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ORISSA ECONOMICS ASSOCIATION

BHUBANESWAR

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THE QUIRK OF THE JAPANESE MODEL OF MIRACULOUS DEVELOPMENT

P. R. Brahmananda

"Golden lads and girls all must
Like Chimney sweeps come to dust"

—Shakespeare

Japan's economic experience during the period 1887 to 1915 and from 1950 to 1973 and implicitly to the current time is considered by many to be akin to two miracles in economic growth.

The first period which saw Japan getting out of the status of a poor, less developed economy, was characterised by a net savings ratio of between 8-10 per cent, a rather low population growth-rate of about 1 per cent per annum, a low and near constant capital-output ratio of around 2 : 1 a less than half per cent growth-rate in supply of land, no substantial rise in real wage rate per labour, though annual labour earnings went up at 2% plus, a rather low falling tendency in the real rate of interest, a sustained high rate of growth of 3-4 per cent in commodity output and between 2-3 per cent growth in per capita commodity output, and an amazingly substantial rate of rise in the volume of trade both of imports and exports.

The second period, even if we take it up to the current times, which has seen Japan emerge as the second economic super power in the world, is characterised by a sustained net savings ratio of about 3.5%+, an intrinsically constant (though recently disturbed by deterioration in terms of trade) capital-output ratio of about 3.5%, a population and labour force growth-rate of 1%, an average annual growth-rate in output of between 9-10 per cent (though recently it has come down to less than 3 per cent), and an amazingly high rate of growth of trade. What theoretical model, or sets of models can explain Japan's economic performance ?

In both the periods, urbanisation and labour-employment in manufacturing have expanded very significantly. Apparently the capital formation rates in both the periods as a ratio of stock capital have been much higher, in the second period very much higher, than population growth-rate. Since capital-output ratios have been steady within each period, but major shifts in employment and production patterns have taken place, industrial growth rate being higher than agricultural growth-rate, and population growth-rate has been low, one has to postulate some reserve of excess labour manpower and all along. In both the periods (in the second period till the early seventies), agricultural output growth and wage-goods supply have expanded at an annual rate of between $2\frac{1}{2}$ and 4 per cent. Does it not follow from this that the Lewis model of unlimited labour reserve *per se* cannot explain growth ? The real wage gaps are not large; the productivity gap widens but agricultural productivity too has grown. Trade certainly helped but because of the pressure it induced to keep down costs. The Nurksian hypothesis of low or zero marginal productivity of labour in agriculture as an initial condition here has been disputed since according to the neo-classical writers, the theory may not sanction this. Such theory has to postulate inefficient conditions initially. This is not tenable. Nor can we depend upon demand-boost factors. Japan's growth has been a supply induced phenomenon. Since Japan has been using primarily technologies tried and invented elsewhere, one may not take recourse to the shock of successive innovations as an explanatory factor. Technical dynamism of Kaldor which depends upon high investment rates inducing shifts in productivity curves does not certainly explain the first miracle. Joan Robinson emphasises sustained animal spirits, high degree of monopoly etc. but they do not account for Japan's growth process. An open, competitive economy has to keep prices low; demand deficiency or demand volatility has not been important in Japan. During the first period, the savings ratio were low and one cannot take recourse to the hypothesis of Rostow about 'take-off' beginning at 12%.

The central fact is that in both periods capital-output ratios have been constant and labour productivity has risen significantly. Certainly a low population growth-rate in a context of rapid output growth connotes that Malthusian supply conditions did *not* obtain. It follows that the leakage out of potential savings into sheer demographic investments could be minimal, thus enabling the bulk of investible resources to be ploughed in favour of directly output-yielding, viable schemes. The absence of

continuing excess population pressure in a direct form supports the application of the hypothesis that an actual and potential low population growth-rate tends to keep the course of the capital-output ratio at a lower and steady path. It makes Government intervention for social subsistence and outlays on economic and social overheads less important, thus releasing investible funds for other uses. That a low population growth, taken along with a rate of growth of wage-goods supply substantially higher than the population growth-rate, enables a larger extent of release of labour from agricultural and other occupations, and also tends to keep the profit-rate higher is the hypothesis flowing from Vakil & Brahmananda *(Planning for an Expanding Economy, 1956)*. This hypothesis is contrary to that of Ragnar Nurkse who argued that a large population and a high population growth-rate could be an asset provided organisational forces are forthcoming. Vakil and Brahmananda argued in that book that population relief can lead to larger output by making the consumption-income multiplier higher.

Another factor which has to be noted is the impact of agricultural and wage-goods supply proceeding at a higher rate than the (low) population growth-rate; an improvement in the aggregate availability of essential consumption goods and of the annual fund thereof, according to the above authors, creates an essential condition for transfer of labour from agriculture and other occupations to other sectors. The Vakil-Brahmananda model does not depend upon the neo-classical principle of marginal productivity. The wage-rate is fixed from institutional or rather conventional conditions. The model postulates a rise in the aggregate supply of wage-goods and in its rate of growth as a necessary condition for the drawal of labour. This condition seems to have been fulfilled in Japan both during the first and the second period, during the phase from 1950 to 1970. A growth-rate in wage-goods supply of 3 per cent plus cannot but lead to a growth-rate in general out-put of certainly more than 4 per cent. Because of the consumption-income multiplier. If the value of the multiplier goes up or is higher, as must have been the case in the post-Second World War Japan, the resulting growth-rate will be higher and the savings rate too will move up significantly.

There is a tendency to explain the Japanese growth in terms of labour-augmenting technical progress (A. C.) Kelley and J. J. Williamson,

Lessons from Japanese Development, Chicago, 1974). Technical progress, and of a particular sort, is made the linchpin of development. But then there is no reason to believe that this is the case with Japan. If we assume that an economy like that of Japan was confronted with unlimited possibility of applications of capital, and the gap was primarily a *capital gap* with techniques known, the problem becomes one of obtaining actual and efficient labour supplies proceeding at a rate at which capital formation is growing. A low population growth rate keeps down the need for a high growth rate of consumption goods supply whose production may face a low bottleneck at some stage.

This is where I think the Vakil-Brahmananda model may be useful in interpreting Japan's miracle. * The Vakil-Brahmananda model argues for efficient consumption-goods production not for inefficient, high labour-absorbing techniques therein. The Japanese case satisfies this. The model requires to be modified in the second period by noting that what is required is not simply a high rate of wage goods supply taken in conjunction with the conventional wage-rate, and the existence of surplus labour concealed in previous agricultural and other forms, but of bringing in some measure of over all organisational improvement, specialisation, and even mechanisation shocks on a continuing basis so as to release labour. I think this is exactly what has been successfully accomplished in post-War Japan. The Adam Smithian economies, particularly in labour, through unlimited scope for division of labour, have been continuously exploited; the adoption of modern management methods and the separation of management from ownership, and existence of accommodative trade unionism, has helped to continuously release more and more of labour. ★ The phenomenal growth-rates in capital of more than 7-8 per cent per annum have been corresponded by corresponding labour supply primarily through economies made by division of labour, managerial efficiency and measure of mechanisation and computerization. Without recourse to high population growth-rate, the

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* Professor Lockwood in a kind note on 'Planning for an Inefficient Expanding Economy had hinted that the model therein may be helpful in interpreting the Japanese experience.

★ See P. R. Brahmananda : Productivity in the Indian Economy : Rising Input for Falling Output, 1983.

Japanese have obtained from within their system enormous labour reserves. The higher level of capital-output ratio in the second period, as compared to the first, explains the impact of a shift to a higher order of mechanisation.

Another factor which may be noted is that in the pattern of overall expenditure in Japan, a low portion is with respect to infra-structure-intensive and high capital-output ratio items This is partly because Japan saves a good deal on transport, power, fuel, etc. by importing materials and transforming them into finished goods, and exporting them. There is considerable infra-structure-economy involved here, but at the same time, it has the defect of giving to Japan a lower share in the overall value of the products than otherwise. The Japanese economists seem to be aware of this problem. To the extent that more and more infra-structure has to be built within Japan, low capital-output ratio situation may not tend to obtain.

It has been remarked that Japan gets 'D' and the U. S. A. spends on 'R'. How long will the situation go on? To the extent that Japan itself will have to generate its own technical progress, will its capital-output ratio remain low ? What about the risks in investment ? These questions also have to be answered.

A steep fall in the terms of trade since 1973 has not affected the savings rate in Japan, but has severely reduced the growth-rate. If the situation continues, Japan's growth-rate will be tied to that of the U S. A., i. e., close to 3-4 percent. If the terms of trade deteriorates still further, the annual growth-rate will further be brought down. In all possibility, the Japanese comparative advantage in many products may not remain for long. The materials now exported to Japan will be increasingly used in the currently exporting countries themselves. If the Japanese growth-rate comes down as a result, what will be the alternative to Japan ?

One presumes that the future of continued economic growth in Japan, even at a rate of between 3-4 percent, will require tremendous and continuing innovational efforts. To what extent can the mixture of feudalism and capitalism, without intervention of economic planning, enable Japan to face these challenges ? What will be the effects of growing defence expenditures on the availability of resources for productive growth ? What will be the effects of robotization on employment ? Can

Japan weather the high and rising ratios of unemployment to labour force implicit in the present process ? What will be the psychological effects of macro-upsets and failures on the economy's and on the peoples' morale ?

These are very difficult questions which have to be faced at some stage. One thing seems to be clear. Whereas to some extent the classical theory of development, as modified by the Vakil-Brahmananda model explains a great deal of Japan's past, there is an important factor of a possible convergence of much lower and lower growth-rate to a stationary state, whose implications for Japan have yet to be studied.

Between 1973 and 1981, the fall in the terms of trade has more than trebled the ICOR with its consequent downward effect on the rate of profit. Japan has just recovered from these shocks, but if further shocks of one form or the other emerges, cannot the prospects of a stationary state emerge ? Will the 1 percent growth-rate of population be too high for Japan in that context ? Will she also have to plan for a stationary population state ?

The trade-oriented development path was perhaps the only path of development for Japan till now. But then cannot Japan gradually export capital to say other Asian countries, and obtain its needed imports for consumption-maintenance through servicing inflows ? Just imagine that the bulk of Japanese capital is placed somewhere in India; the cost of production will be lower, the rate of profit in India would be comparatively higher and it would be possible for Japan through moderate repatriations to obtain all its needs from the world.

My another humble judgment is that it is only by a physical relocation of the direction of investment that the Japanese people may maintain their high affluence and in the process help other countries to benefit substantially. There is no reason why the great factories and businesses should be located in Japan. It is a tribute to the Japanese that they have so far led in world trade despite importing most of their materials from far off countries. But then, it is admitted that optimal efficient locations from world's angle would have to be otherwise. I do not know whether an international point of view prevails in Japan but I think it is time its implications are understood. Japan's paradox is that in commodities it is outward-looking but in approaches it is inward-looking. If Japan does not plan for integrating its capital and technology with relatively resource-richer large countries like India it will perhaps face the same fate as U. K. today.

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DECELERATION OF RATES OF AGRICULTURAL GROWTH IN ORISSA: Trends and Explanatory Factors

Baidyanath Misra

INTRODUCTION

Agriculture is the main occupation in Orissa. To a considerable extent agriculture in Orissa means the growing of paddy which occupies an area of 43.72 lakh hectares constituting about 65 per cent of the total area under food crops. The other major food crops are pulses, ragi, small millets and wheat. The area under wheat has increased from 14,000 hectares in 1969-70 to 61,500 hectares in 1978-79. This shows the increasing interest of the cultivators in wheat cultivation. The area under all food grain crops has increased from 57.7 lakh hectares in 1969-70 to 66.80 lakh hectares in 1978-79 whereas the area under rice during this period has decreased from 44.1 lakh hectares to 43.7 lakh hectares.

The Orissa's economy is heavily dependent on rice production, but the production has not shown any appreciable rising trend. The production has been constant over the last decade. The yield rate of paddy has remained stagnant at about 900 Kg. per hectare during sixties and seventies while the all India average has moved up from 1000 Kg to 1130 Kg. It seems the new rice technology has not produced much impact in Orissa. Only the summer rice has shown some improvement due to increase in area under irrigation and high yielding varieties. But its effect on overall rice production is not significant as only about 3 to 4 per cent of the net area sown in the State and 5 per cent of total production are contributed by summer rice. The area under irrigation constitutes at present about 20 per cent of the total cropped area in the State. Taking all the three seasons of rice i.e. Autumn, Winter and Summer either separately or in combination the performance does not seem to be encouraging when compared with the All India average.

Dr. B. Misra, Vice-Chancellor, OUAT, Bhubaneswar.

The possible reasons for stagnation or slow growth rate of food grains and non-food grains may be either biophysical constraints (i. e. lack of improved seeds and other inputs, inefficient cultural practices, deteriorating soils, weeds, diseases and insects etc.) or socio economic constraints (i.e. lack of knowledge, non-availability of inputs, inadequate marketing and credit facilities, lack of profitability, tradition, risk aversion etc.) which explain the reasons why farming has not been modernised in Orissa.

An attempt has been made in this paper to throw light on the growth rate of area and production of rice separately for Autumn, Winter Summer and for food grains and non-food grains from the year 1969-70 to 1980-81. The results have been explained through the above explanatory variables, i. e. biophysical and socio-economic. Such analysis may help to identify the most limiting factors in improving the crop yields on farmer's fields. Thus if the precise constraints operating in different areas are identified, the gaps between the potential yield in research farm and realised yield in demonstration plots and gap between the latter and the actual yield in farmer's fields can be reduced.

The objectives of this paper are therefore;

(i) to analyse the growth rate of area and production of rice separately for Autumn, Winter and Summer rice,

(ii) to analyse the growth in area and production of food grains and non-food grains and

(iii) to find out the constraints which limit the growth of area and production of rice, the major crop of Orissa.

METHODOLOGY

Data have been collected on production, yield rate, area of Autumn rice, Winter rice and Summer rice from secondary sources along with relevant data on soils, irrigation, high yielding varieties, fertiliser, rainfall and type of sowing.

STATISTICAL ANALYSIS

(i) The growth rate of area and yield of Autumn rice, Winter rice and Summer rice has been esimated using the functional form as below :

$Y = ab^{x}$

Where, Y = yield

a = constant

b = regression coefficient

X = time

The growth rate is obtained by deducting b, from 1. Using the same function, growth rates of food grain and non-food grain have been estimated.

(ii) The growth rate of rice for the period from 1969-70 to 1980-81 has been explained by independent variables such as, area, rainfall, yield rate due to irrigation, yield rate due to fertiliser and yield rate due to high yielding varieties.

The functional form used to explain the impact of these variables is the liner function as given below :

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5$$

Where Y = yield rate per hectare

x_1 = Average rainfall of the crop season i.e. from June to October of the year.

x_2 = yield rate due to application of fertiliser

x_3 = yield rate due to irrigation

x_4 = yield rate due to high yielding varieties.

x_5 = area under crop

Anova table of the result due to application of above function has been prepared.

LIMITATIONS

The result of the above function is to be interpreted with the limitations that only important variables such as rainfall, area, irrigation, fertiliser and high yielding varieties have been taken into account while other variables which are less important have not been taken into account though each has some influence over the function.

RESULTS AND DISCUSSION

Trend of Yield Rate of Rice (Autumn and Winter)

The yield rate of autumn rice varies from that of winter rice over the years from 1969-70 to 1981-82. The yield rates along with their indices are given in tables separately along with the growth functions.

Table—I

Area, average yield rate and total production of Autumn Rice in Orissa (1970-71— 1981-82)

Year	Area in '000 ha	Yield rate Q/ha.	Index	Production (cleaned rice) in 000 M.T
1970-71	627	8.47	102.34	339
1971-72	847	8.64	104.39	476
1972-73	769	7.72	93.27	386
1973-74	845	8.96	108.26	492
1974-75	697	5.47	66.09	248
1975-76	758	8.93	107.89	440
1976-77	778	6.74	81.43	341
1977-78	839	10.76	130.00	596
1978-79	914	10.45	126.26	630
1979-80	879	4.69	56.67	272
1980.81	865	9.10	109.95	519
1981-82	928	12.12	122.27	620

Table—I indicates that there is absence of a clear cut trend in area, yield rate and production of autumn rice over the period from 1970-71 to 1981-82. The trend in yield rate per hectare is following a path of fluctuations but in general the trend is found to be rising. Yield rate varies from about 5 quintals per hectare to 12 quintals. To find out the growth rate of area and the production over the period the function has been applied in the form of $Y = ab^x$ and the resulting functions have become as follows :

(i) Growth of area $= A = 727.9 \times 1.023^t$

Where A = Area

a = 727.9

b = 1.023

Growth, 1 b = 1 — 1.023 = 0.023

The growth of area is positive. But the regression coefficient is found to be not significant.

(ii) Growth of yield $Y = 345.1 \times 1.023$

Where Y = yield

$a = 345.1$

$b = 1.023$

Growth, $1 - b = 1 - 1.023 = 0.023$

The growth of Autumn rice is found to be positive but not found to be significant,

Table—2

Area, Average Yield rate and Production of Winter Rice in Orissa (1970-71 to 1981-82)

Year	Area in 000 hectares	Index Number	Yield rate Q/ha	Index Number	Production (cleaned rice) in 000 M. T.
1970-71	3709	102.34	15.06	108.48	3574
1971-72	3637	104.39	12.26	88.31	2900
1972-73	3524	93.27	14.62	105.31	3349
1973-74	3725	108.26	15.28	110.06	3699
1974-75	3579	66.09	11.69	84.20	2719
1975-76	3746	107.89	15.75	113.45	2834
1976-77	3429	81.43	11.74	84.56	2616
1977-78	3377	130.00	15.50	111.56	3454
1978-79	3293	126.26	16.38	117.98	3559
1979-80	3095	56.67	12.06	86.87	2462
1980-81	3154	109.95	16.87	121.51	3512
1981-82	3094	122.27	14.90	107.32	3043

The trend of area and production of Winter rice does not show any distinct picture as index numbers show that the area and production are subject of fluctuations. To find out whether there is any clear cut growth trend, data on area and yield over the years have been fitted to the function, $Y = ab^x$ and the resulting functions for Winter rice are :

(iii) $A = 3855 \times 0.9828\ t$

Where A = Area under rice

$a = 3855$

$b = 0.9828$

Growih, $1 - b = 1 - 0.9828 = 0.0172$

The b coefficient is 0.9828 which is found to be not significant. It means there is not significant growth trend of area under rice though the regression co-efficient is positive.

(iv) Growth trend of Production :

$Y = 3319 \times 0.9936^{t}$

where y = production

a = 3319

b = 0.9936

growth, $1 - b = 1 - 0.9936 = 0.0064$

The function interpretes that the growth trend of production of winter rice is positive but not significant over the years.

Table—3

Area, Average Yield rate and Production of Summer Rice in Orissa (1970-71 to 1980-81)

Year	Area in 000 hectares	Yield rate Q/ha.	Production of cleaned rice (in 000 M. T. tons)
1969-70	117	11.59	137
1970-71	135	13.86	187
1971-72	162	15.03	244
1972-73	183	13.57	248
1973-74	164	13.00	213
1974-75	156	12.75	199
1975-76	180	14.31	258
1976-77	173	15.11	261
1977-78	189	14.05	269
1978-79	165	12.90	213
1979-80	143	12.89	184
1980-81	172	15.72	270

The table above shows the area, yield rate and production of summer rice in Orissa. An attempt has been made to find out whether there is any trend in increase in production, yield rate and area under rice over the period from 1969-70 to 1980-81. Fitting the statistical function in the form $Y = abX$ to the relevant data, the resulting functions are :

(v) Area, $= A = 144614.72 \times 1.0186^{t}$

where A = Area

a = 144614

b = 1.0186

Growth = 1 − b = 1 − 1.0186 = 0.0186

As per the result of the function, the growth trend of area under summer rice is positive but not significant as the regression co-efficient is not significant.

(vi) Yield, $Y = 184155.63 \times 1.0186$

where y = yield

a = 184155.63

b = 1.0186

growth, = 1 − b = 1 − 1.0186 = 0.0186

The resulting function shows that the growth of production is positive but not significant.

After discussing separately the growth of area and production of autumn rice, winter rice and summer rice, an attempt is made to find out the growth of area and production of total rice.

Table—4

Area, average yield rate and total production of Rice (Total) in Orissa (1970-71— 1980-81)

Year	Area in 000 ha.	Yield Q/h	Production (cleaned rice in 000 M. T. tons)
1969-70	4406	9.02	3976
1970-71	4471	9.17	4100
1971-72	4646	7.79	3620
1972-73	4476	8.90	3983
1973-74	4734	9.30	4400
1974-75	4432	7.14	3166
1975-76	4684	9.67	4532
1976-77	4380	7.35	3218
1977-78	4405	9.81	4219
1978-79	4372	10.07	4402
1979-80	4117	7.09	2918
1980-81	4191	10.26	4301

The table No. 4 shows the picture on area, yield rate and production of total rice over the period from 1969-70 to 1980-81. As seen in the table No. 4 the total rice does not show any clear growth trend with regard to area, yield and production. The production of rice is subject to fluctuations from year to year. To ascertain the growth, the functional form $Y = ab^x$ has been fitted to the above data and the resulting functions for area and production are as follows :

(vii) $A = 912000 \times 1.047\ t$

where A = Area

a = 912000

b = 1.047 t

growth, $1 - b = 1 - 1.047 = 0.47$

As per the resulting function the growth of area is positive but found to be not significant.

(viii) Yield $Yt = 3948553.2 \times 1.00349\ t$

where y = yield

a = 3948553.2

b = 1.00349

growth, $1 - b.1 = 1 - 1.00349 = 0.00349$

As per the resulting function, the growth of production is found to be positive but not significant. All the above analysis indicates that over the period of one decade from 1969-70 to 1980-81, the growth rates of area and production of all varieties of rice i. e. autumn, winter and summer and of total rice are not significantly positive. The statistical analysis does not bring about any firm conclusion regarding positive growth rate of area and production of rice, the major crop of the State. The yield rate has remained stagnant for more than a decade. The problem has been studied by different economists at different times. Despite the introduction of different technical programmes to obtain a breakthrough in rice production, the expectation has not yet been realised. The field workers have not been able to transfer the known technology to the farmers in a systematic manner. The time has come to find out the constraints in rice production and to seek possible solutions.

The constraints limiting a breakthrough in rice production are the pattern of rain-fall distribution, extent of irrigation and water management,

use of fertilizers and high yielding variety, etc. In order to ascertain whether and to what extent these variables are responsible for the present growth of production of rice, a linear multiple regression function has been fitted to the data relating to the period from 1969-70 to 1979-80. The linear regression function is as per the following :

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5$$

Where, y = yield rate of rice per hectare

x_1 = Average rainfall of the cropped season

x_2 = Yield rate due to application of fertilizer.

x_3 = Yield rate due to irrigation

x_4 = Yield rate due to high yielding variety

x_5 = Area under crop

The resulting function is

$$Y = -3461.45 + 0.017x_1 + 203.26x_2 + 1.59x_3 + 27.25x_4 + 9.02x_5$$

$$R^2 = 0.99$$

ANOVA TABLE

Source of variation	d. F.	S. S.	M. S.	F
S. S. due to regression	5	2192797.50	438559.50	97.7896
Error	4	17938.89	4484.723	
Total	9	2210736.4		

Regression coefficients	b_1	b_2	b_3	b_4	b_5
S. E	0.65	21.12	23 56	18.75	0.15
	N.S.	X.	N.S.	N.S.	X
t	0.025	9.622	0.067	1.45	5.95

N. S. = Not significant

X = Significant at 1% level of probability

As per the result of the above function fertiliser and area under crop have significant contribution towards the growth of rice production. Irrigation and high yielding varieties have positive impact on growth but

not significant. The regression coefficient for rainfall is found to be negative and not significant implying that not the amount of rainfall but the pattern of distribution of rainfall is more relevant to growth of rice production. The distribution of rainfall can be seen in appendix table No. I. The annual average rainfall of the State is about 1482 mm, falling within about 75 days. More than 76% of annual rainfall is received during June to September. The distribution of rainfall is also very unreliable and erratic. Erratic rainfall distribution at the beginning and at the end of the monsoon has always resulted in limiting the production due to delayed operations, moisture stress at critical stages, water logging at low lands and excessive inundation at the tillering stage. Such situations carry a great risk in farming (75% of farmers are small and marginal) resulting in low input use. High rainfall without even distribution may be harmful to rice production. The appendix table No. I indicates that the yield rate and total production are low during the years of less rainfall and particularly low rainfall during the month of October.

IRRIGATION

Irrigation plays an important role in determining the quantum of rice production. So far only about 20 per cent of the cultivated area is under irrigation. This means that 80 per cent of rice is grown under non-irrigated conditions. Summer paddy is possible only with irrigation and success of Winter paddy largely depends upon water management whereas the least dependent on irrigation is the Autumn paddy. It is observed in Appendix – II that there is significant increase in yield rate due to irrigation and the increase in yield rate ranges from 3 Qls. to 8 Qls. per hectare. But since irrigation is inadequate it does not have much impact in overall production. During Kharif, irrigated area comes to only 23 or 24 per cent whereas in Rabi, it is only 6 to 7 per cent. But what is more important is that irrigation without water management does not have much impact on increasing productivity. At present, water does not exist during rainy season (that is Winter or Rabi paddy) nor is it easy. While the water from high land is lost by seepage and percolation the same gets accumulated in medium and low lands. Further unpredictable rainfall induces the farmer to impound as much water as possible leaving only a little surplus to drain out. Such excess water thus impounded at tillering stage results in poor grain production. However, irrigation in winter paddy is meaningful only when there is prolonged drought.

Though summer irrigation is very important in increasing yield due to inadequate control structures and absence of field channels, there is wastage of irrigation water. In fact, poor water management leads to inundation when it is not necessary, water logging in low lying areas and scarcity conditions in tail reaches at crucial stages, ultimately leading to low productivity.

FERTILISER

Fertiliser use in the State seems to be the lowest in the country. It is only 10 Kg per hectare. It has become risky to use fertiliser in face of uncertainty of water supply to the field during Kharif. Excessive rainfall within a short time results in erosion and leaching and has become deterrent for higher fertiliser use. The farmers are still in the habit of using small quantity of organic matter like farm yard manure or green manuring. Application of fertiliser normally has positive effect on yield rates and the increase in yield rate of both Autumn paddy and Winter paddy due to application of fertiliser can be seen in appendix No. III. It is observed that the increase in yield rate ranges from 1 to 3 quintals per hectare. So increase in application of fertiliser can ensure increase in quantum of production. The low dose of application of fertilisers by the farmers is not only due to uncertainty of rainfall and increase in cost of fertiliser but also due to non-availability and untimely supply of the same. The condition is still worse in interior areas where the primary cooperative societies serving as the major channels of fertiliser supply are not properly functioning.

HIGH YIELDING VARIETY OF SEEDS

The coverage under high yielding varieties in the State is very poor. The reasons are mainly three-fold : aberration of the weather, increase in cost and non-availability of high yielding variety of seeds. It is observed that the high yielding varieties have a positive impact on increase in yield rate both for Autumn and Winter paddy as shown in appendix—IV. Extent of increase in yield rate due to application of high yielding varieties over the local seeds comes to about 7 Qls per hectare. Though the aberration of the weather cannot easily be controlled, there is still scope to increase the use of high yielding varieties particularly in summer. The policy should be to popularise the use of high yielding varieties in the farming sector.

The growth of rice production is not upto expectation due to low coverage under high yielding varieties.

LAND AND SOIL

Rice is grown under a wide range of soils extending from alluvial deltaic areas in coastal belt, rolling red soils with low fertility in Northern plateau, mixed red and black soils of central table land to redish brown lateric and black soils in eastern ghat region. The soil types vary widely from highly acidic to slightly alkaline and from light sandy soils to stiff clays. The yield rate varies with the type of soil. The sandy soils have low water holding capacity and as observed in appendix – VI, the yield rate is very low. However, with the application of green manuring and fertiliser, these soils can be profitably managed for high yield of paddy. Clayee and Alluvial soils show better performance with higher yield rate compared to that of sandy soils. These soils are more fertile and yield is slightly higher than that of sandy soils. The type of soils have a predominant role to play in determining the yield rate of paddy. The growth rate of rice is not impressive over a period of one decade due to poor fertility of soil in the State. In fact, rice is grown indiscriminately even on sub-marginal land.

Topography or land scape is another important determinant of the yield rate of rice in the State. Appendix—V shows the variation in yield rate due to variation in topography and land scape. Low land gives a better performance than medium land and medium land performs better than high land as far as yield rate is concerned. The State is divided into four well defined physical regions as per the land scape. These are (I) Northern plateau (ii) Central table land (iii) eastern ghat region and (iv) coastal plain. Northern plateau includes district of Mayurbhanj, Keonjhar and Sundargarh districts. About 23 per cent of the total area of the State is under this region. About 45 per cent of the area of this region is covered by forest, and only 36 per cent of the area is under cultivation and major part of the zone is high land. The productivity is not very high. The central table land covering Dhenkanal, Phulbani and Sambalpur districts is flat with undulating and folded topography. The great plain of this region is very well suited for cultivation of rice. The eastern ghat region consists of only hilly ranges and land is highly elevated. It covers about 36 per cent of the total area of the State consisting of the districts of Koraput, Kalahandi and Phulbani. The yield rate is lowest in the region. The coastal plain

covering only 18 per cent of the total area of the State assures a favourable rice production.

METHOD OF SOWING

Rice is sown by method of broadcasting and transplantation. Transplantations always ensures a higher yield rate than the method of broadcasting. Appendix – VII indicates that transplanted rice gives comparatively higher yield rate than broadcasting both for Autumn and Winter varieties. The extent of increase in yield rate often varies from 2 Qls to 6 Qls per hectare. Due to absence of certainty of rainfall and water supply transplanting is not widely adapted by the farmers in the State.

We may now have a look at total agricultural production of which rice forms the major part. Agriculture production can be analysed on two heads, food grains and non-food grains. Food grain includes cereals and pulses wheareas non-food grain includes oilseeds, fibres and other miscellaneous crops. The relevant data on area and production of food grains and non-food grains are given in Table No. 5.

Table – 5

Area and Yield of Food Grains and Non-Food Grains in the State (1969-70 — 1980-81)

Year	Food grains				Non-Food grains			
	Area in 000 ha	Index No.	Yield in 000 M.T.	Index No.	Area in 000 ha	Index No	Yield in 000 M.T	Index No.
1969-70	5775	103.1	4728	104.5	1126	105.3	816	102.6
1970-71	5741	103 0	4863	107.7	1020	89.4	725	99.9
1971-72	5950	106.8	4354	95.7	924	82.8	630	96.8
1972-73	5915	106.2	4860	107·2	1021	98 4	643	106.3
1973-74	6218	111.4	5275	116 4	1066	107.0	720	110.9
1974-75	5992	107 5	3971	87.1	1142	114.0	742	164.8
1975-76	6484	116.4	5570	121 8	1249	123 6	807	116.4
1976-77	6033	108 4	4075	88.4	1171	114.2	717	98.1
1977-78	6519	117.0	5761	121.6	1412	138.5	792	117.3
1978-79	6680	119.9	5765	126.2	1595	163.2	951	169.9
1979 80	6490	115.7	3844	84.9	1838	171.5	869	109.3
1980-81	6946	123 9	5822	128.7	1871	174.6	1175	147.9

FOOD GRAINS

The table above shows the trend of area and production of food grains in the State from 1969.70 to 1978-79. It is observed that the area has increased as expressed in Index from 103 in 1969-70 to 123.9 in 1980-81 with fluctuations in between years. But the trend appears to be rising. The data have been fitted to the functional form $Y = ab^x$ to find out the growth of area and the resulting function is $A = 56,23,000 \times 1.023\ t$

Where A = Area
a = 56,23 000
b = 1 023 $\quad 1 - b = 0\ 023$

The regression coefficient of area is positive but not significant. It means the area under food grain is on an increase but a firm opinion cannot be given in this regard as b is found to be not significant.

Yield of food grains is found to be increasing over the period and the index number has increased from 104.5 in 1969-70 to 128.7 in 1980 81 with fluctuations in between the years. The data have been fitted to the function $Y = ab^x$ to find out the growth and the resulting function is

$Y = 44,67\ 000 \times 1.023t$

Where Y = Yield
a = 44 67 000
b = 1,023 $\quad 1 - b = 0\ 023$

b is found to be not significant As the function interprets, the growth of agricultural production is positive but not significant. One cannot give a confident opinion about the growth rate of food grains.

NON FOOD GRAINS

The table above shows the trend of area and production of non-food grains in the State from 1969-70 to 1980-81. It is observed that the area under non food grain is on an increase and as expressed in terms of index it has increased from 105.3 in 1969.70 to 174.6 in 1980-81 To find out the growth rate, the data have been fitted to the function $Y = ab^x$, and the resulting function is

$$A = 912{,}000 \times 1.047^t$$

Where A = Area
a = 912,000
b = 1.047
Growth rate is $1 - b = 1 - 1.047 = 0.047$

The b is found to be not significant. The area under non-food grain is increasing but not significant. Similar situation is observed with regard to yield of non-food grains in the State during the period. The trend of production is found to be increasing but the fluctuations in between the years is pronounced. It is observed that index number of production has increased from 102.6 in 1969-70 to 147.9 in 1980-81. Data have been fitted to the growth function and the resulting function is,

$$Y = 67{,}61{,}00 \times 1.023$$

Where Y = Yield of non food grains
a = 676,100
b = 1.023
Growth, $= 1 - b = 1 - 1.023 = 0{,}023$

The regression coefficient is found not to be significant. The resulting function implies that the growth of production of non-food grain is positive and not significant.

The trend of area and production is sub-groupwise i e. cereals, pulses, oil seeds, fibres and miscellaneous crops are expressed in index numbers in appendix VIII and IX. As observed sub group wise, there is a rising trend both in area and production though there are fluctuations in between the years.

All the above analysis does not show any significant increase in growth of area and production of both food grains and non food grains during the period from 1969-70 to 1980-81. Of all the factors which are responsible for the low yield, the main seems to be natural calamities and uneven distribution of rainfall. The State is influenced by the monsoon climate characterised by high temperature from March to May and hign rainfall from June to September Major sources of rainfall is from the South-West monsoon and 76 per cent is received from June to September. The constraints imposed by precipitation patterns are two fold. First is, its concentration during the relatively short monsoon season leaving a

substantial period in the year during which water requirement of crop exceeds rainfall and the second is that at both ends of the monsoon, there are periods of highly variable precipitation. This makes crop planning and yield assurance quite difficult. Due to less rainfall dry spell occurs in the month of October which affects the paddy crop at the flowering stage resulting in low yield.

Floods, droughts and cyclones occur almost in every alternate year in a severe form, causing substantial loss in production while floods occur almost every year, varying with intensity, severe drought conditions are experienced once in almost 3 years. Due to frequent natural calamities, agricultural production in the State does not show any favourable trend. As shown in the following table, there has been crop loss in 11 years out of 17 years due to natural calamities.

Table No. 6

Food Grains Production in lakh tonns over the years

Normal Years		Abnormal years		
1964-65	49.24	1965-66	Severe drought	36.85
		1966-67	Drought	42.31
		1967-68	Flood & Cyclone	41.35
		1968-69	Mild flood	47.21
		1969-70	Mild flood	47.28
		1970-71	Mild flood	48.63
		1971-72	Severe cyclone and flood	43.54
		1972-73	Drought and flood	48-60
1973-74	52.75	1974-75	Severe Drought & flood.	39.71
1975-76	55.70	1976-77	Severe Drought	40.75
1977-78	55.61			
1978-79	57.65	1979-80	Severe Drought	38.72
1980-81	59.77			

The table above indicates that Orissa has no respite from droughts, floods and cyclones for more than a decade. It has been estimated by one research worker that during the period 1951-52 to 1965-66, 40% of the

variation in agricultural production was accounted by erratic monsoon whereas during the period 1967-68 to 1977-78, 60 % of the variation was accounted by the same. He has also shown that during the 1st period, food grain production increased at a rate of 2.34 % per annum whereas in the second, it was only 1.40 %. Though the improvement in technology was better in the second period than in the first, due to hazards of monsoon the effect on the yield was almost negative during the latter period. It is therefore imperative to overcome hazards of monsoon in Orissa by increasing irrigation, improving water management system and diversifying crop production. Irrigation potential in the State has been estimated at 40 lakh hectares. By the end of 1977-78, the State achieved a potential of 20 lakh hectares. Of this only 14 lakh hectares of land received irrigation which accounted about 70 % of the total irrigation potential created in the State. This shows that there is great scope for improvement in irrigation.

We have already indicated technological constraints. Apart from the climatological factors which impede technological change, sociological constraints are no less important in preventing technological change. In Orissa, the scheduled tribes and castes account for about 40 % of population and they are economically the weakest community. Many of these communities still depend upon shifting cultivation. Those who have taken to settled cultivation, are not in a position to accept modern technology due to their poverty and ignorance. The small and marginal holdings account for about 75 % of all operational holdings and control less than 30% of total cultivated area. Farmers having five hectares or more representing less than 7 % of holdings control one third of the cultivated land. The operational units are small and scattered. Consolidation of holdings has hardly made any progress. Share croppers who account for a sizeable area under cultivation, do not have any interest to increase productivity. All these have stood in the way of technological change. Unless there is a structural change alongwith a diversification of the economy, agriculture in Orissa cannot be a business proposition.

(contd.)

APPENDIX—I

Monthly average Rainfall of Orissa

(in M.M.)

Year	Months					Average
	June	July	August	September	October	
Normal	213.2	351.6	335.6	236.5	131.6	253.7
1969	142.7	407.8	328.9	216.4	31.3	225.42
1970	348 0	338.3	366.9	337.5	58.1	289.76
1971	341.2	358.7	408.4	228.8	203.2	308 C6
1972	144.2	318 1	303 7	299 2	52.0	223.44
1973	103 4	358.9	326.3	244.2	203 0	247.16
1974	115.9	207.6	293.0	137.6	107.1	172.24
1975	190.6	269.0	421.4	245 7	98.5	245.04
1976	86.4	266.7	357.5	157.1	41.7	181.88
1977	189.5	348,2	310.9	206.1	62 6	223 46
1978	160.4	301.5	417.8	196,1	69.3	228.98
1979	196.3	240.7	260.3	135.0	45 8	175.6
1980	311.3	344.1	215.1	261.5	81.1	242.6
1981	159 7	209.0	362.0	248.8	20.1	200.1

Source— Board of Revenue, Orissa, Cuttack.

APPENDIX—II

Estimates of Yield-rate of paddy (Autumn & Winter) and Index from irrigated and un-irrigated plate in Orissa during the years from 1969-70 to 1979-80 (Q/H)

Sl. No.	Period	Autumn Paddy				Winter Paddy			
		Irrigated		Un-irrigated		Irrigated		Un-irrigated	
		Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.
1.	1969-70	9.66	97.71	7.22	96.40	17.32	102.08	13.88	95 31
2.	1970-71	10.05	101.65	8.40	112.15	16.33	96.25	15.38	105.61
3.	1971-72	9.68	97.91	9.35	124 83	13.17	77 62	12.54	86-11
4.	1972-73	9.80	99.12	7.66	102.27	17.24	101 61	14.30	98.19
5.	1973-74	11.61	117.43	8.90	118.83	17 30	101.96	15.11	103.75
6.	1974-75	8.07	81 63	5.22	69.69	15.77	92.95	11.04	75.81
7.	1975-76	10.97	110.96	9.21	122.36	18.39	108.39	15,71	107 87
8.	1976-77	13.03	131.79	7.77	103.74	15 82	93.24	10.96	75 26
9.	1977-78	15-87	160.52	11.01	147 00	16.99	100.14	14.90	102.31
10.	1978-79	13.37	135.23	11.35	151.54	19.12	112.69	16 23	111.79
11.	1979-80	13.83	139.89	6 36	84.91	18.15	106.97	10.80	74 16

Base year triennium year ending 1969-70 = 100

APPENDIX—III

Estimates of Yield-rate of paddy (Autumn & Winter) and Index from plots manured and un-manured in Orissa during the years from 1969-70 to 1979-80 (O/H)

Sl. No.	Period	Autumn Paddy				Winter Paddy			
		Manured fert. *		Un-manured		Manured fert. *		Un-manured	
		Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.
1.	1969-70	8.66	106.19	5.76	91.67	14.98	97.10	12.01	92.96
2.	1970-71	9.14	105.75	7.42	118.09	15.67	101.58	14 82	114.71
3.	1971-72	8.34	96.49	7.42	118.09	12.65	82.00	12.55	97.14
4.	1972-73	7.88	91.17	6 91	109.97	15.01	97.30	12.50	96.75
5.	1973-74	9.98	115 46	8.11	129.07	15.37	99.63	15.43	119.43
6.	1974-75	5.98	69.19	4.39	69 87	12.21	79.80	9.35	72 37
7.	1975-76	10.12	117 08	7.49	119.20	16.37	106.11	14.61	113.08
8.	1976-77	9.32	107 83	6.51	103.61	12.67	82.13	10.43	80.73
9.	1977-78	12.16	140.69	9 13	145.31	15 93	103 26	13.76	106.50
10.	1978 79	12.39	143.35	9.46	150.56	17.24	111.75	15.33	118.65
11.	1979-80	7.69	88.97	5.41	86.10	12.40	80.38	11.97	92.65

* fert. = fertilizer.

Base year triennium year ending 1969-70 = 100.

APPENDIX–IV

High Yielding Varieties & Local Seeds (Q/H)

Sl. No.	Period	Autumn				Winter			
		H. Y. V.		Local		H. Y. V.		Local	
		Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.
1.	1969-70	12.83	116.71	7.20	96.34	17.32	100.06	14.30	96.64
2.	1970-71	10.76	97.88	8.35	111.73	17.87	103.24	15.36	103.81
3.	1971-72	10.51	95.60	8.21	109.86	18.15	104.85	12.59	85.09
4.	1972-73	6.09	55.40	7.74	103.57	18.40	106.30	14.57	98.47
5.	1973-74	15.12	137.54	8.92	119.36	21.00	121.32	15.37	103.87
6.	1974-75	13.40	121.89	5.27	70.52	15.80	91.28	11.54	77.99
7.	1975-76	12.90	117.34	9.24	123.69	20.15	116.41	16.00	108.13
8.	1976-77	13.19	119.98	7.20	96 34	16.89	97.57	11.54	77.99
9.	1977-78	15.66	142.45	10.12	135.41	19.80	114.33	15.26	103.13
10.	1978-79	15.03	136.72	10.52	140.77	71.20	122.47	16.24	109.75
11.	1979-80	11.74	106.79	5.99	80.15	20.72	119.70	11.67	78.87

Base year triennium year ending 1969-70 = 100.

APPENDIX—V

Estimates of Yield-rate of paddy from different types of land in Orissa during the years from 1969-70 to 1979-80 (Q/H)

Sl. No.	Period	Autumn Paddy						Winter Paddy					
		High		Medium		Low		High		Medium		Low	
		Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.
1.	1969-70	6.62	95.71	8.70	99.58	8.62	102.33	12.50	96.97	13.98	97.13	15 61	90.65
2.	1970-71	7.65	110.60	9.53	109.08	9.39	111.48	13.76	106.75	14.97	104 01	16 52	102.50
3.	1971-72	8.43	121.88	9.53	109.58	7.97	94.62	11.83	91.78	13.28	92.26	12.24	75.95
4.	1972-73	7 03	101.64	8.52	97.52	8.52	101.15	12.02	93.25	14.10	97-96	15.63	96.98
5.	1973-74	8.32	120.29	9.68	110.80	8.18	97.11	13·05	101.24	14.89	103.45	16.06	99 65
6.	1974-75	4.75	68.67	6.08	69.59	6.36	75.50	8.63	66.95	11.08	76.98	12.67	78.61
7.	1975-76	8.77	126.80	9.80	112.17	8.25	97.94	13.97	108.38	15.67	108.87	16.62	106.12
8.	1979-80	6.17	89.20	7.92	90.65	8.90	105.65	11.03	85.57	12.22	84.90	13.40	76.94

Base year triennium year ending 1969-70 = 100.

APPENDIX—VI

Estimates of Yield-rate of paddy (Autumn & Winter) from different types of soils in Orissa during the years from 1969-70 to 1979-80 (Q/H)

Sl. No.	Period	AUTUMN PADDY								WINTER PADDY							
		Sandy		Clayey		Loamy		Alluvial		Sandy		Clayey		Loamy		Alluvial	
		Yield rate	Index No	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.	Yield rate	Index No.
1.	1969-70	7.14	96.10	8.64	95 90	6 84	96.29	8.86	95.27	14.27	95.49	15.33	98 69	13.03	92 61	14.90	96.84
2.	1970-71	7.36	113.06	9.86	110.58	8.00	112.96	8.89	95.59	15.14	101.32	15.31	98.56	15.79	112.22	15.77	102.49
3.	1971-72	8.11	109.15	8.43	94.54	9.72	136.84	7.73	83.12	11.12	74 41	12.00	77.25	13.04	92.68	13.06	89.88
4.	1972-73	7.36	99.06	7.96	89.27	8.57	120.65	7.97	85.70	13.19	88.27	14 82	95.41	15.25	108.39	13.81	89.75
5.	1973-74	8.22	110 63	9.13	102.39	9.10	128.11	10.11	108.71	15.27	102.19	14.89	95.86	16.05	114.07	14.31	93.00
6.	1974-75	4.92	66.22	5.85	65.61	5.17	72.78	5.96	64.09	11.14	74.55	12.56	80.86	10.11	71.86	14.59	94 82
7.	1975-76	9.62	129.48	9 63	108.22	9.01	126.89	5.13	55.16	14.70	98.37	17.10	110.09	16.08	114.29	13.47	81,04
8.	1979-80	6.02	81.02	6.79	76.15	9.24	130.08	7.56	81.29	10.89	72.88	11.66	75.06	14.10	100.21	16.89	109.97

Base year triennium year ending 1969-70 = 100.

APPENDIX—VII

Yield-rate of paddy (Autumn & Winter) due to Broadcasting & Transplanting Methods (Q/H).

(Index Nos. are given in brackets)

Sl. No.	Period	AUTUMN						WINTER					
		Broadcasted			Transplanted			Broadcasted			Transplanted		
		Early	In time	Late	Early	In time	Late	Early	In time	Late	Early	In time	Late
1.	1969-70	6.44 (84.89)	7.17 (95.69)	5.96 (99.50)	—	11.95 (108.97)	9.20 (96.67)	13 43 (99.26)	14.18 (96.48)	10 49 (89.28)	15.54 (128.22)	15.19 (96.75)	10.16 (92.50
2.	1970-71	8.69 (114.54)	8.29 (110.63)	6.59 (110.02)	8.29 (70.02)	11.55 (105 14)	18.43 (109.60)	14 53 (107.39)	15.22 (103 56)	13.80 (109.45)	13.96 (96.54)	16.00 (101.91)	11.14 (101.43)
3.	1971-72	6.93 (91.34)	8.35 (111.43)	8.02 (133.89)	—	10.85 (98.94)	10.49 (110.23)	13 47 (99.56)	13.34 (90.77)	7 24 (61.62)	13.63 (94.26)	13.04 (83.06)	12 18 (201.94)
4.	1972 73	9.18 (121.00)	7 59 (101.29)	7.12 (118.86)	—	9.96 (90.82)	8.94 (93.94)	16.30 (120.47)	14.53 (98.87)	13 92 (118.47)	14.79 (102 28)	15.45 (98.41)	13.03 (209.68)
5.	1973-74	15.45 (203.65)	8.64 (115.30)	7.44 (124 21)	—	11.66 (106 32)	1.95 (20.49)	17.47 (129.12)	14.82 (100.84)	16.05 (136.60)	19.41 (134.23)	15 88 (101.15)	14.75 (134.29)
6.	1974-75	2.37 (31.24)	5.18 (69.13)	4.88 (81.47)	5.21 (44.00)	8.13 74.13)	5.33 (56.01)	10.49 (75.31)	11.40 (77.57)	9.09 (77.36)	13.51 (93.43)	13.18 (83.95)	9.71 (88.41)
7.	1975-76	9.34 (123.11)	8.90 (118 77)	7 82 (130.55)	8.22 (69 43)	13.12 (119.64)	10.03 (105.29)	19.26 (134.96)	15.49 (105.40)	11.71 (99.66)	23.18 (160.30)	17.46 (111.21)	12.30 (111.99)
8.	1976-77	—	7.28 (97.15)	6 13 (85 48)	—	11.36 (103 59)	10.02 (105.29)	—	11.13 (75 73)	8.35 (79.57)	—	12.24 (77.96)	9.93 (90.99)
9.	1977-78	—	10.04 (133.99)	7.82 (130.55)	—	14 60 (133.13)	9.78 (102.77)	—	15.71 (106.89)	10.36 (88.17)	—	16.39 (87.20)	9.93 (90.41)
10.	1978-79	8.93 (117.71)	10.32 (137.72)	7.45 (124.37)	13.36 (112 89)	15.68 (142.98)	11.30 (118.74)	16..31 (120.55)	15.98 (108.73)	13.65 (107.66)	17.42 (120.47)	18.31 (116.62)	13.15 (119.73)
11.	1979-80	4.72 (62.21)	6.07 (81.01)	4.93 (82.30)	6.50 (54.90)	9.90 (90.27)	8.56 (89.95)	10.29 (76 05)	10.95 (79.51)	7.37 (62.72)	9.18 (63.49)	14.25 (90.76)	10.74 (97.78)

Base year triennium year ending 1969-70 = 100.

APPENDIX—VIII

Index numbers of areas different sub-groups from the year 1969-70 to 1980-81

Triennium ending 1969-70 as base

Year	Cereals	Pulses	Oilseeds	Fibres	Misce.	All crops
1969-70	102.5	106.9	105.4	100.6	108.1	103.3
1970-71	103.4	101.6	87.1	100.0	89.1	102.0
1971-72	107.5	102.9	93.7	112.3	76.1	105.7
1972-73	105.1	112.3	104.0	93.2	86.3	105.5
1973-74	111.0	115.1	105.1	127.4	87.4	112.2
1974-75	105.4	119.8	119.2	117.8	98.3	108.0
1975-76	113.0	135.4	130.3	108.2	116.0	116.9
1976-77	107.1	115.5	112.3	121.9	113.2	108.8
1977-78	108.9	163.7	147.6	126.0	122.5	118.7
1978-79	108.0	187.1	182.8	127.4	134.5	123.2
1979-80	101.4	196.4	199.2	121.8	130.9	120.1
1980-81	109.4	205 2	197.6	122.8	147.9	127.8

APPENDIX—IX

Index Numbers of Agricultural Production
(sub-group wise with triennium ending 1969-70 as base)

Year	Cereals	Pulses	Oilseeds	Fibres	Misce.	All crops
1969-70	103.8	110.7	108.0	102.8	98.0	104.3
1970-71	107.0	113.1	100 8	107.9	97.1	106.7
1971-72	95.9	94.0	116.5	124.1	73 4	95.8
1972-73	106.0	117.7	129.8	115.4	84.1	107.1
1973-74	116 6	114.4	136.8	135.1	83.1	115.7
1974-75	85.1	103.6	135.9	121.4	73.9	89 3
1975-76	121.2	126.8	146.9	117.7	90.2	121.2
1976-77	87.3	97.9	114.4	140.1	74.0	89.7
1977-78	116.8	162.7	160.4	146.3	73.7	121.0
1978-79	118.9	189.3	210.9	151.3	139.6	124.6
1979-80	78.9	136.5	134.5	119.8	85.5	88.1
1980-81	119.0	212.6	184.0	121.3	123.8	131.2

A Study of Institutional Credit Supply to Agriculture in Developed and Underdeveloped Districts of Orissa

Santi Das

Inadequacy of rural credit is one of the factors that contributes to poor performance of agriculture in Orissa. The role of credit in bringing about development in an agrarian underdeveloped area has been emphasised by Shivamaggi (1961), Shah et al (1961), Hanumantha Rao (1970) and others. Credit supply to agriculture has assumed special importance in the context of adoption of modern technology by small farmers. Therefore, Sen (1971), Subramanyam (1975), Ghosh (1977), Dhillon and Sankhayan (1977) and others have advocated for augmenting credit supply in rural areas.

OBJECTIVE :

Financial institutions like the Co operatives and Commercial banks are now engaged in supplying credit to farmers. The objective is to assess the extent to which they are able to meet the credit needs of farmers.

HYPOTHESIS :

It is assumed that the financial institutions are not able to meet the credit requirements of farmers in a substantial manner due to their operational inefficiency.

METHODOLOGY :

The study covered 200 farmers belonging to 8 villages (4 irrigated and 4 unirrigated) of Cuttack and Keonjhar districts. The former is one of the developed districts of Orissa and the latter is one of the underdeveloped districts of Orissa.

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The farmers were classified into three categories. Farmers having operational area between 0 to 1.025 hectares came under category I. Category II included farmers having operational area from 1.026 to 2.05 hectares. Rest of the farmers were grouped under category III.

The period of enquiry relates to 1978-79 crop year.

Both the Co-operatives and Commercial banks were the inssitutions supplying credit in the villages taken under the study. It was found that the num5er of farmers benefited by institutional sources of credit was higher in irrigated villages than in unirrigated villages of both the districts taken together. On the whole 46 farmers of irrigated villages and 38 of unirrigated villages of both the districts borrowed from institutional sources.

Between the Cooperatives and Commercial banks, the former provided benefit to a large number of farmers than the latter. On the whole 56 farmers got assistance from the cooperatives against 28 receiving assistance from commercial banks. The Commercial banks were found to serve large number of farmers in Cuttack district than in Keonjhar district. Only 6 farmers of Keonjhar district got loans frcm Commercial banks. This might be due to the fact that number of offices of commercial banks in Keonjhar was much less than what it was in Cuttack district.

Apart from the number of farmers benefited by institutional sources, the quantum of loans advanced by these sources indicates the extent of involvement of institutional agencies in agricultural development. Enquiries were also made in regard to diversion of loans for other purposes rather than the purposes for which loans were sanctioned, since diversion of loans affects the repayment capacity of farmers and thwarts development efforts. The following table gives the particulars of loans advanced, their utilisation etc.

The Loans advanced to farmers by the Cooperatives and Commercial banks for agricultural purposes in irrigated villages of Cuttack and Keonjhar districts, utilisation of loans and loan advanced per hectare of cropped area (1978-79), (table—I)

Table - I

Amount in rupees

District	Cooperatives Cat—I	Cat—II	Cat—III	Commercial Banks Cat—I	Cat—II	Cat—III
CUTTACK						
(a) Irrigated						
Loans Advanced.	3145	7190	1500	1350	700	1500
Loans Utilised.	3045	6790	1500	1350	500	1500
Percentage of loans utilised.	96.82	94.44	100.0	100.0	71.43	100.0
Loan per hect.	933.92	761.33	617.28	876.62	666.67	285.17
(b) Unirrigated						
Loans Advanced.	600	1800	3800	1350	9195	1750
Loans utilised.	600	1600	3800	1320	7595	1750
Percentage of loans utilised.	100.0	88.89	100.0	97.78	82.6	100.0
Loan per hect.	741.32	782.61	1342.76	725.81	1023.66	206.37
KEONJHAR						
(a) Irrigated						
Loans Advanced	2070	2242.15	2000	200	500	10 000
Loans utilised.	1675	2042.15	2000	100	200	10,000
Percentage of loans utilised.	80.92	91.08	100.0	50.0	40.0	100.0
Loan per hect.	248.8	156.88	309.67	246.91	250.0	823.72
(b) Unirrigated						
Loan advanced.	1825	4197	6730	1925		3500
Loans utilised.	1215	1500	6680	1925		3000
Pecentage of loans utilised.	66.58	35.74	99.26	100.0		85.71
Loan per hect.	468.7	536.7	723.66	1132.35		1440.32

Higher quantum of loans per hectare of gross cropped area was advanced by the co-operatives to farmers of category– I in irrigated villages than in unirrigated villages of Cuttack district. In irrigated villages more money as well as inputs are required for seasonal agricultural operations. The farmers belonging to category one being poor could not command enough resources to meet these expenses. Hence they borrowed money from the cooperatives mostly in terms of inputs like fertilisers. The same factor accounted for higher quantum of finance by commercial banks to the above mentioned farmers in irrigated villages than in unirrigated villages of Cuttack district. On the other hand, farmers of category—III in unirrigated villages of this district received higher quantum of loans per hectare from the cooperatives than farmers of the same category in irrigated villages of Cuttack district. Similar tendency was noticed in regard to commercial banks' finance to farmers of category—II in the unirrigated vis-a-vis irrigated villages of Cuttack district. The farmers of unirrigated villages took loans for land improvement measures like digging of wells.

In Keonjhar district, per hectare loan advanced both by the cooperatives and commercial banks was higher for farmers of different categories in unirrigated villages than for the farmers in irrigated villages. In one unirrigated village, the soil condition did not permit the farmers to raise a second crop from their land. In other unirrigated village the farmers raised two to three crops a year, but the yield rates of the crops were very low. These factors necessitated borrowing money from financial institutions for seasonal agricultural operations. Some farmers of category one and three took loans to purchase bullocks and to dig wells. Thus higher level of borrowing in unirrigated villages compared to irrigated villages of this district was due to poverty of farmers, their effort to effect land improvement schemes and for purchase of drought animals.

Per hectare loan advanced both by the cooperatives and commercial banks was higher in irrigated villages of Cuttack district than in the irrigated villages of Keonjhar district for all categories of farmers, exception being noticed in regard to finance by commercial banks to a farmer of category III of Keonjhar district. This farmer took a substantial amount for land improvement. It was found that the farmers of irrigated villages of Cuttack district received regular and adequate water supply in contrast to farmers of Keonjhar district. Such farmers of Cuttack district raised a number of crops for which their demand for loan to meet seasonal agricultural operations was higher than those of Keonjhar district where water supply was irregular and inadequate.

Between the unirrigated villages of Cuttack and Keonjhar districts, per hectare loan advanced by the cooperatives in the former district was higher for all categories of farmers than for farmers of the latter district. The farmer of an unirrigated village of Cuttack district raised a number of crops including h. y. v. paddy in kharif. They borrowed money and inputs from the cooperatives to meet seasonal agricultural operations. This explains higher quantum of borrowing in Cuttack district. On the other hand per hectare advance by commercial banks to farmers of category-I and III in an unirrigated village of Keonjhar district was higher than the advance to the same categories of farmers in unirrigated villages of Cuttack district. The farmers of the former district borrowed more for land improvement schemes and for purchase of drught anoimals.

In most cases, utilisation of loans by different categories of farmers in irrigated and unirrigated villages of Cuttack district was better than that in Keonjhar district. The yield rates of crops and prices of the crops were usually higher in Cuttack than in Keonjhar for which the farmers of the former district were better off than those in the latter. This factor partly explains greater diversion of loans in Keonjhar district. Besides, private rate of interest was between 50 and 60 percent in Keonjhar district against 25 and 36 perent in Cuttack district. Such a high private rate of interest in Keonjhar might have induced farmers to divert a part of institutional loans for consumption purposes instead of borrowing from the private sources for the purposes. Sometimes loans were diverted from the purpose for which they were sanctioned to other productive purposes. Some farmers pointed out that when crops were standing in the field, they were hard pressed for finance. They diverted some amount for the payment to labourers

The farmers where asked to express their preference for loan in cash, kind or both. Cash loans were preferred by 57 percent of farmers in Cuttack and 64 per cent in Keonjhar. Farmers preferring cash loan pointed out that when loans were given in kind, the quality and the nature of loan supplied might not be to their satisfaction. Besides, cash loan would enable them to utilise it for other purposes in time of need. Preference for a combination of cash and kind loan was given by 33 and 28 percent of farmers of Cuttack and Keonjhar district respectively. The farmers opting for such loans said that if inputs of good quality were provided to them, it would no longer be necessary for them to waste time in going to market to buy the same. It would also save their travelling expenses. In addition to loan in kind some

cash loans were required to be paid for such inputs which were not provided by the financial institutions. Rest of the farmers preferred loan in kind as the prices of inputs purchased in open market were higher than those supplied by credit institutions.

Farmers were asked to express their difficulties in procuring institutional credit. In two villages of Cuttack district and in one village of Keonjhar district farmers pointed out the instances of corruption and nepotism of the cooperative societies. Some poor farmers complained that officials of commercial banks showed favourable attitude to better off farmers and ignored ill dressed farmers.

Some farmers were averse to the idea of mortgaging their lands to get loans. They apprehended that in case of crop failure it might not be possible for them to repay the loans in time and as a result they might lose their lands. The apprehension of farmers to borrow from the cooperatives was also mentioned in the Report on Survey of Primary Agricultural Cooperative Societies in Orissa (1979-80). The farmers pointed out that in case of loans obtained from private sources they might reschedule the payment time according to their convenience which was not usually possible in case of cooperative loan.

The farmers also pointed out another difficulty in procuring institutional credit. They had to run a numher of times to such institutions for getting loans and this involved loss of work during busy seasons.

Some farmers were too illiterate and ignorant to form viable schemes for getting loans from institutional sources.

The fore-going analysis points out certain operational deficiencies in the working of financial institutions in the villages which come under the ambit of present investigation. In certain cases the managements of cooperative societies were found to indulge in corrupt practices. Some officials of commercial banks were alleged to favour better off farmers. Financial institutions have not yet become successful in removing apprehension from the minds of farmers. Moreover, farmers had to waste a lot of time to get loans from such institutions.

In view of the problems dicsussed above the following suggestions are made to improve the working of the financial institutions in Orissa.

Management of the cooperatives should be improved to root out corruption and nepotism. A person's capacity to repay loan should be the main criterion for the sanction of loan.

Apprehension of the farmers in regard to institutional credit should be removed with greater extension effort. Such institutions should formulate viable schemes for poor and illiterate farmers and induce them to borrow for such purposes as advocated by Rajkrishna (1979).

The Commercial banks were found to provide more to farmers in advanced area than in backward area. Greater participation of these banks in rural credit is desirable for the development of underdeveloped agriculture as well as for lowering down the private rate of interest in these areas.

Diversion of loans from productive to other purposes is another problem. Utilisation of credit will improve with proper supervision. Nanavati (1961) has shown the benefit of supervised credit. Diversion of loan affects repayment. Mounting overdues have a crippling effect on the working of financial institutions in Orissa. Moreover with coordinated loan assistance by credit institutions, and proper supervision of credit utilisation by them. the problem of double or multiple financing will not arise. A study group of R.B.I., (1981) has already drawn attention to such problems in Orissa. With proper supervision the recovery performance will improve and more money will be available for financing fresh productive activities.

Action taken on the lines suggested above will go a long way in improving the working of credit institutions in Orissa.

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EFFECT OF URBANISATION ON EMPLOYMENT AND WAGE STRUCTURE IN AGRIL. SECTOR

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INTRODUCTION

Recently the growth of urbanisation has helped to some extent the commercialisation of agriculture. The farmers are planning their production programme keeping in view of the nearby markets which ensure a favourable price. Therefore not only the cropping pattern is changed due to increasing urbanisation but also cropping intensity becomes very high. Farms are being diversified with inclusion of more of vegetables, dairy farming, orchards, pisiculture and poultry. In cropping plan more of short duration variety crops are being included. Such changes in agriculture at the outskirt of urban areas have increased the demand for labour and also wage rate. The farmers have to compete with manufacturing industries, construction, trade commerce for securing labour for agricultural purposes. Wage rate in urbanised agriculture is therefore higher than in rural agriculture. Due to changing cropping pattern the farming has become labour intesive with change in composition of labour force. Shortage of casual labour has been made good by employment of more of family labour. A study has been conducted to find out the impact of urbanisation on employment and wage structure in agricultural sector.

OBJECTIVES :

The study has been conducted with the following objectives.

(1) To find out the change in cropping pattern and probability of additional employment due to urbanisation.

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(2) To find out the impact of urbanised villages on wage structure of both permanent and casual labourers in both urban and rural villages.

METHODOLOGY :

The present study is confined to 32 urban households and 32 rural households in four selected villages of Balianta Block, Puri District. The design of the survey adopted in the study is a stratified two stage sampling. All the villages of the Balianta Block numbering one hundred and four were classified into urban and rural. The villages within the radius of 8 k.m from Bhubaneswar town are taken as urban villages, while villages which are beyond 15 k m from the urban centre are declared as rural villages. Two villages from each of the two classes were selected at random with probability proportional to cultivating population.

Therefore, Nakhara, and Pahala, the urban villages and Sisilo and Bhamchua, the rural villages were selected at random in the Balianta block for the present study. A frame of operational holdings hereafter termed as farms as obtained from each sample village by complete enumeration. The farms were then stratified into four classes according to their sizes viz; (i) landless, (ii) 0.01-1.0 hectare (iii) 1.01-2.0 hectares and (iv) 2 hectares and above. From each size of holding four holdings were selected at random. Thus sixteen holdings were obtained in each sample village. And the total number of holdings selected for the purpose from the region was sixty four. The relevant data collected were related to the year 1979-80.

CROPPING PATTERN :

It is known that a particular cropping pattern in certain area is influenced by physical factors like soil, climate etc. and economic factors like marketing and transport facilities. Urbanisation has also its due impact on cropping pattern of the area. The table No. 1 indicates the cropping pattern followed both by urbanised and rural villages.

It Is observed that farmers in urban areas grow more of vegetables in comparison to the rural village, because of heavy demand for vegetables by the urban people. Besides these urban villages devote more area for cash crops like, sugarcane, groundnut and potato and vegetables-cum fruits like banana and papaya. These crops are grown relatively in greater percentage to gross cropped area in urban villages compared to the rural villages.

Thus the cropping pattern indicates that due to urbanisation, the farmers favour to include more of cash crops and vegetables, in their cropping plan.

Due to such cropping pattern the scope for employment is higher in urban villages than in rural villages. To find out the extent of additional employment created due to changing cropping pattern in urban villages a simple linear equation of the model $y=a+bx$ has been fitted to the data, where,

y = total labour employment
x = gross cropped area (hectare)

Two linear models have been fitted, one for urban villages and the other for the rural villages.

Village types	Equation	V^2
Urban	433.65 + 148.36x	0.96
Rural	414.94 + 129.67x	0.90

Both regression co-efficients are significant at 1% level of probability. This suggests that total labour employment increases with the gross cropped area. The regression co-efficient of the equation specifies the change in total labour employment for unit change in gross cropped area. Thus about 148.36 units of labour days are added to the employment by one hectare addition to the gross cropped area. The corresponding estimate for rural villages is 129.67. There is thus greater scope of employment in urban areas compared to rural areas by an increase in gross cropped area.

Then data have been analysed to find out the relationship between total family labour employment and workers to total number of members of the family. Regresssion equations have been developed using employment model $y=a+bx$ to see the influence of percentage of workers to total members of family on the level of family labour employment in urban and rural villages and the results are as follows.

Village type	Equation	V^2
Urban	560.08+2.77x	0.24
Rural	537.28+2.05x	0.22

y = Total labour days (non equivalent days) Utilised per farm.

x = Number of workers to total member of family in percentage.

It is to note that the regression co-efficients of number of workers to total members of the family in percentage is positive and statistically significant at 1% level of probability indicating that there is positive influence of percent of workers in the family on the level of human labour employment. On the other hand, one percent in the workers increased labour employment by about 2.77 percent man days in urban villages and about 2.05 percent man days in rural villages. Then urban villages provide greater scope of employment by an increase in the percentage of workers in the family.

PROBABILITIES OF EMPLOYMENT :

Urbanisation has created probabilities of generating more units of employment in nearby villages compared with that of the distant rural villages. Probability of employment has been calculated as the number of days a person is successful in obtaining employment as a proportion of the days for the period he tried. The following table illustrates the probability of employment of family labour in different fortnight of the year in the two categories of villages.

The table No. 2 indicates that probabilities of employment is more in urban villages in comparison to rural villages. It is more in months of July, August, November and December in both type of villages.

WAGE STRUCTURE :

Agricultural labourers are paid the lowest amount of wages compared to all other types of labourers. The payment is made in form of both cash and kind. The wage rate differs according to sex, type of works and situations. The wage rate in urban area is higher than rural areas due to more demand of labourers in urban farms.

Wage structure of hired labour constitutes both permanent and labour.

PERMANENT LABOUR :

Permanent labour is defined as those who are more or less in continuous employment and are under some sort of contract with employers during the period of employment. The permanent labourers are paid both in cash and kind. The table No. 3 indicates the wage received by the permanent labourer.

It is observed that mostly the permanent labourers are paid wages more in form of cash than in kind. In urban villages wages are paid more in form of cash than in rural villages.

CASUAL LABOUR :

Casual labourers are employed from time to time according to experience of work. Casual workers are paid at the market rate and they are free to leave one for the other. There is no contract with the employer. Casual labourers are also paid both in cash and kind. Payment made operation-wise for different operations is given in table 4.

It is found in table 4 that wages of men labour are relatively higher than the two types of labourers female and children. In urban villages for the same operation wage rate is comparatively higher than in the rural village. Difference is significant among the male workers with regard to the wage they receive in both urban and rural villages.

SUMMARY AND CONCLUSION :

The study shows that

i) there is no significant difference between villages with regard to the operational farm sizes,

ii) intensity of cropping is higher in urban villages than the rural villages,

iii there is significant difference in cropping pattern in two types of villages The urban villages grow more of cash crops and vegetables compared to the rural villages,

iv) due to higher cropping intensity and more of cash crops and vegetables in the cropping plan total labour employment is more in

Table—I

Relative importance of various crops in the varying farm sizes in Urban and Rural villages

(Expressed in percentage to gross cropped area)

Crops	Urban Villages Sizes in hectare			Rural Villages Sizes in hectare		
	0.01—1	1.01—2.0	2.01 and above	0.01—1	1.01—2.0	2.01 and above
1. Kharif paddy	52.13	52.00	57.20	59.00	61.00	64.05
2. Rabi paddy	16.02	16.50	18.00	20.10	21.00	20.05
3. Black gram	1.22	1.12	1.11	2.50	2.79	2.75
4. Green gram	2.70	2.50	2.01	3.50	3.78	3.83
5. Kulthi	.00	0.04	0.00	3.38	3.25	4.02
6. Til	0.00	0.00	0.00	1.20	0.25	0.23
7. Colocasia	0.00	0.00	0.00	0.48	0.20	0.20
8. Patato	3.37	2.72	1.37	1.74	1.15	0.40
9. Sugarcane	1.79	2.50	2.89	0.00	0.00	0.50
10. Chillies	3.29	3.40	2.66	1.05	0.75	0.50

11. Groundnut	3.04	3.55	2.69	1.48	0.98	0.52
12. Mustard	1.12	1.03	1.02	1.15	1.19	1.22
13. Onion	3.33	4.24	3.26	1.18	1.23	0.40
14. Brinjal	2.41	2.04	1.27	1.05	1.32	0.61
15. Tomato	1.40	1.25	0.75	0.24	0.03	0.02
16. Cauliflower & cabbage	2.05	1.85	1.50	0.71	0.52	0.20
17. Sage	0 00	0.00	0.00	0.25	0.16	0.05
18. Saru	0.00	0.00	0.00	0.25	0.15	0.05
19. Gurmeric and Ginger	0.69	0.50	0.49	0.00	0.00	0.02
20. Cucumber	0.70	0.60	0.55	0.15	0.05	0.06
21. Gourd and Bitter Gourd	0.50	0.30	0.25	0.00	0.00	0.02
22. Banana	1.52	1.06	1.01	0.14	0.13	0.02
23. Papaya	1.12	0.93	0.62	0.05	0.07	—
24. Others	1.50	0.65	0.35	0.15	0.05	0.02

Table—2

Fortnight-wise probabilities of employment of family labour in varying farm sizes of the two types of villages

Farm size (hec)	Urban villages			Rural villages		
	Land less	0 01—1.0	1.01—2.0	Land less	0.01—1.0	1.01 —2.0
1st fortnight of June	.81	.83	.82	.89	.73	.75
2nd fortnight of June	.85	.87	.86	.63	.77	.77
1st fortnight July	.99	.100	.98	.95	.96	.93
2nd fortnight July	.98	.99	.98	.94	.96	.96
1st fort. August	.98	.96	.94	.96	.90	.89
2nd fort. August	.92	.92	.93	.90	.94	.92
1st fort. Sept.	.71	.73	.70	.70	.71	.68
2nd fort. Sept.	.69	.70	.68	.66	.68	.64
1st fort. Oct.	.70	.73	.70	.61	.54	.64
2nd fort. Oct.	.72	.75	.74	.53	.57	.60
1st fort. Nov.	.95	.97	.96	.80	.84	.85
2nd fort. Nov.	.99	.99	.99	.98	.97	.98
1st fort Dec.	.97	.96	.94	.93	.95	.98
2nd fort. Dec.	.93	.94	.90	.89	.93	.94
1st. fort. Jan.	.77	.79	.82	.66	.72	.77
2nd fort. Jan.	.75	.79	.78	.60	.69	.75
1st fort. Feb.	.76	.78	.79	.69	.70	.72
2nd fort Feb	.70	.74	73	.71	64	.67
1st fort. March	.82	.85	.82	64	.69	.72
2nd fort March	.78	.81	.78	.58	62	.65
1st fort. April	.88	.89	.85	.72	.74	.78
2nd fort. April	.81	.84	.79	64	68	.69
1st fort May	.83	.90	.92	.74	.77	.76
2nd fort May	.89	.85	.87	.68	62	.61

urban villages. Also family labourers are found to work more in urban villages than in the rural villages,

v) it is found that by increase in one hectare of gross cropped area, about 148 labour days can be added to the employment in urban villages in comparison to 122 labour days in rural villages,

vi) in urban villages the permanent and casual labourers are paid more in cash than in kind compared to the rural villages.

Urban villages provide 20.3% more employment in agricultural operations than that of rural villages. Farmers in urbanised villages produce more of vegetables and crops. The intensity of cropping is more in urban villages. Probability of employment is found to be more in urban villages than in rural villages.

Table—3

Payment made to Permanent labourer
(Expressed in rupees per farm per annum)

Particulars	Urban villages			Rural villages		
	Farm size			Farm size		
	0 01 —1.00	1.01 —2.0	2.01 & above	0.01 —1.0	1 01—2,0	2.01 & above
Permanent made per holding						
Cash (inclusive of perquisites)	—	105.0	409 0	—	75 0	165 0
Kind (in monetary term)	—	95.0	236.0	—	—	108.0
Total payment in cash equivalent	—	200.0	645.0	—	75.0	273.0
Cost of permanent labour per hect.	—	139.8	177.9	—	50.3	87.2

Table—4

Wage structure for casual labourers for different agricultural operations in the two village types (expressed in Rupees)

Nature of Operation	Urban villages			Rural villages		
	Men	Women	Children	Men	Women	Children
Ploughing	4	—	—	3.75	—	—
Planting & sowing	3 50	2 50	—	3.25	2.50	—
Manuring	3 50	2.00	1.50	3 25	2 00	1 50
Weeding	3.25	2.25	—	3.00	1.75	1.25
Irrigation	3.00	—	—	3.00	—	—
Harvesting	4.25	3.00	2.00	4 00	3.00	2.00
Threshing and winnowing	4.00	2.50	—	3.75	2.50	—
Skilled operation	4.00	—	—	3.75	—	—

EMPLOYMENT AND EARNINGS OF LANDLESS LABOUR AND MARGINAL FARMERS : A Case Study in Pipili Block of Puri District, Orissa

R. K. Panda
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The planning strategy for a labour surplus economy in the rural sector should have the objective of maximization of employment opportunities. However, various programmes launched and efforts made in the country in the past have not been adequate enough to absorb the growing and existing manpower. Farm labourers who constitute about 26 percent of the total work force in India belong to the lowest rung of the rural economic ladder. They eke out their existence from wage earnings of farms and in some cases from income trickling from dairying and/or other livestock. Therefore, if the rural poor, particularly the landless labourers and marginal farmers are to be helped to get better incomes special efforts are needed to give relief to these sections and areas.

The major objective of this enquiry is to bring into sharp focus the nature of employment and earnings of landless labourers and marginal farmers in Pipili block of Puri district. It is hoped that the results of this enquiry will help the policy makers in formulating an adequate programme of employment for the benefit of the landless labourers and marginal farmers.

METHODOLOGY :

For the present study, two villages, which are contiguous and are in proximity to block headquarters and where there is a large proportion of marginal farmers and landless labour households were purposely selected and all the marginal farmers and landless labour households of both the villages were enumerated. 50 percent of the households from each class

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were selected for the study. Thus out of a total population of 56 marginal farmers households and 76 landless households, a sample of 28 marginal farmers and 38 landless labour households was selected. From the selected households, detailed informations was obtained on schedules specially structured for the purpose. The study relates to the year 1981 82.

RESULTS AND DISCUSSION :

The family particulars of the sample households show that in respect of their family size both the groups do not differ significantly but in-respect of the average number of workers (male and female) it ranges from about 2.6 workers in landless households to 2.9 workers on marginal farmer households, the average being 2.7 workers per sample households in the area under study (Table-1A)

EMPLOYMENT :

The working strength of the households alone does not decide the nature of employment or earning capacity in a rigid manner. It further depends on a number of factors, viz; sex, whether exclusively attached to their own enterprise and whether casual or permanent labour. The composition of workers form a little more than 20 percent of the total workers. Though all children are not attending schools, many of them are not at work either. Exclusive attachment to their own enterprise is not observed among the female and the children. There are also no attached agricultural labourers among the females and the children. Year-round non agricultural wage earners are also rare in these groups. Thus the females and children are entirely casual labourers. Among males, marginal farmers should be distinguished from landless labourers, since all farmers have attachment to their own enterprises and only a few among the latter have their own enterprises like, household industry. Attached agricultural labour is much more prominent among landless labour households than among marginal farmers. Year-round non-agricultural employment is observed among marginal farmers, but not among landless labour.

Employment details are not elicited in respect of workers exclusively attached to their own enterprise and year-round workers. In respect of the farmer, measurement of employment by "time criterion" is not meaningful since employment becomes indistinguishable from "disguised unemployment." Income criterion is much more relevant. In respect of year-round

workers, employment details are unnecessary and incomes are much more relevant to measure the nature of employment. Hence the details of employment relate only to wage paid casual workers.

The details of wage paid employment per worker are given in Table-1 B.

The number of days of employment per worker in agriculture is extremely low for both categories of workers. In case of landless labour, it works out to 140 days. The corresponding figure in case of marginal farmer is 121 days. Wage employment in non-agricultural persuits is also not adequate to compensate for the low employment in agriculture. Non-agricultural employment for landless and marginal farmers works out to 88 days and 75 days respectively. Thus, the overall employment picture per worker for both categories is one of despair and one really wonders, how the people in these areas manage with such meagre employment. They may manage to subsist by pooling the meagre incomes got by every one in the family. Hence, total employment per household is relevant. Table-1 C, presents the same.

Total employment of marginal farmers both in agriculture and non-agriculture for all members of the house-hold is estimated to be 568 days. For landless labourers, wage employment per household is higher compared to thatof for the marginal farmers. Their position too is better, when compared to the available labour days. (Estimated on the assumption of availability of labour days to be 300 days for workers in a year.)

EARNINGS (Income) :

Employment is a means to earn incomes and to got a command over goods for living. Incomes are influenced not only by wage paid employment but also by (a) self employment, (b) wage rates and (c) proportion of workers with year-round employment in the household.

The source-wise household incomes are given in Table 1 D.

In respect of landless labourers, wages from agriculture form a large percentage of the household income. Considering the differences between marginal farmers and landless labour in respect of the nature of wage employment, incomes derived by marginal farmer households from

agricultural work are not in any way less than those of landless labourer. However, incomes of the marginal farmers from non-agricultural work are less than those of landless labourers in the area.

On a household basis, marginal farmers have slightly better incomes than landless labourers.

In terms of percapita income and per worker income, marginal farmers are found to be no better than landless labourers (Table—1 E). The percapita income and per worker income in case of marginal farmers works out to Rs. 955.85 and Rs. 1483.22 as against Rs. 914 29 and Rs 1547.26 in case of landless labourers respectively.

A possible approach to measure the extent of self employment is to get the residual days with the household after employment as casual labour and year-round work is considered. This residual is available for self employment, though the household may not actually use all the days on its own enterprise. The productivity of self employment as related to the subsistence wage rate gives a measure of under employment. We relate the days available for self employment with incomes from self employment and compute the earnings per day. Table—1 F, shows the same.

Remuneration from attachment to self employment per day for both categories is far less than even the subsistence wage rate. Attachment to self employment under these circumstances could be explained only in terms of non-availability of work opportunities in the area under study.

CONCLUSION :

The above study shows that both agricultural and non-agricultural sectors provide employment a little more than fifty percent to the family labour. So half of the days, they are to remain unemployed. The level of such unemployment is more or less same in both categories of households. It is therefore suggested that an adequate programme of employment should be based on an understanding of current levels of unemployment. Effort should be made to develop small-scale and cottage industries in the area in order to get full employment.

Table—1

A. Population and Workers per household categories.

	Land less	Marginal
Number of households	38	2
Population	4.4	4.5
Workers	2.6	2.9
Average Population worker	4.4 2 7	

B. Days of wage paid Employment per worker

Agriculture	140	121
Non-Agriculture	88	75

C. Days of Employment per household classified by nature of Employment

Total available	780	870
Casual	593	568
Year round	9	51
Residual	178	251

D. Housedold Income by sources

SELF EMPLOYMENT

Diary poultry etc.	158.61	52.78
Household Industry	185.89	43.83
Farm income	—	1137.58
Total	344.50	1234.16

WAGE EMPLOYMENT

Agril.	2258.20	1892.44
Non-Agril	1420.26	1174.76
Total	3678.46	3067.20
Total Household income	4022.90	4301.36

E. Percapita and per worker Income

Household Income	4022.90	4301.36
Percapita Income	914.29	955.85
Perworker Income	1547.26	1483.22

F. Earnings perday in self employment

Income per day in self employment	1.93	4.91

FOUNDATIONS OF WAGE THEORY AND OBJECTIVES OF WAGE POLICY IN A DEVELOPING ECONOMY

Dr. Sanatan Mohanty

TRADITIONAL WAGE THEORIES :

Adam Smith was pioneer in formulating a comprehensive wage theory based on the ideas of the earlier Physiocrats and Mercantilists. When Adam Smith says that "the produce of labour constitutes the natural recompense of wages of labour"[1] he evidently advocates a productivity theory of wage. But from his analysis of the process of wage determination, we find hints of the various alternative theories of wage developed subsquently, e.g. Exploitation, Bargaining, Subsistence Wage Fund and Residual Claimant. In fact it is difficult to say what aspect he was emphasizing upon in the determination of wage. In the face of the various theories of wage, traditional economists generally agreed that the actual levels of wage were the products of market mechanism. The lower limit was fixed by the levels of subsistence and the higher limit by the marginal productivity of labour. Actual rates varied between the maximum that the employers could pay and the minimum that the labourers could expect.

Modern economists have questioned the traditional view that wages are determined by market forces. They are of the view that wage structures and wage levels in countries cannot be explained only in terms of the labour market forces without reference to the environment and setting in which wages are actually fixed. J. T. Dunlop has rightly remarked that "the wage theory of a period can be interpreted as a product of (1) economic developments and quantities of the time and place, including the movement of wage rates; 2) the wage setting institutions, (3) the dominant economic theory of the period, and (4) the policy issues of the day"[2] Eminent economists like Barbara Wooten[3] and J. R. Hicks have alse recognised the fact that wages are influenced by non-economic forces. Hicks went to the extent of saying that "Economic forces do affect wages, but only when they are strong enough to overcome the social forces."[4] This paper makes an attempt to analyse the economic and non-economic foundations of wage

theory and the objectives of wage policy in a developing country like India.

Foundations of modern wage theory

Economic foundations : It is natural for wages to be influenced by economic forces, e. g. the characteristic features of labour and product markets, monetary situation reflected in the price level and cost of living index; and the pace of economic development reflected in the growth of G. N. P. The non-economic forces, which are usually ignored by economists, have both direct and indirect bearing on the levels of wage in developing countries. Based on the ideas of the French Economist Bastiat, Watson has aptly remarked that ' the theory of wages describes many things not seen."[5]

Sociological factors : The influence of sociological factors on the wage levels of a country is quite evident. Wide difference in wage and multiple scales of pay in developing countries are due to the existence of social stratifications in these countries. Even the scales of pay for employees of Government services in India are reflection of our hierarchical society, where pay and prestige go together. One does not find any reasonable justification for maintaining token differences in pay; or putting different categories of employees on the same scale of pay, and allowing some to go to a higher slab of the scale, while leaving others to stagnate in a lower slab. On the other hand emphasis on higher levels of minimum wage in the developed countries is due to the acceptance of the norms of an egalitarian society.

Political system : A democratic society believing in free and competitive economy, leaves the levels of wage to be determined mostly by market forces, and tries to correct the aberrations, if any, only marginally, through social security and labour legislations. On the other hand a socialist state regulates wage directly without leaving it to market forces.

Legislative, administrative and judicial influences : Wage levels are influenced by legislative and administrative decisions. Wages are some times fixed by law or executive orders. Corporate managers, both in the private and public sectors, also play a role in influencing the levels of wage. Judicial decisions in influencing wage structure can be traced in the judgments and adjudications of labour tribunals.

Collective bargaining : Experience of the modern industrial economy has established the fact that labourers can influence wage levels through collective bargaining Unfortunately labourers in a developing country like India, specially those in the rural sector, are most numerous, and less organised. There is the existence of socio-economic classes among them with rigid barriers. Due to these features their bargaining strength is reduced and they are often deprived of their legitimate wages.

Investment on human capital Development : Health care, Family welfare, education and training, and technological development have indirect influence on the levels of wage. Investment of capital in the rearing and early training of workers is a factor which ultimately influences wage level. Such investment is limited by the resources of parents, by their forecasting the future and by their willingness to sacrifice for the sake of their children. Alfred Marshall has rightly said that the son of an artisan has a better start in life than the son of an un-skilled worker. He is brought up in more refined home with more of mother's care. Similarly the investment on technical training given to the young worker depends on the unselfishness of the employer because he knows that the worker sells his work but retains his property to himself.[6]

Public expenditure on social services, e.g child care, family welfare, general and technical education, and social security expenditure on employment and health schemes influence the levels of efficiency of workers and ultimately wage levels.

Wage policy in a developing country :

The objectives of wage policy are generally to evolve an equitable structure of wage based on skill and experience, and to ensure a reasonable standard of living for workers within the limits set by productivity and economic development.[7] Formulation of wage policy in a developing country is a complex affair. Wage levels determined by the operation of the spontaneous processes of labour market in an industrialised economy are not suitable in case of the under developed countries. On the one hand wage levels have important implications for other strategic economic variables, e.g. investment, productivity and employment; and on the other hand there is increasing awareness of the pronounced economic and social inequalities which lead to distortions in development programmes.[8] It may be relevant to discuss here some of the constraints in formulating wage policy in a developing country like India.

The unorganised rural agricultural seotor :

Wage policy in a developing economy like India should be analysed in the context of the specific features of the labour market. The industrial sector is more or less organised. On the other hand there is the large mass of unorganised rural sector constituting landless cultivators, agricultural labourers and rural artisans. The large mass of unemployed and underemployed people among them are exposed to the exploitation of big land owners. States in India have recently enacted minimum wage legislations for agricultural labour. But it is impossible to enforce machinary in the vast rural areas, and the labourers are not organised to take advantage of the law.

Disparity in wage levels in agriculture and industry is likely to create distortions in the economy. Lower wages in agriculture may limit demand for industrial goods, whereas higher industrial wages may limit employment opportunities. There should be a balance between the rural and urban wages.

Wage policy and other economic variables :

Wage policy to be realistic must establish relationship with other economic variables, e.g. prices, employment, production and national income. It cannot be treated in isolation. Wage policy in public sector undertakings has also direct bearing on the wage levels in the private corporate sector.

Conflicting interents :

Formulation and execution of wage policy involve conflicting interests of various classes, groups and organisations. Alongwith employers and trade unions, political parties also get themselves involved. This is inevitable in a democracy. Steps would be taken to associate different interests not only with wage policy making, but also with the implementation of the same at different levels. Even the minority interests should not be ignored as they are likely to create problems. There is need for cooperation among the conflicting interests in a democratic set up.

Wage policy and an egalitarian society :

Wage policy, as such, cannot be expected to serve as an instrument in solving the fundamental problem of inequality in a developing society.

Wage policy can have limited objectives. Establishment of an egalitarian society is possible through a policy mix. Besides for an appropriate wage policy, there should be the policy of social investment on education, health and housing; social security and social insurance measures; balanced development of the rural and urban sectors; progressive fiscal policy measures; and above all an emphasis on structural and institutional reforms in the socio-economic system with a view to providing opportunities to the weaker sections to come up and claim their rightful position in the society.

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WAGE STRUCTURE IN A DEVELOPING ECONOMY : A MACRO APPROACH

R. C. Sarangi

The paper reflects an aggregative approach to the Wage Structure in relation to manifold economic variables. The methodology adopted is based on secondary data. In the study of each of the aspects, the hypothesis is clearly spelt out and such hypotheses have been tested on the basis of empirical evidences.

In the introduction, the significance of the wage structure in a developing economy like India has been highlighted. Some theoretical models in the context of wage structure relevant for a developing economy have also been examined.

Broadly it is a study of the wage-price relationship, wage structure in the agrarian sector and the industrial wage level.

In a developing economy any meaningful analysis of economic development must necessarily mean an elavation of the standard of living of a large segment of population suffering from the backwash effects of growth. The computation of the general wage level either in terms of the real or money wage would not lead to identical results.

The theoretical models built by Kalecki and others are based on the premises :

(1) Average wage should be proportional to the per capita output.
(2) The share of labour depends on the degree of monopoly power.
(3) Real wage in a country varies from time to time according to the terms of trade.

It can be corroborated that trade relationship tends to establish an undesirable wage structure in a developing economy.

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In studying the wage price relationship the evident hypothesis is the correlation between the wage and price. One of the main constraints in the process of growth in a developing economy is its vulnerability to the wage price spiral. The vulnerability is essentially attributed to the gap between the generation of money income and that of wage goods and between aspirations of the working class and their realisation. A logical concomitant of the wage price relationship is to attain a balance between stability on the one hand and guaranting social justice on the other. As a solution to this wage price riddle it may be imperative to formulate appropriate frame work for the wage price regulation with the help of monetary and fiscal variables.

So far as the wage structure in the agrarian sector is concerned, this two hypotheses are : (1) There are are uneven wage rates for all categories of labour and (2) The disparity in wage rate also exists amongst the male and female labourers. The broad disparity in the wage rates is attributed to the uneven increase in the agricultural labour force. The agricultural labour is unskilled and unorganised. The labour supply with declining efficiency is broadly determined within the limits of survival and subsistence popularly termed as the tolerance level. The growing misery and distress of a large proportion of agricultural labourers would necessitate strict adherence to the statutory minimum wage level. The intra sectoral disparity manifested in the male and female wage rate can be removed to a greater extent by imparting education and training to the workers in general and to the female labourers in particular. In order to make minimum official wage rate effective, creation of adequate avenues of employment for the absorption of the surplus labourers in the rural areas is warranted.

Coming to the industrial sector the intra-sectoral disparity in the wage level is accounted for the skilled, semi-skilled and unskilled labourers in industrial concerns. The minimum wage is intended to provide not only the more subsistence but also to maintain the efficiency at a higher level. The study of the wage structure in this sector would reveal that despite the preference maximising objective of the trade union and the effectiveness of the collective bargaining strength, the wage increase in the industrial sector not in commensurate with the increase in productivity. The I.L.O Report on general wages provides ample testimony to this effect.

In concluding paragraphs, stress has been put on the activating finance rather than functional finance. The broad conclusions are (1) The

wage structure in a developing economy must secure for all categories of workers such amount of wage sufficient to maintain a reasonable standard of living. (2) In formulating a rational wage policy it would be necessary to avoid inflation as far as possible (3) In order to promote industrial peace and ensure social justice and further to remove the intersectoral and intra sectoral disparity in the wage rates, it may be required to motivate the workers to develop skill, make the labourer more mobile and to allocate labour in desirable lines.