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SUMMARIES

NUTRITIONAL INEQUALITY IN INDIA

Raja Ram Das Gupta*

This paper attempts to analyse the nutritional situation of India on the basis of data obtained by (i) National Sample Survey Organisation for the year 1971-72 and (ii) National Institute of Nutrition, Hyderabad for the year 1974. Availability of calorie or protein per consumer unit per day has been used to know whether enough calories and proteins are available or not. Gini coefficient has been estimated as a measure of inequality. Analogous to Sen's index, an index of undernutrition (U) and in a slightly different form, an index of calorie sufficiency (S) have been estimated to reflect the nutritional status of a society. Complete ordering scheme on the basis of U and S has been advocated. The results show that about 25 per cent of Indian consumers are found to live below the minimum level of protein. Calorie situation is much more severe. Fifty-six per cent of the consumers in rural India and 71 per cent of them in urban India suffer from undernutrition. It is evident that not only the nutritional position of India is bad to-day, but it has indeed been deteriorating over time. The problem is not only of distribution, but of availability itself. It has been found that although nutritional inequality is more in the rural than in the urban areas, nutritional status is better in the rural than in the urban areas. Also a sort of nutritional demarcation between geographical north and south has been obtained. Inter-regional inequality has been found to be lower than inequality within a State. To meet the problem, a proposal has been made to find out a food production pattern which, given other constraints, can make available relatively greater nutritional benefits to the poorer section of the population.

AN ANALYSIS OF THE RELATIONSHIP BETWEEN DISPOSABLE INCOME AND LEVELS OF NUTRITION IN BALIANTA BLOCK OF DELTA IRRIGATION PROJECT AREAS OF ORISSA

H. K. Das Gupta and B. Misra†

The objective of the study is to examine the relationship between disposable income and level of nutrition of the sample farmers of the area. Four villages—two with irrigation and two without irrigation—selected from the Baliana block situated in the delta irrigation project area of Orissa are further stratified into three farm sizes. From each of the stratum of each village, 20 farmers were selected. Thus data were obtained from 120 farmers classified into six groups with varying levels of disposable income. In fact, these groups of six farms are proxy variables for six income groups. The study related to the year 1969-70. The conclusions of the study are as follows: (1) The study proves the hypothesis that with rising income the calorie and protein intake values increase. (2) The marginal propensity to consume food in terms of calorie and protein intake is negatively correlated with income. (3) There are some evidences of the calorie consumption elasticity to fall as income increases. With regard to protein consumption elasticity however, the study reveals increasing trend up to a certain level of income with a subsequent fall.

NATURE AND MAGNITUDE OF FOOD AND NUTRITION SITUATION IN HARYANA

U. K. Pandey, A. C. Gangwar and J. P. Singh‡

The objectives of this paper are (i) to make an appraisal of the food and nutrition situation in Haryana State, (ii) to examine the impact of green revolution on area, production and productivity of cereals, pulses, millets, oilseeds, sugarcane and potato in the State, and (iii) to assess the food availability and requirements for consumption within the foreseeable future. Data for the study

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were obtained from the National Sample Surveys, Indian Council of Medical Research publications, Statistical Abstracts of Haryana and some other secondary sources. It is evident from the present study that the people of Haryana State are faced with the problems of both undernutrition and malnutrition. The major source of calorie intake is from cereals whereas from nutritious food items it is very low. It is indicated that green revolution has made perceptible impact only on cereals. The green revolution has still to make its influence in the case of nutritious food crops such as gram, pulses, oilseeds, etc. Most of these crops have been cultivated in the dry farming areas and with the extension of irrigation facilities, these have been replaced by more profitable crops like rice and wheat. Besides, these crops have been subject to high variability in yield, production, price and consequently in income. Hence there is need to evolve better strains of these crops in terms of high production and yield stability. If proper steps are not taken, it might lead to an increase in the incidence of protein malnutrition. It has been projected that by the end of 2001 A.D. the population of Haryana State will more than double the 1971 population, even after considering the positive impact of family planning measures. Thus in future the need for food requirements especially nutritious food is going to be very high. If proper measures are not taken, the people of Haryana would suffer more seriously than today from both undernutrition and malnutrition.

THE ROLE OF PRICE IN MARKETING OF PROTEIN FOODS IN DEVELOPING COUNTRIES

K. L. Rathod†

The development of processed nutritious foods is one of the alternate nutrition intervention strategy. Price is reported to be a prime factor for failure of such enterprises either to develop or to develop at a wholly satisfactory rate. The basic problem of private food industry is that while low price is a basic requisite to reach the vulnerable income groups of population who need the protein foods most, achieving a low unit price constitutes a fundamental stumbling block. The paper sets out the objectives of a private company under the background of achievable goals and discusses how price is affected in pursuance of objective realisation. It examines the relationship of price with product, consumer attitudes, direct marketing cost and economic viability. It concludes that the profit maximizing objective commonly followed by the private company is more often at variance with the nutritional objective (maximizing production and distribution). There is a conflict between nutritional impact and profits. A marketing programme of protein foods cannot decrease the cost of product to the consumer and maximize the revenue. Lowering the cost to the consumer by lowering the price jeopardizes the economy of the project. Protein foods would be cheaper if there is mass production (and distribution) which could be considerably facilitated through active assistance of Government and international agencies. Their roles are critical particularly in covering development costs (product and packaging development, market research, product launch campaigns) and some part of promotion and distribution expenditure. As an alternative, it would be necessary to look for unconventional marketing approaches that involve some form of government-business co-operation.

ECONOMICS OF NUTRITION IN MARATHWADA

K. D. Rajmane, V. C. Kale and T. G. Satpute*

The rural population of Marathwada region in Maharashtra mainly depends on agriculture for their livelihood. The income of rural masses is very low, which has ultimately resulted in lower consumption expenditure. Due to this fact, the majority of the population in the rural area stands below poverty line. In order to determine the gap of calorie intake by the rural population, a study was undertaken in the village Jawala of Parbhani district. Data on food consumption have been collected by cost accounting method from the cultivators for the year 1976-77. These cultivators were divided into four groups according to size of holdings, namely, below 4, 4.1 to 6.4, 6.5 to 10.4 and above 10.5 hectares. In order to have uniform per unit calorie intake, the scale suggested for practical nutrition work in India by ICMR was adopted. The average per family units

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were 4.92, 6.46, 5.87 and 8.16 for the four size-groups, respectively. The foodstuffs consumed by the selected farm families are classified into cereals, pulses, nuts and oils, vegetables, milk and milk products, etc. It was observed that cereals contributed a major part of total food consumed by the farmers, which amounted to 460, 488, 515 and 727 gm. per unit per day for the four groups of cultivators, respectively. Among cereals, jowar was found to be more important, which contributed as high as 72 per cent of the total cereals in group I and 61 per cent in group II, which was the lowest. The next important item of food was wheat followed by rice. Sugar, vegetables, milk and oils contributed very much less as compared to the ICMR recommendations. The expenditure incurred on cereals was higher than that on other items. It was further observed that about 88 per cent of the calories were obtained from cereals, whereas the calorie intake from pulses and sugar was only 4 per cent each. The total calories obtained from the consumption of all food items were 1795, 1921, 2088 and 2881 and the cost per kilo-calorie was Re. 0.38, 0.39, 0.43 and 0.41 for the four groups, respectively. From this, it can be suggested that the farmers of this region will have to change their dietary habits in order to meet the required calories. The consumption of cereals and pulses should be reduced and the use of items like milk and milk products, oils, sugar, vegetables may be increased in the dietary system. Further, unless the purchasing power of the rural masses is increased, it will not be possible to increase the consumption of items like oils, milk and milk products.

EQUITABLE DISTRIBUTION—A POSSIBLE SOLUTION FOR INDIAN NUTRITIONAL PROBLEMS

S. Rajakutty, Shakuntala S. Desai and S. C. Bandyopadhyay†

The aim of the present paper is to concentrate on some of the issues as faced by India with a view to (a) understand the dimension of undernutrition and malnutrition in the country, (b) identify the main causes of malnutrition, (c) locate the specific economic groups mostly affected by the nutritional shortcomings and (d) throw some light on the possible solution to the problem. The concept of nutrition has changed over time with the shift in the focus from 'Protein Gap to Calorie Gap.' Recent scientific evidence has shown that only when the calorie intake is adequate and above the critical limit that the body can fully utilize the protein consumed. As estimated by Dandekar and Rath, one-third of the rural population and one-half of the urban population in India accounting for over 40 per cent of the Indian population, lived on inadequate diet in respect of calories. The main cause of under- and malnutrition in India is poverty and inequitable distribution of available food supplies and purchasing power among the population. The growth rate of demand for foodgrains in India is 4.1 per cent while the foodgrain production has registered an increase of more than ten per cent over the last five years ending 1975-76. Thus the problem of under- and malnutrition in India is more of distribution of food supplies and income. This has been further substantiated by the differences in the consumption patterns in different States and of socio-economic groups in the country. Another significant revelation that emerges from the analysis is the importance of foodgrains and cereals in particular in the Indian economy and in nutrition planning.

With favourable food supply situation at present in India, it is possible to provide for 600 gm. of foodgrains (2400 calories) per capita per day provided it is made available to the needy through more equal food and income distribution systems. This can be achieved by effective administrative measures in order to be able to distribute food supplies at a price the poor can afford and by evolving a growth strategy that would involve broad participation of the labour force in the growth process through labour intensive techniques of production. The programmes such as nutrition education, nutrition-related health activities and nutrition intervention which have a direct impact on the consumption habits, nutritional status and health of particular segments of the population need to be emphasized.

A STUDY OF THE LEVELS AND PATTERNS OF FOOD NUTRIENT CONSUMPTION (A CASE STUDY OF URBAN POPULATION)

H. S. Aulakh and G. S. Kainth*

The objectives of this study are (i) to examine the levels and patterns of consumption of different food nutrients by urban households in Amritsar City, and (ii) to examine the contribution of different types of factors affecting the levels of food nutrient consumption. The time reference of the study is 1976-77. In all, 75 households scattered in different pockets of the city and representing different

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strata were selected randomly. Data were collected with the help of a schedule. Information on different types of food consumed by the households in a year was obtained in physical units. From the physical quantities, the values of food nutrients such as calories, vitamin 'A', protein and iron were computed. The norms of conversion used was the one suggested by the Indian Council of Medical Research. In addition, the advice of food nutrition experts was also sought. The level of food nutrients reported in this study refers to raw food, while some of the food items are taken in cooked form. Some values of these nutrients get lost (in some cases, however, it is added also). This factor, however, was not taken into consideration in this study. The results of the study are as follows: (i) The levels of per capita daily consumption of calories, vitamin 'A', protein and iron were estimated at 2545, 3836, 76.53 and 51.93 units, respectively. The corresponding coefficient of variation was 23.55, 37.77, 20.47, and 22.03 per cent. Thus wide variation in the consumption of vitamin 'A' was observed as compared to the consumption of calories, protein and iron. (ii) As the size of per capita disposable income increases, the per capita daily consumption of calories and vitamin 'A' also increases. In general, a similar pattern was observed in respect of protein. No such clear-cut relation in respect of the consumption of iron nutrients was observed. (iii) The income elasticity of calories, vitamin 'A', protein and iron nutrients was estimated at 0.32, 0.30, 0.57 and 0.32, respectively. These positive income elasticities, though small in magnitude, are indeed very meaningful for policy purposes. (iv) The impact of education in the family was observed to be inversely related to the consumption of calories and vitamin 'A'. However, it was positively related to the consumption of protein and iron. (v) The size of family was positively related to the consumption of calories and iron, while it was negatively related to the consumption of vitamin 'A' and protein.

EXTENT OF UNDERNUTRITION AND FUTURE FOOD NEEDS IN WEST BENGAL

Ratan Ghosh*

One of the methods of estimation of incidence of poverty is based on the criterion of meeting man's need for total calorie. And the energy content of the diet expressed in terms of calories provides a uniform basis for measuring the quantity of food consumed. So, if the actual average intake of calories for a region is found to be lower than the corresponding requirements, we may conclude that food supplies are inadequate to meet the needs of the people and that part of the masses remain undernourished. In this paper an attempt has been made to estimate the extent of undernutrition in both the rural and urban areas of West Bengal. The future needs of food in West Bengal were also estimated in accordance with the pioneering works of P. V. Sukhatme (1961). Data from the Indian Council of Medical Research (Nutrition Expert Group) and the 25th (No. 250) and 26th (No. 258/3) Rounds of the National Sample Survey have been used for this purpose. Some of the limitations of the data base have also been mentioned. On an average, 57 per cent of the rural households and 46 per cent of the urban households are estimated to be undernourished in West Bengal for the year 1971-72. To improve the nutrition status of the people, the present production level in West Bengal has to be raised by 100 per cent for foodgrains and sugar, by 300 per cent for milk and by 500 per cent for fats and oils. Some suggestions regarding the improvement of present production level are given at the end.

LEVELS OF NUTRITION, EMPLOYMENT AND WAGES— A STUDY OF MINING LABOUR

G. Saibaba, P. Devasena Naidu and C. Devarajulu Naidu†

In this paper an attempt has been made to analyse the nutrition structure in terms of per capita calorie requirements of mining labour of Andhra Pradesh. For this purpose a case study has been conducted covering 19 mines during May-June, 1977. Out of these 19 mines, 61 households of mine labourers from three mining sectors of Andhra Pradesh, *i.e.*, coal, mica, manganese have been selected at random for this study. In analysing the nutrition structure an attempt has

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been made to identify the per capita calorie gap of mining labour in Andhra Pradesh. In examining the nutrition structure, the changes in wages and employment have also been taken into consideration and the relationship between these three variables have also been examined. Further, the factors contributing to the prevailing structure of wages, employment and nutrition have been examined in depth. The study also examined the differences in per capita calorie availability of different occupational groups of colliery workers. Further, the nutrition programmes implemented in the State during the Plan periods have been reviewed in the context of overall development strategy oriented to generate employment opportunities for the masses. An attempt has been made to examine the impact of the nutrition programmes in improving the levels of living of the mining labour. In improving the welfare and quality of the life of the miners, the role played by labour, management and State have been analysed. The calorie requirement, as recommended by the National Nutrition Advisory Committee of 1958, was taken as the basis to find out the per capita calorie gap. The per capita calorie availability has been derived from the actual quantities of food consumed by the mine labourers. Thus the results of this study should be valued accordingly.

The major conclusions of this study are as follows. Increasing employment opportunities coupled with higher wages resulted in favourable nutrition structure of coal mine labourers. Declining employment opportunities with minimum fluctuations with moderate wages and fast declining employment opportunities with low wages resulted in intermediate and low level of nutrition structure of mica and manganese mine labourers, respectively. The one single important factor that has contributed for wide variations in the per capita calorie availability of the three sections of the mining labour class is the size of the family. Small size of the family of coal mine labourers helped them to reach a high level of per capita calorie availability. Large size of the families resulted in a lower level of per capita calorie availability for mica and manganese labourers. The food habits of the labourers has a significant influence on the nutrition standards. In the case of manganese and mica workers it is true to a greater extent. These workers consume large quantities of dry fish, *ragi*, jowar and such other food articles which are generally believed to be consumed by socially inferior sections of the society. Whereas our analysis reveals that by consuming only these food items the mica and manganese workers were in a position to reach at least the present level of nutrition standards. In fact, all these food commodities contain more calories than the items consumed by coal mining workers. Even then the coal mine workers were not at all consuming any of these items. Further, it is found that the nature of management of the mining industry, the degree of trade unionism and the nature of the market for the products of the mines have also influenced the employment and wages of the mine labourers. In turn, all these factors greatly influenced the nutrition structure of the mining labour force. The coal mines are under the public sector management with a cent per cent domestic market and the labourers are highly organized. The mica and manganese mines are under the management of private entrepreneurs and are cent per cent export-oriented products; whereas the mica mine workers are partially organized, the manganese mine workers are highly unorganized.

IMPACT OF MODERN TECHNOLOGY ON INTAKE OF FOOD BY FARM FAMILIES IN EASTERN UTTAR PRADESH

R. I. Singh, V. Prasad, R. K. Singh and D. S. Singh*

The adoption of improved-seed-fertilizer-irrigation technology and multiple cropping has resulted in increased agricultural production and income of the farm families. These developments have led to changes in the intake of different types of food and a wide improvement in nutrition. An attempt has been made in this paper to examine the impact of new technology on the quantity and quality of intake of foods by a sample of 100 farmers in Sikrara block of Jaunpur district of Eastern Uttar Pradesh. The data pertain to the year 1976-77. Specifically, the paper examines the farm structure, cropping pattern, productivity of crops, total availability of foodgrains and vegetables, and actual consumption and surplus and compares the actual daily consumption per head with that of the recommended balanced diet for the progressive and less progressive farmers. The progressive farmers preferred to grow superior crops like paddy, wheat, maize, potato and other vegetables while the less progressive farmers put more area under jowar + *arhar* and pea, etc., due to poor resource availability. The productivity of crops and total production were higher on the progressive farms due to the adoption of modern technology. The higher productivity of crops and larger production enabled the progressive farmers to earn a surplus even after meeting their annual requirements. These farmers were also

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in a position to meet the requirements of vegetables and milk of their families by growing vegetables and maintaining good milch cattle. The less progressive farm families could hardly meet their foodgrain requirements due to the low productivity of different crops grown on their farms because of poor farm resources. They could not grow vegetables and maintain good milch cattle.

A comparison of the balanced diet recommended by the Indian Council of Medical Research for hard labour with the actual daily consumption per farm worker revealed that the consumption of foodgrains was 610 gm. for the progressive farm worker and 695 gm. for the less progressive farm worker against the recommended level of 650 gm. per day per worker. So far as the consumption of pulses is concerned, it was 60 gm. for the progressive and 50 gm. for the less progressive farm worker against the recommended level of 80 gm. The situation was similar for ghee and oils, sugar and *gur* and fruits, but the position was somewhat better for the progressive than the less progressive farm worker. The consumption of vegetables and milk was satisfactory for the progressive farm worker, while fruit consumption was below the recommended level. It may be concluded that the adoption of improved technology has resulted in higher food production, and brought about a surplus of foodgrains and vegetables over actual consumption. The production of pulses was found short of the requirements due to low productivity and allotment of small area under it. Farmers need nutritional education for balanced diets. Their diets may also be improved by the introduction of nutritive and protective crops in their crop rotations.

A STUDY OF PATTERN AND NATURE OF NUTRITION IN ADIVASIS OF WESTERN MAHARASHTRA

S. D. Suryawanshi and D. V. Kasar†

The paper seeks to examine the pattern and nature of nutrition in *adivasis* (Scheduled Tribes) of Western Maharashtra for identifying the extent of undernutrition and, as a result, malnutrition in their diet. Forty landless *adivasi* households were randomly selected from six villages, two each from Shahada and Nandurbar talukas of Dhule district and Kalwan taluka of Nasik district in Western Maharashtra for study. Data on income and expenditure pattern, food consumption of the selected *adivasi* households for the year 1976-77 were obtained by cost accounting method. Data were processed to estimate the actual consumption of different food items by the adult per day for comparison with the optimum dose of different food items recommended by the Indian Council of Medical Research (ICMR), New Delhi. The calorific values and protein contents of the food consumed by the *adivasis* were estimated and compared with their optimum requirements per adult per day for knowing the extent of undernutrition and malnutrition.

The study revealed that the overall situation of nutrition in the case of *adivasis* was pitiable. It is noted that 70.40 per cent of the total expenditure of the *adivasis* was on food. They spent, on an average, 73.30 per cent of their earnings on food consumption. While studying the pattern of nutrition, it is observed that cereals, sugar, jaggery, ghee and oils were the major items of food of the *adivasis* since these commodities alone provided 90 per cent of the total energy to the sample households. The consumption of pulses, vegetables, milk and milk products, meat, fish, eggs and fruits was found to be low as compared to the optimum requirements of balanced diet. The study also revealed that actual consumption of food by the sample *adivasis* was only 40.23 per cent of the recommended quantity of food for the balanced diet. The total calorie intake per adult per day was 1680 as compared to the optimum requirement of 3000 calories as suggested by the Nutrition Advisory Committee, ICMR, for moderate work. The per adult per day availability of proteins from different food items in the sample households was 51.68 gm. which is significantly low as compared to the optimum requirement of 70 gm. This has indicated the extent of undernutrition and, as a result, malnutrition in the selected *adivasis*. It is, therefore, suggested that suitable nutrition improvement programmes for the vulnerable sections of the society may form a part of the overall rural development strategy in the country.

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NUTRITION STATUS OF FARM FAMILIES IN PARBHANI DISTRICT
(MAHARASHTRA)—A CASE STUDY

B. W. Ashturkar and C. D. Deole*

As more emphasis is being given to increase the nutrition status of rural masses in the country, an attempt has been made to study the present nutrition status in a village from Parbhani district of Maharashtra State. A sample of 40 farm families, ten each from four income groups (up to Rs. 2,500, Rs. 2,500 to Rs. 3,000, Rs. 3,000 to Rs. 3,500 and Rs. 3,500 and above) was drawn to examine their nutrition status. A survey was conducted during the period from 15th June to 15th July, 1977. Per day consumption of food by adults and children has been ascertained. The physical quantities of different food items have been converted into calories. A comparison has been made between actual quantities consumed and energy gained in terms of calories with that recommended by the Indian Council of Medical Research. Further, the annual expenditure incurred per family on food has been calculated and related to the expenditure required to take the standard diet and actual annual income, respectively. The study revealed that on an average the rural family comprises 6.7 persons consisting of 3.4 adults between the age of 15 to 60 years and 3.3 children between the age of 7 to 15 years. Other family members have not been taken into account in the present study. The consumption of all food ingredients is less than 50 per cent of the recommended quantities, except cereals which are more than the recommended quantities. Among the different cereals, jowar constitutes more than 80 per cent of the total. The diet of the children consists of more pulses, fruits, oil and fats than that of adults. The consumption of food items rich in nutritive value such as eggs, meat, milk, oil and fats is much less (below 25 per cent of the recommended quantity). The calories gained through these foods come to 2161 and 1219 for an adult and a child, respectively, as against the recommended calories of 3328 and 1981 per day. The annual expenditure incurred by a family on food items varied between 35 and 45 per cent of the expenditure required for standard diet which gives the recommended quantities of calories. The income groups up to Rs. 3,000 per annum spent more than 80 per cent of their total annual income on food items, while the remaining groups spent 60 to 63 per cent of their annual incomes. The survey shows that unless and until the annual income of farm families increases, it will not be possible for them to take the food of required quantity and quality.

NUTRITIVE VALUE AND COST OF RURAL DIET IN WESTERN MAHARASHTRA

R. G. Patil and S. D. Suryawanshi†

The main objectives of this paper were (i) to study the quantitative dietary content of rural population in different categories of people in Western Maharashtra and to compare it with the recommended norms of balanced diet, (ii) to study the calorific value and protein content of the diets and (iii) to work out the cost of the diet of these rural people. Data on food consumption of rural families were collected by cost accounting method for one complete year of 1975-76. The region selected for the study was Western Maharashtra comprising Pune, Solapur and Ahmednagar districts. The sampling design adopted was three-stage stratified random sampling with tahsil as primary unit, village as a secondary unit and farmer/or agricultural labourer as an ultimate unit. Each district was divided into developed and under-developed zone, based on percentage irrigated area, cash crops grown and development of infrastructure. In all, 180 families, 90 from each zone, were selected. Of these 90 families from each zone, 30 were agricultural labourers and 60 were farmers. The farmers were further sub-divided into four size-groups, viz., small (upto 2.00 hectares), semi-medium (2.01 to 4.00 hectares), medium (4.01 to 10.00 hectares) and large (10.01 hectares and above). The family members in these size-groups were converted into adult units by adopting adult consumption coefficient. The food consumption data were then processed on the basis of consumption per adult per day. In all, 97 foodstuffs consumed were grouped into eight main categories such as (i) cereals, (ii) pulses, (iii) vegetables, (iv) ghee and oil, (v) milk and milk products, (vi) sugar and jaggery, (vii) meat, eggs and fish and (viii) fruits. The calorific value and protein content of the foodstuffs consumed for each class of families were calculated. The physical quantities of foodstuffs consumed were also converted into money values, using prevailing prices so as to arrive at the cost of diet.

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The average size of family (5.776 adult units) in the developed region was insignificantly bigger than that in the under-developed region (5.707 adult units). Amongst the different items of food consumed by the rural families, the consumption of all foodstuffs except cereals was far below the recommended norms in both the developed and the under-developed region. The consumption of cereals by the landless agricultural labourers, small and semi-medium farmers increased from 429 gm. to 499 gm. per adult per day in the developed region and from 438 gm. to 487 gm. in the under-developed region. This trend was found declining in the medium and large farmer categories in both the regions. In the case of all other food items, per adult per day consumption was found to increase as the size of holding increased in both the regions but did not reach up to the level of the recommended norms of balanced diet with the exception of pulses. The consumption of food items like meat, eggs, fish and fruits was extremely low. Thus the diet of the rural people was not only inadequate but ill-balanced.

The average per caput caloric intake of the sample families was less by 271 calories in the developed region and by 369 calories in the under-developed region, as against 2800 calories required. The caloric intake of the agricultural labourers and small farmers in both the regions was far below the standards of recommended food energy requirements. The average protein content in the diet of the sample families was 67.02 gm. and 63.39 gm. per adult per day for the developed and the under-developed region, respectively. Comparing these levels with the recommended norm of 70 gm. per day, the protein intake of the sample families was less by 2.8 gm. in the developed region and by 6.61 gm. in the under-developed region. Nearly 72 per cent of the total protein intake was from cereals. The protein intake of the agricultural labourers and small farmers in the developed region and agricultural labourers, small and semi-medium farmers in the under-developed region was very low as compared with the recommended protein requirement. The average food cost per adult per day was Rs. 1.92 and Rs. 1.65 in the developed and under-developed region, respectively. The food cost was below these averages in respect of small farmers and agricultural labourers in both the regions. Unless the income of these families is raised there is very little hope of improvement in their diets.

STATE OF NUTRITION OF AGRICULTURAL LABOURERS— A CASE STUDY OF A VILLAGE IN WEST BENGAL

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The study aims at examining the changes in the state of nutrition of agricultural labour families in a village in the district of Birbhum in West Bengal during the last 17 years from 1960 to 1977. Data for the study have been drawn from socio-economic surveys of the village Dakshin Sija conducted by the Agro-Economic Research Centre, Visva-Bharati in 1960 and in 1967. Data for 1977 are collected by the authors themselves. All the three surveys are conducted during the months of May and June. Of the total number of families pursuing agricultural labour as their major source of income, a set of 21 households found to be common in all the three surveys are taken for the present purpose of studying the change in the level of their nutrition. The estimation of caloric and protein contents of the diet as well as the requirements has been done according to recent recommendations of FAO/WHO (1971). However to avoid controversy on the measurement of undernourishment, estimates of caloric and protein intake are made both on per capita and per consumer unit basis. The analysis of the average daily per capita intake of different food items reveals that the level of consumption of almost all the items which was quite low in 1960 improved somewhat in 1967 while in 1977 it declined drastically. Expressed in terms of calories and nutrients, the mean daily per capita caloric intake was found to be 1867 in 1960, 1886 in 1967 and as low as 1182 in 1977, while the mean daily per capita protein intake was 37 grams in 1960, 43 grams in 1967 and only 25 grams in 1977. Taking the minimum daily per capita requirement at 2100 calories and 42 grams of protein, the mean deficiency in caloric intake was of the order of 19 per cent in 1960, 11 per cent in 1967 and as high as 44 per cent in 1977, while the mean protein deficiency was 12 per cent in 1960 and 41 per cent in 1977. In 1967 the mean protein intake was just sufficient to meet the average requirement. Calculations on the basis of minimum requirements reveal further that about 76 per cent in 1960, 67 per cent in 1967 and cent per cent of the families in 1977 were deficient in caloric. Further, 57 per cent of the families in 1960 and 90 per cent of the families in 1977 remained deficient in proteins. A study of the relation of income levels of households with the level of nutrition shows that households belonging to the lower income groups were more deficient in proteins than in calories and as one moved up the income classes the percentage of caloric deficient households decreased more rapidly than the protein deficient ones. In 1977, however, the highest income earners among agricultural labourers also remained underfed both in calories and proteins. A search for the fac-

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tors affecting the level of nutrition brings out that the fall in the level of nutrition of agricultural labourers was neither due to an increase in the size of family nor due to an increase in the load of dependants per earner in the family. The drastic decline in the level of nutrition of agricultural labourers appeared to be due mainly to the fact that their level of earnings fell much below the price level of food articles.

IMPACT OF NEW TECHNOLOGY ON THE AVAILABILITY OF CALORIE AND PROTEIN FROM FOODGRAINS

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Protein-calorie malnutrition is the major nutritional problem faced by the developing countries and India is no exception. As cereals and pulses are the direct and low cost sources of protein and calorie, the increase in the production of these foodstuffs is of paramount importance in these countries. With the advent of new technology Indian agriculture experienced a number of changes in the cropping pattern as also production pattern during the last decade. This, in turn, has affected the overall availability of calorie and protein from foodgrains. Two trienniums covering the period of last decade, one from 1963-64 to 1965-66 representing the period before the new technology and the second from 1973-74 to 1975-76 representing the period of new technology were chosen with a view to examining such changes. A number of changes took place both in respect of crop pattern and production pattern during the period under review. The overall increase in the production of foodgrains helped to increase the supply of calorie and protein. However, what is more important is the changing crop pattern in favour of cereals from pulses and in favour of wheat, maize and rice (in that order of importance) within the cereal group which increased the total availability of calorie and protein. The growth in overall productivity also substantially contributed in increasing the total availability of calorie and protein. The per capita availability of both calorie and protein increased by 8 to 10 per cent. The increase in the availability of calorie can be considered quite satisfactory. The same cannot, however, be said about protein. Thus the need to direct the changes in the crop pattern in the following two ways must receive proper attention by the policy-makers: (i) in favour of those crops which have a relatively high yield potential and (ii) in favour of pulses, though of course after evolving suitable high-yielding varieties of pulses.

NUTRITION—ECONOMIC ANALYSIS WITH SPECIAL REFERENCE TO MADHYA PRADESH

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In this paper an attempt has been made to analyse the National Sample Survey (NSS) data in respect of Madhya Pradesh and to quantify the nutritional problem in the State. The NSS Report [(26th Round, June, 1971-June, 1972) (No. 258/2)] of the National Sample Survey Organisation, Government of India, New Delhi on "Calorie and Protein Content of Food Items Consumed Per Diem Per Consumer Unit" is the main source of information for this paper. Five food groups which have been considered are: I. Cereals, potato, sugar, jaggery and cereal substitutes, II. Pulses, nuts and seeds, III. Milk and milk products, meat, egg and fish, IV. Edible oils, V. Fruits, vegetables, spices and prepared food. Ten per capita monthly expenditure classes have been taken into consideration and the percentage of calorie from each food group has been indicated along with average intake of calorie and protein per diem per person for rural as well as urban population. The paper identifies the cereal/pulse based diet of the population. It supports the observations made by P. V. Sukhatme that "What cereal/pulse based diets lack is energy food which would enable active utilization of protein people do eat." Calorie/protein norms have been worked out for urban and rural population. The urban norm for moderate work comes to 2500 calories and the rural norm comes to 3000 calories. Protein (in gm.) norm remains as 75 for both

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the rural and urban population. Taking these norms as nutritional level, the study reveals that about 70 per cent of the rural population and about 65 per cent of the urban population are below the norm in regard to calorie intake. As regards protein intake, the picture emerged is a different one. About 24 per cent of the rural population and about 81 per cent of the urban population are below the protein norm. These facts reveal the existence of non-monetized sector in the rural areas due to which the rural poor has an edge and the urban poor has to suffer as he has to pay money for every purchase. The main sources of protein for the rural poor are pulses, nuts and seeds. Another factor which influences the magnitude of the problem is the demand for items under food groups III, IV and V which consist of milk and milk products, meat, egg and fish, oils, vegetables, etc.

Infant mortality rates have been given for the years 1970, 1971 and 1972 to specify the areas of the problem. In the rural area, the infant mortality rate (per thousand live births) is 141.5, 141.3 and 164.9 for the years 1970, 1971 and 1972, respectively. (The source is Registrar General, Government of India.) For the urban area, the infant mortality rate is available for 1970 and 1971 only, which is 106.0 and 75.6, respectively. (These data are based on Sample Registration Survey.) It may be observed that the incidence of infant mortality is high in the rural areas, which can be attributed to causes like undernutrition, non-availability of medical care and unhygienic conditions prevailing in the rural areas. Amongst all the various causes, the one which appears to cause concern is lack of balanced diet and nutritional food available to pregnant and lactating mothers. Thus schemes of nutrition should give highest priority for the supply of nutritional food to mothers and children, who constitute the most vulnerable section of the population.