaswant Singh Chamak and Joginder Singh, income refers to "farm business income which is equal to gross income minus cost incurred on seeds, manure, fertilizers, pesticides, human labour, bullock labour (owned and hired) running expenditure and depreciation on irrigation structures, farm machinery, implements and farm buildings, taxes, cesses, water rates and interest on working capital." In the paper of J. S. Garg and H. L. Srivastava, *investment* on crop enterprise was measured as expenditure incurred on human labour, bullock labour, HYV seed, fertilizer, irrigation, revenue and the so-called "overhead;" and, the saving is derived as gross income minus investment on the crop enterprise minus investment on dairy enterprise minus investment on fixed farm assets minus family consumption. According to D. S. Nandal, income includes farm income, non-farm income and borrowings; and farm income is derived as the value of crops and livestock products plus amount received from the sale of farm assets and receipts of land rent, etc. Investment is derived as the sum of farm investment, non-farm investment and household investment (including expenditure on con-

1. It is sad to note that a similar remark was made by the Rapporteur (D. K. Desai) in his report on the papers submitted for the 1970 Conference. See the *Indian Journal of Agricultural Economics,* Volume XXV, No. 3, July-September, 1970, p. 68.

sumer durables). The concepts of "gross saving" and "net saving" used by Nandal conform to the generally accepted definitions. Nandal defines gross savings as equal to changes in physical assets, financial assets, borrowings, lendings and outflow and inflow of capital transfers; and net saving as equal to gross saving minus depreciation.

In the paper of B. J. Hinge and T. Y. Patil, premiums paid for the Life Insurance and amounts spent in construction and repairs to houses are considered essential items of expenditure along with expenditure on marriages, litigation, education, guests, etc.

According to S. B. Singh and H. N. Patel, income means gross value of agricultural produce plus income from other subsidiary occupations and "net capital investment" is defined as capital investment in agriculture minus income received from the disposal of capital assets.

In the paper of R. E. Waghmare and M. D. Maral, "Net income denotes either net profit or net loss to the operator of land after deducting all sorts of expenditure such as paid-out costs both in kind and cash, depreciation charges, land rent, interest on capital and imputed labour on family labour from the total income on the farm."

K. K. S. Chauhan, S. Mundle and D. Jadhav have calculated farm business income by deducting current expenditure on seeds, fertilizers, pesticides, cost of hiring labour and bullock, interest charges and land revenue from gross farm income. Gross farm income is defined as the value, at the prevailing prices, of retained as well as marketed crop output and also income from allied activities such as dairy and poultry. Net household income is defined as farm business income plus non-farm income. Household consumption expenditure included expenditure on food, clothing, light and fuel, education, medicines and usual expenditure on social functions and ceremonies. However, expenditure on durable assets, construction of house or non-recurring expenditure on items such as marriages were excluded because, according to the authors, such items cannot be considered a part of regular consumption financed from annual income stream. They are careful to state that the imputed value of farm output retained and consumed was added to the consumption expenditure since the corresponding element was added to net household income. The residual obtained after deducting household consumption expenditure from the "net household income" was defined by these authors to represent household savings.

According to L. N. Gupta, the volume of total investment is initially a sum total of funds, both personally earned income and the amount of loan taken. In the paper of S. L. Shah, "from total agricultural and non-agricultural income agricultural expenditure and consumption expenditures on durable and non-durable items are deducted to find savings."

In the paper of Saroj Kanti Chowdhuri, investment refers "to amount invested during last five years and the items on which investment has been made include land purchase, land improvemnt including reclamation, excavation of tank, etc., for irrigation purposes, farm houses or cattle shed, residence, business, improved tools and implements, improved livestock, pump-set, etc."

From the above account of various definitions used in the different papers submitted for this Conference, it appears that there is no generally accepted definition of the concept of income or investment. Some agricultural economists seem to define the gross value of the crop output without deducting any paid-out operating costs, as income accrued to the cultivator. Will it not be more meaningful for analysis, if the concepts of gross income, net income and disposable income as used in the National Income Accounts and macro-economic theory are accepted for analysis of cross-section data ?

Another important conceptual issue that arises in measuring saving or investment relates to the treatment of consumer durables. These are sometimes treated as capital expenditure and hence as saving and investment, and sometimes as current expenditure and hence as consumption. There exists some difference of opinion among economists on the appropriate treatment of consumer durables in saving studies.[2] As Keynes observed, "Any reasonable definition of the line between consumer-purchaser and investor-purchaser will serve us equally well, provided that it is consistently applied."[3]

Amidst the welter of divergent usages of the terms, it should be possible for agricultural economists to discover generally acceptable definitions and methods of measurement of important variables like income, saving and investment.

III. *Changes in the Composition of Assets in which Saving and Investment are Embodied*

With the exception of one good paper by Kahlon, Bal and Singh, the papers submitted for the Conference have not dealt directly with the changes over time in the composition of assets in which saving and investment are embodied. It would have been interesting to find out the changes in the pattern of savings and investment as a result of changes in income. As the incomes increase, do the farmers generally invest more in agricultural assets ? What factors influence the savings of farmers in the form of financial assets ? Does the easy access or proximity of financial institutions have any positive influence in increasing the savings of farmers ?

---

2. For a complete discussion of the pros and cons for treating consumer durables as part of saving see Irwin Friend and Robert Jones, "The Concept of Savings," Consumption and Saving, Volume II, University of Pennsylvania, 1960.

3. J. M. Keynes : The General Theory of Employment, Interest and Money, Macmillan Co., London, 1964, p. 61.

Kahlon, Bal and Singh have presented a detailed analysis of the average farm family investment for various size-groups for the five years, 1966-67 to 1970-71. "It was found that on the small holdings, irrigation structure formed the major investment from 1966-67 to 1969-70. This means that the small holders gave high priority to development of irrigation resources for increasing the intensity of cropping. On the medium holdings, the emphasis shifted to the purchase and improvement of land . . . On the large holdings, investment in farm machinery accounted for a large proportion of 31.32 per cent and 54.22 per cent of farm investment during 1966-67 and 1970-71. This clearly indicates that the large holdings invested more and more in farm machinery for efficient and timely performance of agricultural operations."

Garg and Srivastava, on the basis of an analysis of data obtained from a sample of 100 farmers selected from ten villages in Kalyanpur block, found that "the net investment on new inputs particularly irrigation structure and machinery showed an increasing tendency with the increase in income and size of farm whereas the traditional input specially livestock showed a reverse trend." In the paper by K. N. Rai, D. K. Grover and D. S. Nandal, the pattern of investment in the irrigated area turned out to be slightly different from that of the unirrigated area in Haryana. In the assured irrigated zone, the authors found that the farmers invested mainly on the purchase of farm equipment, machinery and building construction, whereas the farmers in the unirrigated or relatively less assured irrigated zones have "made investment largely on the purchase of livestock and construction of farm building. The investment on the large farms was approximately three times higher than the investment on the small farms in all zones."

Hinge and Patil collected data on investment for the years 1964-65 to 1968-69. However, instead of analysing the annual changes they have presented only the total investments made during all these years. It would have been interesting if they had analysed the changes in incomes and the consequent changes in the pattern of the investment in different years.

P. C. Goswami and P. D. Saikia, on the basis of data collected from a sample of 100 cultivating households in agriculturally prosperous areas of Nowgong district, observed a general tendency among the farmers of Assam to invest the surplus first either in purchasing land or improving the residential or other houses. According to them, such a pattern of investment is not congenial for capital formation in agriculture. Singh and Patel, on the basis of data collected from 42 cultivators in two villages in Anand taluka in Gujarat, found that "the large size cultivators are investing proportionately more on irrigation equipments and other farm machinery while livestock and building are the major items of investment on the small farms." Waghmare and Maral, based on the data collected from 228 holdings in Sholapur district, have observed that "the capital investment in land was found to be the maximum to the extent of 65.89 per cent of the total assets. Land in-

cluding farm dwellings occupied two-thirds portion of the capital. The share of livestock, implements and machinery amounted to 10.62 per cent and 6.23 per cent respectively."

R. P. Singh, Vishwa Nath and H. K. Pandey, in their paper based on the data collected from a sample of 120 cultivators of the consolidated and unconsolidated farms in Azamgarh district of Uttar Pradesh, found that "implements and machinery accounted for the highest proportion (35 per cent) followed by installation of tube-wells (25 per cent) on the consolidated farms, while on the unconsolidated farms maximum (30 per cent) proportion accounted for other items (construction of dwelling houses, purchase of cycles, radio, etc.) followed by installation of tube-wells (24 per cent)."

Saroj Kanti Chowdhuri found, on the basis of data collected from 120 farms from six villages from Burdwan district of West Bengal that "generally less than one-fourth of the gross income was invested during last five years by the cultivators in the irrigated region; in the unirrigated region investment ranged nearly 15 per cent of their gross income. Although the cultivators in the irrigated region invested a sizable proportion in constructing building, etc., there is no such investment by the cultivators in the unirrigated area. Also the proportion of investment on business, improved livestock and pump-sets, etc., was more for the investor in the irrigated region. The cultivators having land holding exceeding ten acres did not invest at all in land purchase in both the regions possibly because of the sense of uncertainty arising from Land Reform Legislation." P. B. Parthasarthy and K. Satyanarayana observe, on the basis of analysis of the data collected from 62 cultivators of Guntur district, that "on the dry land farms 54.9 per cent of the total funds available for investment was utilized for agriculture. With respect to irrigated and garden land farms relatively low investment was made, *viz.*, 38 per cent in the irrigated and only 11.7 per cent in the garden land farms. Investment in bonds and shares was almost nil in all types of farming and size-groups."

IV. *Income Distribution*

Although the authors of the papers have used different concepts of income it may be relevant to note here some of their main findings regarding the pattern of income distribution in selected areas.

Bharat Jhunjhunwala and W. W. McPherson, using a linear programming model to analyse the impact of tractorisation on income distribution on the basis of the data collected by interviewing 81 farmers in the Faizabad district of East Uttar Pradesh in early 1972, found that the income distribution became more equal on the initial introduction of tractors, but became progressively unequal at high levels of tractorisation. The Lorenz curves depicted in Figure 2 of this paper for different levels of tractorisation seem to

intersect each other. In such a case, it is doubtful whether one can say categorically that income distribution has become more equal or unequal. However, the Gini index for inequality for different levels of tractorisation calculated by the authors shows that the initial introduction of 1,000 tractors has resulted in the decline of the index from 0.506 to 0.458. But further introduction of more tractors created a more unequal distribution—the Gini index increased from 0.458 to 0.511. Some of the implications of the study given by the authors are worth further investigation by economists.

Miglani, Chamak and Singh, using probit analysis to test the log-normality of income distribution on the basis of the data collected from 150 holdings for the three years 1967-68 to 1969-70 in Ferozepore district of Punjab, came to the conclusion that "in the case of farm size-group 15 to 20 hectares the income disparity was the least and it was the maximum in the case of 20 hectares and above farm size-group. These results were supported by working out quantiles, Gini ratios and the coefficients of variation. However, the results of probit analysis were conflicting. The income inequality between the farms with and without irrigation was also examined. The study brought out that the farmers having assured water supply on their farms earned higher farm business income as compared to the farmers having unassured irrigation. Farms with assured irrigation had the highest income disparity during the first two years of study, while the coefficient of variation turned out to be higher on farms with unassured irrigation during 1969-70."

Using a similar pattern of analysis to study the differences in the income distribution between the tractorised and non-tractorised holdings in Ludhiana district, A.C. Sharma, Parkash Mehta and J. N. Singh found that the farm family income per holding and per acre had log-normal distribution on the small, medium and large non-tractorised and tractorised holdings, and that this income was more evenly distributed on the tractorised holdings compared to the degree of income concentration on the non-tractorised holdings.

V. *Estimates of Average and Marginal Saving and Investment Rates*

Few papers submitted for the Conference have dealt with the changes in the average and marginal saving and investment rates over time and between different classes of farmers. These papers, however, have dealt with the estimation of farmers' saving function using only cross-section data. Here, again one should keep in mind that different authors have used different concepts of income in the estimation of marginal propensity to consume or save.

Nandal, in a study based on the data collected from 49 so-called progressive farmers of Haryana, has given the estimates obtained by fitting a simple linear regression equation of the form : $Y = a + bX$, where Y re-

presented the average farm family investment in the three years 1967-68 to 1969-70 and X represented the average farm family income per holding. The marginal propensity to invest was estimated to be 45.72 per cent, with an "income elasticity for investment per holding" of 1.17. A similar linear equation was fitted with the dependent variable Y taken to represent the so-called "average pooled net savings per holding for three years 1967-68 to 1969-70." The marginal propensity to save was estimated to be about 34 per cent and the income elasticity of savings of 3.5. There was no discussion of the implications of the difference in the marginal propensitities to save and to invest. Also, the calculation of the so-called income elasticity of saving and investment seem to be irrelevant for any meaningful policy conclusions.

H. K. Das Gupta and R. K. Dash, in their study of small farmers in Banarpal block of Dhenkanal district of Orissa, have estimated the marginal propensity to consume for two groups of farmers, with and without irrigation facilities, using a linear functional form : $C = a + bY_d$, where C = consumption spending in rupees and Y_d = disposable income in rupees. They find that the marginal propensity to consume in the irrigated village was 0.61, whereas in the unirrigated village it was about 0.71. To test the significance of the marginal propensity to consume, the authors have wrongly used the 'F' ratio test, which is estimated by dividing the regression mean square by the residual mean square. There is no reason why the standard t-test should not be used for testing the statistical significance of the regression coefficient representing the marginal propensity to consume.

Singh, Nath and Pandey have presented the saving-income ratio as well as the estimates of marginal propensity to save for the small, medium and large farms in the two categories of consolidated and unconsolidated holdings. They estimated the marginal propensity to save using the single equation of the form : $G_s = \propto + \beta D_i$, where G_s = gross saving and D_i = disposable income (which includes borrowings also). The marginal propensity to save on the consolidated farms was found to be higher than that on the unconsolidated farms.

Chauhan, Mundle and Jadhav, based on the data from a sample of 87 small farmers in Sangli district of Maharashtra, estimated the marginal propensity to save by using two different versions of the savings function, namely, (1) $S = BY - A$, and (2) $S = Y - A - B\ (Y/\bar{Y})$. The marginal propensity to save turned out to be about 34 per cent and 42 per cent for the participants and non-participants in the IAD Scheme respectively. According to the authors, "this difference in the marginal propensities is consistent with the Duesenberry hypothesis that people in relatively lower income groups (in this case, the small farmers participating in the IAD Scheme) have a stronger aspiration to raise their standard of living and therefore spend a higher proportion of their incomes on consumption. The alternative Keynesian hypothesis of a constant marginal propensity to save is not consistent with our data."

The authors are not correct in this context, in attributing constant marginal propensity to save for all income levels or for different groups of farmers as Keynesian hypothesis. Contrary to the conclusion of the authors, the different estimates of the marginal propensities to save are consistent with the Keynesian theory.[4]

Kahlon, Bal and Singh, have estimated the marginal propensity to invest by fitting a Cobb-Douglas function of the type : $Y = aX^b$, where Y represents the investment and X represents farm family disposable or gross income.[5] The authors have not given any reasons why they prefer the Cobb-Douglas type function to a simple linear relationship between investment and income variables. The authors found that the derived marginal propensity to invest came out to be 16, 20, 22, 28 and 20 per cent for 1966-67, 1967-68, 1968-69, 1969-70 and 1970-71 respectively. The authors have also estimated the marginal propensity to save by fitting a similar Cobb-Douglas type function to the income-saving data. The marginal propensity to save was 14.24 per cent in 1966-67 and increased to 27.46 per cent in 1969-70, but for the year 1970-71, it was 23.06 per cent. In estimating the marginal propensity to save or invest for the year 1970-71, the authors have related savings to farm family gross incomes and not disposable income. The authors have not given any reason for the use of the "farm family gross income" as an independent variable. According to the generally accepted theory, there seems to be no justification for using farm family "gross income" to explain the marginal propensity to save or invest. The authors feel that the decline in the farm family investment and savings in 1970-71 was due to the fact that "the farm family made heavy investment in building the infra-structure upto 1969-70 and thereafter spent more on household expenditure and particularly on socio-religious ceremonies, which is an unhealthy trend in the development of the agricultural economy." However, the decline in the marginal propensity to save or invest in 1970-71 may be a purely statistical phenomenon.

Pandey, Nath and Singh, in their study based on the data collected from 120 farmers selected from Varanasi and Deoria districts of eastern Uttar Pradesh, have also estimated the marginal propensity to consume and marginal propensity to save. However, they have not estimated any functional relationship between income and consumption or saving and income. They have given the estimates of marginal propensity to consume and marginal propensity to save for different class intervals of the disposable income in the two districts by simply calculating $MPC = \frac{\Delta C}{\Delta Y}$, where ΔC is incremental

4. See J. M. Keynes : The General Theory, *op. cit.*, p. 97.

5. It may be noted here that the farm family gross income was obtained by the authors by adding all the incomes from farm, non-farm resources and borrowings from institutional and non-institutional resources. In other words, production expenditure in the cultuvation of crops has not been deducted from the gross value of the crops to obtain the gross income.

change in consumption and ΔY is incremental change in income. MPS is calculated by substracting MPC from 1. They found that the MPC declined as the disposable income increased, while a reverse trend is observed for MPS. In the relatively backward area (of Deoria), the MPC for the farmers with different levels of incomes was higher than in the relatively developed area (Varanasi).

J. P. Bhati, T. V. Moorti, L. R. Singh and K. K. Verma have estimated the marginal propensity to save for the tribal and non-tribal farms separately by using a single equation of the type : $S = a + bY_d$, where S is savings and Y_d is disposable income. They found the marginal propensity to save was 38.92 per cent in the case of non-tribal farms and 27.19 per cent in the case of tribal farms and conclude: "Thus any increase in incomes on the non-tribal farms would result in higher saving which could be made available for further investment in agriculture. This self-generating investment potential is relatively lower on the tribal farms."

VI. *Issues for Discussion*

Taking into account the salient points made by the different authors of the papers dealing with the topics of income, savings and investment in agriculture, the group discussion at the Conference may be focused on the following five main topics:

1. Concepts and definitions of income, savings and investment.
2. Pattern of income distribution in the rural areas.
3. Pattern of savings and investment in agriculture.
4. Average and marginal savings and investment rates.
5. Economic and social implications of the trends or changes in income, savings and investment in agriculture.