Vol XXXIV
No. 4

ISSN 0019-5014

OCTOBER-
DECEMBER
1979

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS

INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
BOMBAY

SUMMARIES

LINKAGE BETWEEN AGRICULTURAL OUTPUT GROWTH AND NEW TECHNICAL INPUTS (OF INDUSTRIAL SECTOR) IN SELECTED STATES OF INDIA

P. K. Joshi*

An attempt was made in this paper to examine the effect of two important industrial inputs, namely, fertilizer and tractor on the growth of agricultural output in Andhra Pradesh, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal. The study also examined the substitution of conventional inputs available in the agricultural sector by new technical inputs, produced in the industrial sector. It is observed that there is an earnest need for developing the industrial sector which produces and markets new technical inputs for accelerating the growth of the agricultural sector. In some of the States the substitution of fertilizer for land and of tractor for labour were found. Replacement of a scarce factor like land is a healthy sign for economic development but displacement of an abundant factor like labour may involve social cost. Therefore, investment policies to develop these two industries should be made according to their impact on the agricultural sector. It emerged from the study that the two industrial inputs have a significant bearing on the agricultural sector and hence the urgency of formulating suitable industrial policies to realise the twin objectives of (*i*) increasing agricultural and industrial production and (*ii*) expanding the employment opportunities on and off the agricultural sector.

TECHNOLOGICAL CHANGES IN AGRICULTURE AND INTER-SECTORAL LINKAGES

R. P. S. Malik and Usha Nagpal†

The technological changes in Indian agriculture, witnessed in the last one and a half decade or so, have increased agricultural production manifold. The increased production has resulted in greater marketed surplus of the farmers and consequently in increasing their cash incomes. These increased cash incomes have paved the way for complex inter- and intra-sectoral linkages in agriculture. The present paper attempts to examine what changes these linkages have undergone with the technological changes that have occurred in agriculture between 1954-57 and 1966-69, based on analysis of Farm Management data for Muzaffarnagar district, Uttar Pradesh. On the consumption side, it is revealed that the increased income has enabled the farmers to buy more consumption goods and services from the 'other sectors' of the economy, thereby increasing employment in these sectors. This increased employment in the non-agricultural sector provides the necessary wages to buy more quantitites of goods produced in the agricultural sector. On the production side, the input structure has shifted towards inputs which are procured from the non-agricultural sector. In addition, as a feed-back the increased savings in agriculture have contributed to the capital required for the investment in the non-agricultural sectors of the economy.

RELATIVE LINKAGE INDICES: AN INTERNATIONAL INTERTEMPORAL ANALYSIS FOR AGRICULTURE AS WELL AS ITS FOODGRAINS SUB-SECTOR

Dipti Prakas Pal‡

In an input-output framework the sectors are linked through purchases and sales of each other's output. A sector's intra-sectoral linkage relative to its economy-wide linkage, called its relative linkage, presents the sector's relative dependence (importance) on (to) the rest of the system. Indices of relative linkage (both input and distribution) for agriculture as well as its sub-sector, foodgrains have been computed for different years for India, Japan and the USA. It is observed that both agriculture and foodgrains in India are relatively self-contained, less dependent on the rest of the economy and, therefore, require careful planning so as to transform their self-contained characteristics by increasing structural interdependence.

---

* Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi-12.

† Agricultural Economics Research Centre, University of Delhi, Delhi-7.

‡ Department of Economics, University of Kalyani, Kalyani, District Nadia (West Bengal).

ROLE OF FORESTRY AND FOREST-BASED INDUSTRIES: LINKAGE

Sreelekha Basu*

When we speak of linkage between agriculture and rural industries, we mean industrial activities based in the rural areas which have both industrial and service components. Growth in agriculture and allied activities always includes a non-agricultural component mostly in the informal sector. Introduction of formal industrial sector in the rural economy would necessitate imagination on the part of planners and investors. These industries should utilize highly labour-intensive techniques with low capital-output ratios. Forests are our national resource, which provide protection to other resources. Forestry not only generates income and employment to the rural and tribal labour, its products are used as raw materials for a number of forest-based industries. There is a multiplier effect, not only between forestry and forest-based industries, but also between these industries and various servicing and secondary industries, commercial activities and ancillary occupations. The most important impact of this is generation of additional employment, resulting in the improvement of earnings of the people involved.

Forestry as a part of agriculture provides employment under various circumstances, which can be vastly increased if labour-intensive wood-processing industries are located around the source material. Increased activities in forestry and forest-based industries would not only boost the local economies, it would also sort out our seasonal and perennial unemployment problems, to a certain extent. If wood-processing and manufacturing industries (like paper, pulp, plywood, etc.), are located in the vicinity of forests producing right type of wood, particularly in the tribal areas and near hill towns, forest economy could be linked up with the social and economic development of the region. Location of these industries in the rural areas also simplifies the problems of housing and other amenities, and helps in reducing pollution and congestion in the cities. The current Plan insists on geographical dispersal of industries and has recommended special area-oriented employment programmes in the rural areas. It is necessary to select those industries for the rural people which would utilize local resources—natural and manpower—and also have some forward linkage in terms of employment generation and resources development. Programmes of employment intensive forestry activities, suitably supplemented by linked local industrial units would go a long way in removing unemployment and under-employment of the poorest sections of our society.

AN ANALYSIS OF INTER-SECTORAL GROWTH, TRADE AND INCOME DISTRIBUTION IN INDIA

T. Haque and A. S. Sirohi†

Harmonious growth of inter-sectoral income, trade and income distribution are some of the prerequisities of accelerated economic development. In the process of growth, agriculture and industry depend on each other both for raw materials and market. Besides, it is often argued that declining output ratio of agriculture and industry increases the net domestic product and affects the income distribution pattern in the economy. Furthermore, inter-sectoral terms of trade determine the flow of fund from one sector to another, thereby regulating the pattern of inter-sectoral growth. The present study is an attempt to examine the effect of inter-sectoral growth of agriculture and manufacturing sector on national income and income distribution. Secondly, price relatives between selected agricultural and industrial commodities have been investigated for measuring their effect on input use levels and productivity. Both tabular and regression analyses were used as the technical tools for the study. The results indicated that there is an inverse relationship between agriculture-industry output ratio and per capita income. The net domestic product was found to be an increasing function of low agriculture-industry output ratio. In the process of unbalanced growth between agriculture and industry, however, the income distribution pattern was adversely affected. More particularly, the relatively declining share of agriculture in the net domestic product appeared highly regressive in respect of agricultural labourers whose relative share in the net domestic product from agriculture decreased from about 27 per cent in 1960-61 to 25 per cent in 1972-73, while during almost the same period (1961-71), the percentage of agricultural labourers to total agricultural population increased from 19 to 26. Also, the price relatives indicated an unfavourable trade for the agricultural sector and were found to have affected the levels of input use and productivity adversely.

---

* Director (Labour & Employment), Planning Commission, Government of India, New Delhi.

† Scientist (S-1) and Head, respectively, Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi-12.

IMPACT OF MILK PROCESSING PLANT ON THE DAIRY FARMING AND NET INCOME OF RURAL AREAS IN DISTRICT AMRITSAR

J. S. Chawla and J. S. Arneja*

The purpose of this paper is to (*i*) study the backward linkage effects of the Verka Milk Processing Plant on dairy cattle, milk production, sale and consumption by farmers; (*ii*) and examine the effects of the plant on the net income of the farmers. The study was confined to 112 farmers—44 landless and marginal, 17 small, 32 medium, 11 large and 8 big—selected randomly from seven randomly selected villages included in the Mitha Majha area of the district. The data were collected through a schedule. The reference period of the study was 1963-64, 1971-72 through 1974-75. Budgeting technique was applied to estimate the gross income, variable costs and net income.

The number of cattle went up in each category in 1974-75 compared to 1963-64. The increase was maximum in the case of large farmers and minimum in the case of big farmers. The maximum increase in the case of large farmers was due to their better financial conditions to purchase cattle and to put more area under fodders. As against this, the big farmers showed less interest in dairy activities. Production of milk increased from 80·4 to 148·1 per cent for different farmers, the increase being maximum in the case of large farmers and minimum in the case of big farmers. Some large farmers were operating dairy farms on a commercial scale whereas the big farmers produced only for domestic consumption. A similar trend was noticed in respect of sale of milk and consumption of milk. The establishment of the plant also provided an impetus to the sale of milk. Consumption per family also increased likewise. The increase in milk consumption was less in the case of big farmers as they were already consuming large quantities of milk. As a result of sale of milk to the plant and better price offered by the plant, the net income increased from 331·2 to 489·4 per cent for different farmers.

RECENT TRENDS IN SECTORAL TERMS OF TRADE

G. S. Kainth†

The principal mechanism most frequently mentioned in the literature on economic development is the fluctuation in the relative prices of the goods and services inter-changed between the sectors. This study, therefore, endeavours to analyse the changes in the domestic terms of trade between the agricultural and industrial sectors. The time reference of the study is the 15-year period from 1961-62 to 1975-76. The data on prices of various commodities available in India pertain to the annual wholesale prices and are expressed in the form of Index Numbers. These are available in three series with 1951, 1961-62 and 1970-71 prices as the base year. In this study we have used the new series commencing in 1961-62 with that year as the base year. These are issued by the Economic Advisor to the Government of India and are reported by the Reserve Bank of India.

The study shows that agricultural prices during 1960-61 to 1975-76 have shown much sharper rate of increase than the industrial prices. This is on account of more rapid increase in the foodgrain prices. On the other hand, the industrial raw material prices have gone up more rapidly than the industrial prices. The analysis also reveals that the terms of trade between the agricultural and non-agricultural sectors of the Indian economy have turned in favour of the agricultural sector during the study period with the only exception of the year 1962-63. As between foodgrains and non-foodgrains, the terms of trade have turned in favour of foodgrains. The movements of the domestic terms of trade in India during the study period have been largely due to greater variations in agricultural prices. Compared to industrial prices, agricultural prices have tended to show greater flexibilities both in the upswing and in the downswing of the business cycle. This disparity in the behaviour of agricultural and industrial prices may be attributed to relatively lower price elasticities of demand for and supply of agricultural products in relation to industrial products.

The most important policy implication of the study is that given the probable coefficient, the domestic terms of trade are not likely to turn against the agricultural sector during the early stages of development. The capital contribution from the agricultural sector is not likely to arise from a change in the terms of trade and, therefore, reliance must be placed on other means of drawing such a contribution. Secondly, the domestic terms of trade will turn so radically towards agriculture a to create a major political problem. That is, if the terms of trade do turn towards agriculture, it will be by so small an amount as to be relatively undetectable within a period of few years. Finally, when agriculture is the main sector, the per capita income is largely determined by the levels of production of agricultural commodities. This is suggestive of the fact that the potential contribution of the agricultural sector should be recognized. Thus, the agricultural sector should be given a separate treatment in the model dealing with the early stages of economic growth.

---

* Post-Graduate Department of Economics, Khalsa College, Amritsar.

† Ph.D. Scholar, Punjab School of Economics, Guru Nanak Dev University, Amritsar.

OPTIMAL TERMS OF TRADE (CAUSES, IMPACT AND INDIAN EXPERIENCE)

P. S. Grewal*

The changes in terms of trade may be attributed firstly to different rates of growth in the two sectors, namely, agriculture and industry, secondly to differences between the demand and supply elasticities of commodities of the two sectors and lastly to the Government policy. The deviation from the optimum terms of trade is an important mechanism to cause inter-sectoral transfers, leading to changes in the structure of the economy which may accelerate/decelerate the process of economic development in the following manner:—

1. They may alter the relative profitability of the two sectors and regulate the flow of investible funds between them.
2. They may affect the revenue of Government as income is transferred from a high to a low tax paying sector and vice versa.
3. They may affect saving and investment as the tilt in terms of trade transfers income from a sector with a high marginal propensity to save and invest to a sector with a low marginal propensity to save and invest and vice versa.
4. They may alter the distribution of income between the sectors and within the sectors.

In the early stages of development, the terms of trade are depressed against agriculture so as to provide cheap food and raw materials for the expansion of the non-farm sector. This happened in India during the pre-green revolution era as the Government adopted consumer-oriented price policy due to high income elasticity of demand for food of the majority of the population. As a consequence, agricultural production remained unstable and the use of non-conventional inputs remained limited. To induce the farmers to adopt production-raising technology, the terms of trade which were adverse to the agricultural sector during the pre-green revolution era were tilted in favour of agriculture since the mid-sixties after the onset of the green revolution. This tilt in terms of trade may be attributed partly to the role played by state and partly to the pressures applied by the farm lobby in Parliament which stressed that farm growth is essential for industrial progress. As a consequence, the Agricultural Prices Commission was appointed in 1965 to advise the Government on farm product prices. Since then, support prices of principal crops are fixed and arrangements are made for the purchase of agricultural produce. This change in terms of trade has produced beneficial as well as harmful effects. To sum up, the farmers should be provided parity prices for their produce so that their standard of living does not suffer in the wake of technological break-through. Parity prices can also be justified on the ground that the tempo of agricultural development needs to be sustained to provide wage goods and raw materials for the expanding non-farm sector.

AGRICULTURAL PRICE BEHAVIOUR IN UTTAR PRADESH SINCE 1950-51 TO 1973-74

P. C. Shukla and B. K. Misra†

It is true that changes in the nature and quantum of output and acreage could, in a significant manner, be the product of secular changes in the development of the economy. But it is also true that these variations could be brought about by changes in the prices of various agricultural products. The behaviour of prices in Uttar Pradesh has not been uniform throughout the Plan periods both in respect of direction and speed. In agriculture the supply conditions have certain pecularities, *i.e.*, (*i*) it is not easy to increase or withhold the supply at a short notice because there is a gap between decision taken and actual supply. This affects agricultural prices to move more violently than non-agricultural prices; (*ii*) the expected price behaviour than the prevailing one's determines farm output as well as area adjustment. This gives an idea that there is a lagged relationship between output and prices, the latter leading and the former following.

An analysis of growth trend of prices during the Plan periods revealed that during the First Plan period the price trend has decreased for all crops but was significant for rice and maize (8·6 per cent and 4·1 per cent) among cereals, 7 per cent for *arhar* and 14·5 per cent and 8·6 per cent for castor seed and groundnut, respectively. There was a further decrease during the Second Plan for crops like wheat, barley and jowar among cereal crops and mustard, sugarcane and potato among non-food crops. There was a rising trend after this period and prices rose more than 12 per cent per annum.

It was, however, found that different commodities had different price fluctuations and production could not respond equally. This unequal responsiveness of production was due to the impact of other variables on prices of commodities. The price-output relationship shows that wheat, rice and production of jowar, barley and gram were negatively related. It was also found that the decrease in output was more sharp than the decrease in the prices of these crops. The area-price relationship showed positive relationship for crops like jowar, maize, wheat and rice whereas for barley

* Post-Graduate Department of Economics, Government College, Ludhiana.

† Agro-Economic Research Centre, University of Allahabad, Allahabad.

and gram it was negative contrary to the known positive relationship. Taking price constant, the area under barley and gram decreased by 8·2 and 3,1 level, respectively, and taking area constant, prices decreased very insignificantly being 0·0009 level for gram and 0·08 level for barley crop.

Price fluctuations are necessary to correct the imbalances caused by the technological effect on agricultural production and distribution but it should not be too sharp to create income inequalities among the farmers and fall in marketable surplus through decrease in productivity and shift in area allocation. Thus an integrated price policy involving inter-sectoral prices is highly desirable for balanced growth of the economy. But however desirable, it may not be possible to bring about such an integrated price structure unless the economy—production, distribution and prices—is totally controlled.

LINKAGE BETWEEN SUGAR INDUSTRY AND AGRICULTURE IN THE DEVELOPMENT OF RURAL SECTOR—A CASE STUDY IN WESTERN MAHARASHTRA

S. D. Suryawanshi, P. M. Kapase and S. J. Patil*

In this paper an attempt has been made to study the growth of sugar factory, income generation, quantitative and qualitative benefits received and relationship between production and utilization of sugarcane in the vicinity of the Co-operative Sugar Factory, Rahuri, Maharashtra State. The data on the development and working of the factory were obtained for the period from 1971-72 to 1977-78. It is revealed that during the period under study the number of shareholders benefited, cane crushed and sugar produced showed an increasing trend. The per hectare productivity has also increased in recent years. The years 1974-75 and 1975-76 were the best seasons as regards the rates received, production and recovery. The number of shareholders increased from 4,510 in 1971-72 to 7,454 in 1977-78. The factory distributed considerable quantum of bonus which showed the efficiency and profitabil'ty of the factory. The cess and taxes are also important sources of income to the Government. This factory has provided more than Rs. 500 lakhs every year to the State Government, which is an indirect contribution for public welfare. The land utilization pattern showed that the area under irrigation, area under cash crops and net sown area have increased. With the developmental efforts of the factory, the irrigation potential and water lift devices have increased. Due to development of productivity and its proper utilization, the co-operative sector has also developed its business. The surety of recovery of loans increased the credit worthiness and repayment capacity. The sugar factory also played an important role in the socio-economic and infrastructural development in the rural sector. The factory has its own crop protection and agricultural extension education cell to keep in touch with the advanced technology in agriculture. The factory has also its own agency to implement the lift irrigation schemes in the area, for which development funds are utilized. Attention has been paid to road development, cattle improvement, means of transportation, medical heath and housing facilities. It has made arrangements to educate the youth by providing financial assistance. A considerable amount is being spent for higher studies of the poor class talented students. The overall development in the area is due to the linkage between farm production and the sugar factory and has a mutual interrelationship with each other. The agro-industry has played a significant role in the development of the area. It can be thus suggested that if other agricultural processing industries like cotton ginning, oil mills or rice and flour mills are organized on modern lines, similar results may be obtained.

LINKAGES OF A FRUIT AND VEGETABLE PROCESSING AND PRESERVATION UNIT—A CASE STUDY

B. S. Murdia†

Agriculture is the most important industry in under-developed countries like India. With the adoption of planned economic development the other sectors are also acquiring increasing importance. It is observed that these sectors have mutual linkages and interrelationships so that growth in one sustains the other.

With the growth of population, per capita income and urbanisation, the total demand for food and raw materials goes up. At the same time the demand pattern undergoes a shift from inferior to superior foods and from raw to processed or 'convenience' foods such as bread, butter, cheese, corn/soya flakes, jams, pickles, frozen or dehydrated fruits and vegetables, squash and *sherbets*. This assumes special relevance in a vegetarian India with tropical climate, inadequate and inefficient transport and storage and long distances. As such there is a lot of spoilage and wastage, seasonal glut in the producing areas and shortage in long distance or off-season markets. There is thus a strong case for the development of a fruit and vegetable processing and preservation industry which can have

* Agricultural Research Officer, and Research Associates, respectively, Department of Agricultural Economics, Mahatma Phule Krishi Vidyapeeth, Rahuri, District Ahmednagar (Maharashtra).

† Associate Professor of Economics, Department of Economics, School of Basic Sciences and Humanities, University of Udaipur, Udaipur (Rajasthan).

very useful linkages and spread effects in terms of production, processing, marketing as well as income and employment thereby relieving rural poverty and unemployment, on the one hand, and serving the consumers in a much more desirable manner. The present case study relates to a small scale fruit and vegetable processing unit in Udaipur city of Southern Rajasthan. The firm established in 1947 has by now acquired a size and a name in the region. The total fixed and working capital aggregates Rs. 1,20,000 and Rs. 50,000, respectively. The production, marketing and management is looked after by members of the owner-firm family, four of whom are thus self-employed. The number of hired permanent labourers is 6, being paid on salary basis. Forty per cent of the operations are mechanized. Permanent labour is supplemented by contract labour on piece wage rate ranging between Rs. 10 and Rs. 25 per quintal depending on the intensity of labour involved. As per the total annual volume of such manual labour, the wage payment comes to Rs. 7,000—Rs. 8,000 which works out to 1,500 man-days a year or 5 adults per day at the prevailing wage rate. Besides, two salesmen also operate on 5 per cent commission basis. Thus total employment is generated for about 17 persons, giving a low capital/labour ratio of Rs. 8,000.

The product is based on the utilization of about 110 tonnes of agricultural inputs including mango, tomato, garlic, lemon, *amla*, chilly and oil, all of which are produced in the district or in the neighbouring areas, thus providing good outlet to the farmers. The sales are concentrated in Southern Rajasthan but are also spread out to other areas.

The study thus highlights the employment and income generation effects of a small scale agro-processing unit with low capital intensity utilizing profitably perishable agro-horticultural products, serving local and distant markets in and out of season. The policy implications are to encourage farmers to diversify products, improve transport and storage, encourage and assist such industries by providing necessary technical and financial training and assitance through Agricultural Univerisities, Training Centres, Banks and Marketing Federations. It is heartening that the Sixth Plan proposes a higher priority to this.

IMPRESSIONS ON INTER-SECTORAL LINKAGES: A CASE STUDY OF DAIRY FARM FINANCING IN ANDHRA PRADESH

K. R. Rao, T. P. Gangadharan and R. K. Patel*

For a vigorous growth of the dairy sector healthy linkage between dairy farm and financing sectors has been keenly sought. Doubts have often been raised in regard to the performance of nationalised banks on farm front. This paper attempts to provide a perspective on the qualitative aspects of dairy farm financing operation of Bank of Baroda at Rajahmundry (A.P.). A sample of 53 households from eight villages of the milkshed area of Horlicks Factory was drawn for the study. The present system of advancing loans was found to be cumbersome and complicated. About 55 per cent of the farmers reported inadequacy of the loan amount disbursed.This feeling was more strong in the case of large and medium farmers.The time taken to receive the loan from the bank was found to increase with the size of the farm and milch herd. The bank advanced to the extent of 75 per cent of the value of loan applied for. The majority of the dairy farmers were in favour of the existing rate of interest (11 per cent per annum). Constraints appear to exist in increasing the share of financial assets on dairy farms due to the understandable natural preference for farm real assets like land, livestock, farm implements, etc.

INDIAN ECONOMY—AN ECONOMIC ANALYSIS OF INTER-SECTORAL LINKAGE

R. I. Singh, V. Prasad, Om Prakash and T. R. Singh†

The present paper examines the interrelationships between the agricultural and industrial sectors with respect to the pattern of investment, occupational structure, production of raw materials and industrial products, contribution of national income by industry of origin and export of main products, etc., in different Plan periods. Of the total outlay made in the different Plan periods, the share of agriculture, including irrigation was 37 per cent in the First Plan, 21 per cent each in the Second and Third Plan, 23 per cent in the Fourth Plan and 20 per cent in the Fifth Plan period. The percentage investment on industries was 5 per cent, 24 per cent, 23 per cent, 19·7 per cent and 26 per cent in the corresponding Plan periods. Of the total working population, around 72 per cent was engaged in agriculture, 11 to 12 per cent in industries and 16 to 18 per cent in other sectors. The heavy burden of working population on agriculture relative to the industrial sector shows the unbalanced and under-developed nature of the Indian economy.

* Research Associate, Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad, Scientist (S-1) (Agril. Eco.), and Head, Division of Dairy Economics, Statistics and Management, National Dairy Research Institute, Karnal, respectively.

† Department of Agricultural Economics and Statistics, C. S. Azad, University of Agriculture and Technology, Kanpur-2.

An examination of the production of food and non-food crops and production of agriculture-based industrial products showed a direct and positive relationship between manufactured goods, supply of raw materials and exports. With the rise in cotton production from 53 lakh bales in 1960-61 to 61 lakh bales in 1975-76, the producton of cloth rose from 674 crore metres to 809 crore metres which in turn resulted in an increase of export from Rs. 90·60 crores in 1961 to Rs. 158·70 crores in 1975. Similarly, with the rise in sugarcane production from 111 lakh tonnes in 1960-61 to 147 lakh tonnes in 1975-76, the production of sugar rose from 30·20 lakh tonnes to 46·35 lakh tonnes and that of exports from 2·50 lakh tonnes to 12 lakh tonnes during the corresponding years. A similar trend was noted in the case of jute products also. Of the foreign exchange earnings through exports, the agriculture-based industries—jute, tea, cotton cloth, leather products, tobacco, sugar, etc.,—accounted for the highest share varying from 91 per cent in the First Plan, 84 per cent in the Second Plan, more than 60 per cent in 1970-71 and 1975-76 and the rest was the share of the industries. As regards the contribution to national income, agriculture contributed 52·5 per cent in 1960-61, 44·2 per cent in 1965-66, 45·8 per cent in 1970-71 and 42·9 per cent in 1975-76 and the industry's contribution to national income was 19·2 per cent, 23·6 per cent, 22 per cent and 22·9 per cent in the corresponding periods. It may be noted that the trend of contribution to national income follows the trend of earnings made through exports by the two sectors. Thus the production of raw materials, manufacture of industrial goods, exports and the contribution to national income are interrelated to a certain extent.

AGRICULTURAL AND INDUSTRIAL DEVELOPMENT AND THEIR INTERDEPENDENCE IN INDIA

J. S. Garg, G. N. Singh, M. P. Azad and S. P. Tewari*

An attempt is made in this paper to examine the development of agriculture and industries separately and their interdependence for the economic growth of the country. The importance of agricultural development in India has been discussed under three heads, *viz.*, contribution of agriculture to national income, its contribution to employment and to foreign exchange. The study revealed that the share of agriculture in the total national output was maximum, being 57 per cent for the period 1925-29. Afterwards, a decreasing trend was observed upto the pre-Plan period. During the Plan period, the contribution of agriculture to the national output was maximum, being 56 per cent in 1950-51 and it remained above 50 per cent upto the end of the Second Five-Year Plan period. During the later period from 1960-61 to 1973-74, it remained above 40 per cent. The dependence of working force of the country on agriculture remained more or less the same, being 72·1 per cent, 71·8 per cent and 72·1 per cent during the Census of 1951, 1961 and 1971 respectively, indicating thereby no significant change in agricultural technology and in the rate and pattern of investment in the non-agricultural sectors to attract the surplus rural labour and to relieve the pressure of population on land. This has resulted in widespread under-employment and unemployment with the increase in population. It is further revealed that the agricultural commodities like raw cotton and jute, unmanufactured tobacco, oilseeds, spices, tea and coffee accounted for about 49 per cent of the total value of exports in 1938-39. The share of agricultural commodities and agricultural content of related manufactures and semi-manufactures in the total export of the country showed a decreasing trend, the maximum being 70 per cent in 1950-51 and the minimum being 50 per cent in 1970-71. It was 54 per cent in 1973-74. On the contrary, the export of non-agricultural products showed an upward trend and increased from 30 per cent to 50 per cent and 46 per cent in the corresponding years. The total exports of the country increased from Rs. 579 crores in 1950-51 to Rs. 2,518 crores in 1973-74. In spite of the break-through in technology and supply of essential inputs, the trend rate of growth of crop production is not sufficiently different from the trend observed before the introduction of new technology. The slow growth in foodgrain production, insufficient development of animal husbandry and inadequate supply of agricultural products specially pulses, milk and milk products, fish, sugar and edible oils have created inflationary trends in their prices.

As regards industrial development, India now occupies the tenth position in the industrialised world. The industrial pattern in the country on the eve of planning was marked by capital intensity, and high priority was accorded to steel and iron industries under the public sector. On the contrary, the village and small scale industries are labour-intensive and are estimated to provide full time employment to about 2·8 million persons during the Sixth Plan period. The pattern of industries followed before the Sixth Plan suffered from slow employment generation. The Sixth Plan envisages an industrial growth rate of 7 per cent during the Plan period, as against the record growth of 10 per cent registered in 1976-77. This growth rate of 7 per cent is proposed to be achieved not so

* Professor and Head, Agricultural Economist, Assistant Professor and Registrar (C.S.A.U.), respectively, Department of Agricultural Economics and Statistics, C. S. Azad University of Agriculture and Technology, Kanpur-2.

much by investment in the capital goods sector as in the earlier Plans but by making investment on "employment intensive activities like agriculture, irrigation, infrastructure, like power and roads, and minimum needs programmes like water supply, health, primary education and housing." A shift in industrial pattern will place the small industrial sector at the top in the industrial revolution. The share of large and medium industries in the total public sector outlay will fall from 25 to 19 per cent, whereas the increase in the investment in the cottage, village and small industrial sector will be nearly 300 per cent and will operate under a protective umbrella.

As regards the interdependence between agriculture and industries, the study showed that out of the total agricultural production in 1964-65, about 12·5 per cent passed from agriculture to agriculture, nearly 23 per cent was utilized by the industries and the rest was used directly in the form of consumption. The value of agricultural inputs was 20·6 per cent of the total value of industrial output. The industrial sector delivered goods worth about 11 per cent of the total value of goods sold by agriculture to industry and accounted for about 2.53 per cent of the total output of the agricultural sector. The above facts clearly indicate that the dependence of the industrial sector on agriculture is relatively higher as compared with the agricultural sector's dependence on industry. The dependence of the agricultural sector on industry has increased substantially, particularly with the modernization of agriculture.

According to estimates of 1973-74 at 1971-72 prices, the share of *gur* and sugar industry in the total output has been as high as 58 per cent, for tea and coffee industries it was 42 per cent, for leather products 40 per cent, for vegetable oils 32 per cent, for jute textiles 35 per cent and for cotton textiles 29 per cent. The processing industries like fruit canning, milk products, meat processing, etc., not only help in the development of exports but also provide employment and income to the masses. As such, the economy of the country develops by increased income and employment through high productivity of both the agricultural and industrial sectors, resulting in the expansion of market both within the country and in the foreign countries. Thus it can be concluded from the present study that the further growth in agricultural production in India is materially dependent on the rapid increase in the production of inputs supplying industries. This will help in the use of modern technology in agricultural production. Similarly, the rapid growth of industries is basically dependent on the development of agricultural production, particularly of the raw materials used by the industries.

INTERDEPENDENCE OF LIVESTOCK PRODUCT AND LIVESTOCK-BASED INDUSTRY

R. K. Singh, R. I. Singh, V. Prasad and Janardan Singh*

The present study was undertaken in 1978-79 with a view to analysing the interdependence of meat, a livestock product and meat industry for the overall growth of the national economy. The livestock population of India as per the 1972 livestock census is 178·86 million cattle and 57·94 million buffaloes and it is expected to increase to 181.02 million and 63.81 million respectively in 1980. The total meat production in the country is estimated at 830,000 tonnes of which about 46·7 per cent of meat is from sheep and goat, 22·8 per cent from cattle, 12·4 per cent from poultry and 7 per cent from pigs. The increase in meat production in 1976 over the average production during 1961-65 was about 21·2 per cent. The domestic demand of meat will range between 1·1 and 1·4 million tonnes in 1975 and between 1·6 and 2·1 million tonnes in 2000 A. D. as against 0·72 million tonnes in 1971. The percentage of livestock slaughtered of different species of animals has been reported to be cattle 0·9 per cent, buffalo 1·4 per cent, sheep 32·5 per cent, goat 36·8 per cent and pig 22 per cent. The meat industry is facing problems like lack of facilities for the procurement of livestock and animals, slaughtering, storage, processing and packaging. Therefore, for developing the meat industry the above problems should be solved along with the establishment of disease free animal zones, modernization of slaughter-houses, meat inspection, marketing of meat and meat animals and provision of export assistance by the Government. In the different States, the production, processing and marketing of meat need to be suitably organized at different levels. The marketing of animals for slaughter is quite complex and there is therefore the need for organizing it at the level of the primary producers by educating them to form their societies at the village level. Slaughter-houses should have attached livestock markets where the animals can be kept for some days. The slaughter-houses are needed to be modernized, particularly for export purposes.

---

* Department of Agricultural Economics and Statistics, C. S. Azad University of Agriculture and Technology, Kanpur-2 and Sachiv, Krishi Uttpadan Mandi Samiti, Gangoh, Saharanpur, Uttar Pradesh, respectively.

LINKING SMALL-SCALE, AGRICULTURALLY RELATED INDUSTRY WITH AGRICULTURE IN THE PUNJAB STATE

Parkash Mehta, R. S. Prihar and J. N. Singh*

Recent developments in the Punjab are sufficient to indicate a very high correlation and interaction between agricultural and manufacturing sectors of the State. The present investigation was undertaken to study whether the manufacturing sector covering threshers, reapers, electric motors, diesel engines, improved farm implements, sprayers and other farm equipments has any effect on the agricultural front of the State. It was observed that the shift of labour from agriculture to industry would be highly beneficial to the economy of the State and also the increase of these industrial products would have a direct effect in increasing the agricultural output. This means that whereas the increase of the output of the industrial sector would increase the net national income, added agricultural output would further enhance it.

INTER-SECTORAL GROWTH AND THEIR CONTRIBUTION TO HIMACHAL ECONOMY

C. S. Raghubanshi, B. K. Sikka, M. S. Jairath and Y. S. Negi†

Economic growth with social justice is one of the most important goals of a developing country like ours. Attainment of the objective/goals calls for a sustained development of different sectors of the economy. Himachal's economy is basically agricultural, *i.e.*, horticultural which has developed rapidly during the last two and a half decades. The State's economy is closely linked with the expansion/development of horticulture, forestry, animal husbandry, electricity and water sectors. Some other sectors, *viz.*, mining and quarrying, transport and communication, banking, etc., have also developed. This paper presents a critical analysis of the inter-sectoral linkage in Himachal Pradesh. The main focus is on the growth of horticulture, agriculture, forestry, industry, transport, etc. It also discusses the institutional changes that took place for inter-sectoral development and for the delivery of the required inputs at the field level. In the process of growth, the interdependence between agricultural (including horticulture) and non-agricultural sector increased, as reflected by the increasing amount/percentage of horticultural output moving into market channels and by the increasing dependence of horticulture upon non-farm produced inputs, especially forestry. Various kinds of timber which earlier had no market are now being used for manufacturing wooden cases. Forestry contributes about one-third of the total revenue of the State exchequer and has helped the development of mixed farming, providing grasses for grazing. The contribution of forestry and logging sector to the gross domestic product (at current prices) in 1977-78 was nearly 1·8 per cent, which is very small and is not commensurate with its potential. Electricity is the most important source of power (energy) which has helped in increasing agricultural/horticultural production and the utilization of mineral resources, communication, etc. Likewise the transport sector developed with a fast pace to meet the requirement.

While analysing the contribution of different sectors to the State economy at constant prices, it is observed that the agricultural sector (including animal husbandry, forestry and fishery) alone contributed about 60 per cent of the total State income and practically the same level was maintained in the earlier years except in 1966-67. The share of mining and manufacturing enterprises during the same year was about 8 per cent and that of the tertiary sector was about 32 per cent. However, the share of commerce, transport and communication sector was about 9 per cent in 1975-76. The net domestic product of agriculture increased by 29·23 per cent in 1975-76 over 1967-68. However, the net domestic product of forestry and logging rose by 59·91 per cent in 1975-76, whereas it increased by 73·33 per cent in the fishing sector. The increase of net domestic product was the highest (151 per cent) in banking and insurance sectors and was lowest (14·94 per cent) in the manufacturing sector. Recent growth theories have made the take-off in agricultural development heavily dependent on the achievement of enough growth in the agricultural sector. The analysis regarding inter-sectoral relationship between net State domestic product revealed that there is a high degree of association between agriculture and fishing (+0·8494), agriculture and transport/communication (+0·8540), forest and transport/communication (+0·9124), fishing and banking (+0·9235), electricity and water with trade and commerce (+0·9562), trade and commerce with banking (+0·9100), etc. However, agriculture has a very low association with manufacturing. A high degree of association between two sectors reveals that they are highly dependent on each other whereas a poor degree of association signifies their non-dependence on each other.

---

* Department of Economics and Sociology, Punjab Agricultural University, Ludhiana.

† Senior Economist, HPMC, Simla-2 and Agro-Economic Research Centre, Himachal Pradesh University, Simla-5, respectively.

NATURE AND SCOPE OF SECTORAL LINKAGE IN A MIXED ECONOMY

P. C. Shukla and J. K. Hajela*

The linkage of sectors implies not only the association or relationship between the sectors in question but signifies the fact of bearing those responsibilities in terms of influencing the other sector for achieving a higher rate of growth in terms of physical production and income distribution. Our main concern about the sectoral linkage is to explore the possible areas of linkage and to deal with the theory behind it. It is generally believed that the agricultural and industrial sectors are very much inter-linked at the level of demand and supply. Each sector is the market of the other. Despite these demand and supply linkages, where mainly three aspects are covered, *viz.*, output, input and prices, some other possible aspects of linkage can be explored. These aspects are very well present in the economy, but in disguised form and are the main instruments of proper linkage and development of both the sectors. The aspects of possible linkage between agricultural and industrial sectors may be described as (*a*) linkage through marketable surplus, (*b*) linkage through input-output, (*c*) linkage through manpower planning, (*d*) linkage through entrepreneurial ability, (*e*) linkage through technological innovations, (*f*) linkage through structural (physical-financial) changes and (*g*) linkage through institutional behaviour. The first three aspects are related to the demand and supply conditions through price and trade mechanism and the remaining four aspects are related to the service sector. The service is not apparently visible but forms a part of the industrial as well as the agricultural sector when related to the respective sectors. Technological innovations, marketing techniques, entrepreneurial ability, structural changes and institutional behaviour are the areas of the service sector and influence the sectoral linkage.

It is, however, realised that without proper planning the service sector always tilts towards the industrial sector and causes unbalanced growth of the economy. Wide fluctuations take place in prices, income, employment, saving and investment pattern among the industrial as well as the agricultural sector. As a matter of caution, the components of the service sector must be kept in balance by deliberate and planned action in terms of comprehensive development planning to maintain the sectoral linkage. It should not be assumed here that comprehensive development planning through rearrangement of resources can bring about the desired linkage and can accelerate economic growth. It may, however, be suggested that decentralisation of manufacturing and processing industrial complexes must be supported by State's concession to private manufacturing and processing sectors for creating rural-biased entrepreneurial and innovational changes. With decentralisation, efforts should also be made by the State to attract invesment in the rural areas by manufacturing and processing industries which would gradually eliminate the prejudices against the large and big houses created by the so-called slogan "Socialistic Pattern of Society" or Socialism—an hatred-prone slogan.

SOCIO-ECONOMIC SIGNIFICANCE OF AGRO-INDUSTRIES IN A DEVELOPING COUNTRY

J. K. Gupta*

Economic prosperity of a developing country like India depends upon the integration of its agriculture with industry. The strategy of economic growth has to be such that it integrates rural and urban economies by reducing economic disparity and regional imbalances. Agro-industries are considered the most suitable agencies for achieving this. Agro-industries are being used to promote employment opportunities to the surplus labourers and they also engage the farmers in productive use during the off-season. A well-planned agro-industry should have the following four characteristics: (*i*) There should be interdependence between agriculture and industry. (*ii*) The industry must be based on the raw materials provided by the agricultural sector. The processed goods of the industry must have access to the rural market. (*iii*) The surplus manpower must be absorbed by this industry. (*iv*) In order to enhance the productivity improved indigenous technology, as far as possible, should be used. It is also necessary to save foreign exchange by avoiding the import of sophisticated machinery. In order to activise and infuse a new dynamism to these industries certain concrete steps must be taken at all levels. These include (*a*) encouragement of new methods of cultivation for achieving requisite growth of both commercial and food crops, (*b*) intensification of irrigation facilities and improvement in the overall availability of important agricultural inputs, (*c*) intensification of intensive cultivation techniques in selected oilseeds growing areas for overcoming the shortage of oilseeds in order to cater to the needs of oil extraction plants, (*d*) establishment of new financial institutions to cater to the financial needs of agro-industries that are already in existence and planned to be set up in future, (*e*) the setting up of a national level commission on agro-industries to enquire into the problems of existing units and find solutions to them, to list up the industries that can be organized by tapping various agricultural raw materials and also to suggest the possibilities of starting new industries suited to different regions, and (*f*) provision of incentives to the farmers to adopt the need-based cropping pattern.

---

* Agro-Economic Research Centre, University of Allahabad, Allahabad.