ORISSA ECONOMIC JOURNAL

Volume V Number Two

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ORISSA ECONOMICS ASSOCIATION
BHUBANESWAR

PREFACE

This issue of the Journal contains the papers discussed at the 5th Annual Conference of the Orissa Economics Association held under the auspices of the Bhadrak College, Bhadrak, on the 22nd and 23rd July, 1972. The subjects selected for discussion in the Conference were :

1. *Employment and Productivity in Agriculture in Orissa;*
2. *Investment in Education in Orissa.*

This issue also includes the Rapporters' reports on the two subjects, the address of the President of the Conference, and the inaugural and welcome addresses delivered at the Conference. We thank the Rapporters for writing the reports and all persons who took part in the discussions of the subjects.

B. Misra
Editor

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ADDRESS OF WELCOME

by

T. Misra

Chairman, Reception Committee
Principal, Bhadrak College

Mr. President, Sri Das, Minister of Finance, Planning & Coordination & Commerce, Distinguished Delegates, Fellow Members of the Reception Committee, Ladies and Gentlemen,

I have the honour, on behalf of the Reception Committee, to extend to you all a hearty welcome to the 5th Annual Conference of the Orissa Economics Association. I am much obliged that our College has been chosen as the venue for such an important conference of a learned association like yours.

We are all happy, and in particular, I have personal reasons to be proud, that Sri Das, in spite of his numerous pressing engagements, is with us this evening. By his continuous selfless service and sacrifice for the country and the mass, especially as an architect of socialism, socialistic economy and social justice, he has earned the love and admiration of the millions. We are fortunate that such a personality is here to inaugurate this conference which is assembled to make momentous decisions on economic issues towards the reconciliation of economic growth and social justice.

To you, Mr. President and the learned delegates, most of whom are my friends and fellows of the same fraternity, I have a special debt of gratitude. You have not only honoured us by selecting this venue, but also done us a favour by enabling us to arrange a friendly get-together, as it were, on this occasion. I know the limitations, that in a rural college like ours we are not in a position to provide the

standard amenities required for modern living; but nevertheless, friends as you are, the less we afford, I hope, the more shall be your favour.

Bhadrak is a subdivision with a rich socio-cultural heritage and basic economic significance. In the 16th century from the time of Akbar when the Muslim population originally settled down here, the Hindu and Muslim neighbours have been living as fellow brothers in perfect peace and complete accord. The harmonious integration of different classes of people in the subsequent centuries on account of exchange of population has resulted in an unprecedented synthesis of culture for which Bhadrak has occupied a pioneering position in the fields of art and literature, education and leadership. Being an important junction in the socio-religious life of Orissa, it has been sanctified by the sojourn of Guru Nanak, Sri Chaitanya, Ma Sarada Devi, Mahatma Gandhi and many other celebrities. Endowed with many latent economic potentialities hitherto unexplored, it has once been a centre of maritime trade and commerce through its ports—Chandbali and Dhamra. As a centre of large scale production of paddy, it still occupies the position of being the rice-bowl of Orissa, or the granary with an average despatch figure of 30,000 tonnes of rice outside the State every year.

The present Conference is meeting at a critical juncture when the right approach to the Fifth Five Year Plan has to be formulated to effect the eradication of poverty. As laymen, we are happy that amidst other problems the Conference will deliberate upon the two leading economic issues, namely 'Investment in Education' and 'Agricultural productivity and employment'. The humanistic ideal of education for its own sake is a wasteful institution for a developing economy, where education cannot but be treated as a process of economic growth. Especially in a backward State like Orissa, large investment on education, oriented to provide gainful employment and production of economic needs, can build up the human capital necessary for the creation of infrastructure of the economy. A rational expenditure on this type of education and the application of its results to productions are governed by the law of increasing return.

Agriculture also plays an equally important role in so far as it contains the seeds of economic progress. With organised agrarian reforms and mobilisation of resources of the rural sector, the process

of economic growth cannot only be accelerated but also made compatible with social justice. As common men let us hope that the learned delegates of this Conference will arrive at important decisions on these issues which will go a long way in breaking the so-called 'vicious circle of poverty'.

Before I conclude, I convey my sincere apologies to the distinguished delegates and guests for the inconveniences caused to them on account of the prior inclemency of weather, inadequacy of amenities and the deficiencies and failures. With a deep sense of gratitude to you, Mr. President and learned members of the Association, I once again welcome you all with sincere cordiality and warm affection to this Conference.

Thank you,

REPORT OF THE SECRETARY, ORISSA ECONOMICS ASSOCIATION

Mr. President, Respected Chief Guest, Chairman, Reception Committee, Delegates, Ladies and Gentlemen,

I have great pleasure in welcoming you all to the Fifth Annual Conference of the Orissa Economics Association. We are indeed very grateful to Shri Banka Behari Das, Minister, Finance, Planning and Co-ordination and Commerce for having accepted our invitation to inaugurate the Conference. Shri Das has been an eminent Socialist leader in the country and the merger of the PSP with the Ruling Congress in the State under his leadership marks the beginning of a new era of the political stability in the State. We earnestly hope that with him as Planning Minister the underdeveloped State of ours whose per capita income is almost lowest in the country will march ahead and progress rapidly so that the State can come to the level of all-India average. He has made valuable suggestions for mobilising the resources of the State as a member of the Orissa Taxation Enquiry Committee, 1961. We hope that now as Finance Minister of the State he will implement these in order to mobilise adequate resources for economic development of the State.

We are also extremely grateful to the Principal and Members of the Staff of Bhadrak College for taking all the troubles in arranging this Conference here.

The Association organised its first Conference at Cuttack in 1968 and now it has completed five years. The primary objective of the Association is to develop intellectual understanding among the economists of the State, through annual gatherings which provide an opportunity to exchange views and discuss the pressing economic problems of the State.

This Association is the only organisation in the State which affords opportunity for all the economists of the State to get together. The members of the Association include some eminent economists of the country, but it is unfortunate that their services have not been properly utilised by the State. We feel that the economists of the State should be associated with the Govt. in providing the expertise in formulating the State Plan and its evaluation. They should be consulted on various economic issues which confront the State. We are a group of professional economists who sincerely believe that we cannot do justice either to our profession or the State by simply remaining confined to the class rooms. We feel great concern for the present state of the economy of the State, the problems of growing unemployment and acute poverty. Orissa presents a picture of 'poverty amidst plenty'. We feel that the single factor responsible for the slow progress of the State is its heavy reliance on the bureaucratic machinery for decision making. The bureaucracy often displays utter lack of understanding of the aspirations of the people and formulates plans in an unrealistic manner and implement them without a sense of involvement. The active participation of the professional economists in the decision making process has become very much imperative today and here we plead for active participation in the best interest of the State.

The Association is extremely grateful to Dr. Baidyanath Misra, Secretary, Youth Welfare Board, for providing a sum of Rs. 4000/- to the Association. I am also personally very much grateful to the President of the Association, its Editor, Dr. Bidyadhar Misra, and Dr. Baidyanath Misra for their advice and co-operation in performing my duties. The Association is also grateful to Dr. Sadasiva Misra, the first President of the Association, who has kindly agreed to be with us and deliver a lecture tomorrow, Lastly, I thank you Ladies and Gentlemen for your kind presence and cooperation.

RANGLAL AGARWALLA

INAUGURAL ADDRESS OF

Shri Banka Bihary Das,
Finance Minister, Orissa

TECHNOLOGY AND THE STRATEGY OF DEVELOPMENT

Technology and its application to productive sectors have always been the most important factor in the strategy of growth in a country, irrespective of its stage of development. Hence, a major problem that has to be faced in development planning is that of choosing between different alternative techniques of production. Although, since after the Second World War, the economics of the developing countries have received maximum attention, yet, this aspect of the choice of technology suitable to the objective conditions of developing countries has been given scant regard by economists and planners.

The number of alternative techniques available is rather large, varying from primitive hand process to automatic manufacture, from wooden plough to tractor and from the charkha to the automatic loom. Even amongst the developing countries, one set of productive techniques suitable in a particular field cannot be uniformly employed. Several factors govern the choice and level of technology best suited to a particular developing economy to get the maximum results, both in economic and social terms.

The economists of developed countries or such experts from these countries who have come to assist in the process of planning in the developing countries, have not cared to study this important question. Even the economists of the developing countries who have been mostly trained in those countries have given the least attention to this aspect of production technique, lest they be branded as less modern. This superstition in approach has harmed all the developing countries and particularly India. In fact, even today, there is little awareness of the need of the choice of suitable technology in different sectors of economy.

However, a social scientist can hardly neglect this important factor in the strategy of growth.

Two most important factors govern the choice of alternative techniques of production and condition the acceptance of highly automatic mechanical techniques which provide maximum production and a very high rate of growth. The first factor is the amount of the capital available for investment in the economy. The second is the size of the population, particularly of working age group, of a country and the rate of its increase. Gone are the days when economic growth was being thought of in terms of investment only, irrespective of the fact whether it ensured employment in full or in part to the nation. With the popularisation of the concept of the welfare State, the question of employment has gained significance in planning and full employment has become one of the cardinal principles of planning and has been accepted as an obligation on a civilised society.

Though these factors are important in the development of any type of economy, they are particularly and highly significant for a developing economy where capital resources for investment have got to be mobilised and large numbers of the unemployed and "disguised unemployed" are to be given employment. A socialist economic policy can hardly lose sight of these factors.

The amount of capital investment per unit of labour varies greatly from technique to technique, and the higher the technique, the bigger is the amount of capital investment required for employing it. If capital can be found in sufficient amount to utilise highly computerised techniques of production, the question may not be so much complicated. But in the case of the developing countries this is just not possible. The development of the economy is at such a low level that there is not enough scope for savings and collection of internal resources for investment. The next alternative is foreign aid and invitation to foreign investment to fill up the resource gap in the investment field. Even if all the developed countries were to come to realise their duty towards the backward nations and to contribute liberally to aid them, the dimension of investment requirement is so great that it would still not be possible for them to finance the industrialisation of the developing nations by utilising modern techniques.

Some years back, some progressive countries and political parties had proposed that every developed country should contribute at least one per cent of its national income to the development of backward nations. But this has not materialised, and barring one or two nations, others have

not shown readiness to contribute this proportion. On the other hand, the climate for foreign aid is in fact gradually vanishing. India's experience in this regard is disappointing and bitter. That is why the Fourth Five Year Plan has reduced the percentage of foreign aid in the total investment and it is proposed that the economy becomes self-reliant as far as possible. That has been the fate of many other countries. The biggest aid-giver, the USA, has reconsidered this matter for political reasons and my discussions with the officials of the State Department and prominent members of the Foreign Affairs Committee of the Senate in the month of April, 1969, have led me to the conclusion that the USA will gradually reduce its aid to all developing countries. Subsequent event have confirmed my conclusion. There appears no possibility of change of climate in the world in the coming years. How can India, in this situation, opt for higher technology in various fields of the economy, which requires higher capital outlay ?

The second major limitation of India and such other countries is large population. Whether one agrees with Professor Nurkse in his definition of "over-population" and 'under-population" or not, one cannot be oblivious to the fact of the high density of population in India and its high rate of growth. It may or may not be over-populated in the fundamental sense of Malthusian doctrine, but there is no doubt that with respect to the existing capital and other productive resources, it is disproportionately over-populated. Every year huge armies of men of working age group are being added to the labour force, demanding employment. Besides this 'visible' unemployment, we have a greater dimension of 'disguised unemployment'. They may be employed, but because of partial employment, the marginal productivity of labour is low.

Unlike the problem of lack of capital, this problem in India is different from that of many other developing countries, particularly of Africa. The density of population in those countries is low, and unemployment in those countries will not be a great problem, even if higher technology were to be adopted. The density of population per square kilometre, according to 1967 estimate, is much below one hundred (it is 31 in U.R., 67 in Nigeria) in African countries, is 106 in Pakistan and 36 in Burma, whereas in India it is 156. Even in the developed countries like USA and USSR, where capital is plenty, the density of population is 21 in USA and 11 in USSR. Can India afford to adopt the same higher techniques of production which UAR and Nigeria can adopt or USSR have pursued ?

Technology is neutral to ideology and both USA and USSR can easily adopt highly computerised technology in their strategies of growth; but countries like China and India will have to treat a different path. Even China is in a better condition because it has a density of population much below that of India, it being 75 per sq. kilometre.

These limitations compel India to adopt a technology which is labour intensive. In selective fields we may have to accept automatic mechanical devices because of the very nature of things, but by and large we will have to develop labour intensive techniques of production to suit our circumstances.

Economic growth is required not for its own sake but for the man and if the entire labour force cannot be gainfully employed, then modern planning loses its importance. This also gives rise to serious unemployment problem, which creates economic and social problems in the society. Such a condition creates political instability in which democracy and democratic values become first casualty. So, in Indian conditions, highly computerised technology, even if available, is likely to threaten the very social and political fabric of the country. This inevitably encourages forces of anarchy and totalitarianism. The choice of technology is therefore highly important.

Two alternatives confront the Indian situation. Higher technology, leading to more production, causing high unemployment, brings in economic difficulties and political chaos which retards production and growth. On the other hand, 'comparatively' lower technology, leading to high employment with relatively slower rate of growth brings in conditions of stability and safeguards democracy. The later choice is preferable, even if a slower rate of growth is accomplished in the beginning, though it is not inevitable.

The consequences of the second alternative are also being contested by many modern economists. Higher investment does not necessarily mean faster rate of growth, they contend. Mr. Gunnar Myrdal, the eminent Swedish Economist, in his recent book 'Asian Drama' an enquiry into the poverty of Nations, has exploded this myth. His contention is that South Asia's poverty is not due to shortage of capital as commonly attributed. It is due to irrational attitudes and outmoded institutions. Unless there are 'attitudinal and institutional changes', there is no remedy against the abysmally low level of living. If such changes in attitudes and corresponding reforms in social institutions take place, the rate of growth may be accelerated significantly despite a technique which is comparatively less automatic. Modern

economists take into account social and political factors in the strategy of growth unlike their predecessors. That is why the famous economist Rostow gave importance to political climate of a developing country as one of the ingredients in his theory of growth leading to 'take off' in the economy in relation to development.

Till the Second World War, Japan deliberately followed such a labour-intensive technique and it boosted its economy to such an extent that it posed a challenge to all. Though now it has gone in for highly automatic technique of production, owing to the initial start the subsequent growth since the end of the last century has been phenomenal. Today Japan has attained her annual rate of growth which is as high as ten per cent and it has been so since 1950, barring one year only. How could Japan stand second only to the USA in the world in terms of gross national product or of national income ?

Even at present, in Japan, agricultural sector is completely different from Industrial sector as regards technology. The power tiller which symbolises this technology in agriculture is no less modern, though it is labour intensive, not labour saving as is the case with the tractor. During Mac Arthur's regime after the second world war, radical land reform was implemented in Japan and a ceiling on family holding was imposed at approximately seven and half acres. Only in a small northern part of Japan, where only one crop in a year can be grown because of heavy snow for half of the year, the holdings are much larger than this ceiling. There only tractors are used in farming. Power tiller lightens the burden of man, and thereby helps in raising more crops in a year and does not save labour as tractors do. So in Indian conditions, by and large, labour-saving devices like big tractors are not of much use, whereas power-tiller are of real relevance. An average farmer can go in for power tillers or such other mechanised multi-purpose plough because of smaller holdings and low investment, whereas a few big farmers can utilise tractors. If land reforms are sincerely effected in India, then power tiller technique will represent the real choice of technology in the agricultural economy.

It is again a superstition in India that labour saving technique is the only modern technique and labour-intensive techniques are antiquated, primitive and less modern. High cost of labour and lack of labour impelled the Western scientists and research scholars to devise a technology which is labour-saving. That has been a constant endeavour in those countries and it will continue to be so. But Japan an equally developed country went in for labour-intensive technology both in industry

and agriculture till late, because it had cheap and abundant labour. It has now opted for higher technology in the industrial field because labour costs have gone up and the country has attained a level of full employment.

When labour intensive, yet modern, level of technology is termed as intermediate, economists object to it because intermediate smacks of something which is not modern. This was my experience when I discussed with some Western economists and social scientists who are dealing with the economics and development planning of the developing world. Many of them appreciated this approach towards technology in the developing countries, but they objected to the word "intermediate" on the same ground as suggested above. They admitted that this field which is vital for developing countries like India with high population, has been neglected as Western economists are concerned with a technology which is advancing more and more to replace labour.

India goes in for foreign collaboration and technical knowhow without considering this important aspect, which has serious repercussion on the future. Environment research which is generally directed to utilise indigenous knowhow, labour and materials has been neglected. Utilisation of labour both skilled and unskilled, has never been given importance when planning of projects is undertaken. Even when a dam on a river or a dyke is taken up, heavy earthmoving machines are imported by wasting large amount of foreign exchange which we seriously lack. Instances are not rare when these have remained idle because of bad handling and lack of spares and components. The industrialists go in for modern plants from A to Z, and never bother whether a part of the plant can be locally manufactured and some of the processes in the plant can be manually operated. They want to avoid employing more men and dealing with more men, though it might reduce the costs. If factories cannot deal with men by employing them gainfully, then the police will have to deal with the unemployed youths in streets with batons. A change of approach is however needed, because an engineer who designs a dam or designs a factory, identifies portions which can be dealt with by human labour without harming the efficiency of production. Instances could be cited of how some countries which have imported highly mechanised plants, have failed to utilise fully their productive capacity because the level of skill locally available was of a lower order and automatic plants in the hands of such countries could never give maximum production. It has been sarcastically pointed out that the developing countries which clamour about shortage of foreign exchange

and aid, spend lavishly their hard earned foreign exchange by indiscriminately buying automatic plants.

The right approach to the productive technique for India coupled with environmental research can solve this problem. Population control measures can give results in the long run, but had choice of technology which should go hand in hand with that social measure, aggravates the problem when population is growing at a rapid pace. This mad rush for technology of automation whether in the office of Life Insurance Corporation or Oil industry, makes the projects capital-intensive when capital is scarce in the country. Machines are not substitues for inefficiency, they are meant only to further production.

Mr. J. R. D. Tata, in the international Labour Conference in Geneva in 1969, has complained that India was moving too much in the direction of capital intensive industries by neglecting human labour. How I wish this idea gets root in him and his colleagues in the industrial field. It has become a question of change in the approach and attitude. An 'attitudinal reform' in the words of economist Myrdal is needed, even in this sphere of technology, if India is to attain growth with stability. Rightly planned, a core of automatic manufacturing process may have a large periphery of labour intensive process in a plant and a core of automatic plant can enlarge the scope for a large number of labour intensive industries around it.

The choice of technology for India is not a question of ideology, but the logic of compulsion of objective conditions. It is a human, a social approach to the problem, not purely an economic approach.

PRESIDENTIAL ADDRESS

PLANNING FOR GROWTH WITH SOCIAL JUSTICE

Dr. Chakradhar Mishra

Director, Bureau of Statistics & Economics, Orissa.

Hon'ble Minister, Finance, Planning & Coordination, Orissa, Chairman of the Reception Committee, Members of the Orissa Economics Association, Ladies and Gentlemen,

2. I express my deep gratitude to the members of the Orissa Economics Association for inviting me to preside over the Fifth Conference of this distinguished body. From the beginning, I must confess that your choice in inviting a person like me, who is basically a Statistician, to preside over the deliberations of the Economists, brings an element of inhibition in me; never-the-less, this is a recognition of the growing urge and the increasing need for closer integration of the two professions, for playing a more useful role in directing the process of our economic thinking and economic planning. This is necessary because, I believe that 'theory without practice is sterile and practice without theory is blind'.

3. I intend to draw your attention to certain basic problems of planning in a developing economy, with special reference to Orissa. These problems arise from the following considerations :

(*i*) Whether our planning strategy and approach are consistent with our basic economic and social objectives ?

(*ii*) Whether planning in terms of overall growth rate is capable of effecting equitable distribution of income and wealth, or reduction in economic disparity and social backwardness.

(*iii*) What sort of rethinking and restructuring of our planning model is necessary to achieve our objectives of development.

4. India has, by now, completed twenty years of planning. Our strategy of development, in different plan periods, has determined the priority in the allocation of resources to different sectors of the economy. Whether the emphasis was on agriculture sector as in the First Plan or on the growth of industries and minerals sector as in the Second, on the irrigation and power sector as in the Third Plan, or on the development of infrastructure as in the Fourth Plan, the basic planning technique is one of a growth model.

5. The objectives of our economic policy as enunciated in various plan documents, have been 'to promote a rapid rise in the standard of living of the people, by efficient exploitation of the resources of the country, increasing production, and offering opportunities to all for employment in the services of the community'. For this purpose it was envisaged to increase the national income by 11% during the First Plan, by 25% during the Second Plan, by 30% during the Third Plan and by 27.5% during the Fourth Plan period.

6. In terms of achievement, the growth of national income actually had been higher in the First Plan. It increased by 18% as against a target of 11%. This increase was not, of course, so much due to increase in the efficiency of production but was rather a reflection of our inexperience in target fixation. In subsequent periods, however, the achievements have been widely fluctuating. It was 4% per annum in the Second Plan while it fell down to 2.5% per annum in the Third Plan and again it picked up to 5.3% in the First year of the Fourth Plan, which could not be sustained in the second year, when it came down to 4.8% in 1970-71.

7. Whatever may be the degree of fluctuations in the growth rate, the very strategy of raising the standard of living by increasing the aggregate national income seems to have assumed that a faster rate of growth of national income will, by itself, create conditions for fuller employment and thereby produce higher living standards for all including those at the tail-end of the society.

8. It has to be noted that during this period, India's economic base has been greatly strengthened. Looking at the brighter side of India's economic development, one would find that in the 'Agriculture sector', food grains production has been more than doubled, from 54.8

million tonnes in 1951-52 to 112.0 million tonnes in 1971-72, resulting in making India not only self-sufficient in food grains but also turning it from an importing country to an exporting country. For the first time in India, we have been able to exceed the food grains production target in the year 1970-71, when the actual production recorded a level of 107.8 million tonnes as against the annual target of 105.0 million tonnes. We will perhaps be able to reach our target of 129.0 million tonnes of food grains by the end of the Fourth Plan.

9. As a result of such encouraging developments in food grains production, the annual rate growth in the agriculture sector in the first two years of the Fourth Plan was 5.1% and 5.3% respectively. Considering the fact that in India nearly 65% of total household consumption is comprised of agricultural products and the overall elasticity of demand for food products being of the order of 0.8 and that the projected growth of population being 2.5% per annum, the demand for farm products is estimated to rise at the rate of 4.7 per cent per annum. The midterm achievements in the Fourth Plan at 5.2% per annum in agriculture sector is therefore certainly a good performance and builds up an annual surplus of the order of 0.5 per cent.

10. While this has been the performance in terms of growth rate what has been its effect in terms of distribution of income and reduction in disparity in the standard of living. Agricultural development has the inherent capacity of largely influencing the rural consumption standard. A look at the consumption distribution pattern in India shows that the share of the lowest docile group of rural population in the total national consumption is 65% lower than the average with 50% of the rural population enjoying a consumption standard which is 30% below the average, whereas the richest 10% of rural population enjoy a standard which is 126% higher than the average level. Thus the gap between the rich and the poor has assumed an alarming proportion. The gap in the per capita consumer expenditure between the top 5% and bottom 5% of the rural population has increased from Rs. 795 in 1960-61 to Rs. 1447 in 1967-68. In Orissa, the highest expenditure group was spending 15 times more than the lowest group in 1961-62 and after a decade in 1970-71, it now spends 18 times more.

11. Thus the end result shows that the growth model which has been adopted as our strategy in planning is not sufficient to achieve the

social objectives. It is therefore, necessary to analyse the causes as to why the high growth rate has not resulted in reduction of the inequality.

12. If we assume that the pattern of income distribution is a dependent variable, the two independent variables on which it depends are (*i*) firstly the volume of aggregate income, and (*ii*) secondly, what may be termed as the 'production relations', obtaining in the economy.

13. It has been indicated earlier how national income is increasing in different plan periods. As regards production-relations, not much attention has been paid so far. As we find, production relation is the manifestation of the pattern of ownership of the means of production. In Indian agriculture, the distribution of land-holdings presents a picture of extreme skewness in the ownership pattern. As many as 43.3% of the households in the lower holding groups own only 1.6% of the total land while only 4.3% of the households in the higher holding groups own 35.8% of land and what is still more important is that the first category possesses land in below 1 acre size-holdings, whereas the size class of the ownership holding of the later category is 20 acres and above. Under such ownership pattern, if per-acre income originating in the agriculture sector is presumed to be uniform (which is actually not the case), then only 1.6% of the income is being distributed among 43.3% of the house-holds, whereas big land holders owning 20 acres and above constituting 4.3%, share 35.8% of total agricultural income. It happens largely because of the capacity of big landholders to build heavy economic overheads. Use of irrigation pumpsets is an indicator in this regard. Studies on benefits derived from rural electrification shows that 57.7% of the electric pumpset owners had holdings of more than 10 acres, whereas only 3.8% had holdings below 2.5 acres.

14. Secondly, as the increase in agricultural production is largely accounted for by the High Yielding Variety Programme and as the higher input-costs make this programme more successful in large size farms, the relatively higher income flowing from it makes the disparity in income distribution still sharper.

15. Under such conditions, available projections suggest that if one were to rely on growth rates alone without directly tackling the problem of income distribution, it may take another 30 to 50 years for

the poorer sections of the people to reach a minimum consumption level. Is it desirable to think in terms of such a waiting period ? The theoretical postulates of growth-economics, which assume that in the process of increase in the sectoral output and income, the share of different factors of production will increase in proportion to their respective contribution to the aggregate national income, may have some validity in a developed economy, where there is high degree of employment, or near-full employment. But in the context of the Indian economy, where there is large-scale unemployment of not only man-power but of other resources, the validity of this assumption is doubtful. This is the reason why multiplier-analysis has not been considered suitable as a distribution theory.

16. The assumed conflict between growth and social justice in earlier plans has been based on the arguments which assert that whatever surpluses are mobilized from the richer classes are needed for investments primarily directed at raising the future rate of growth. For this reason there was a school of thought which even advocated greater inequality in income distribution. Whatever might be the justification for this view in the initial years of planning, Indian economy now has reached a stage where larger availability of resources may make it possible to launch a direct attack on poverty for ensuring a reduction in the disparity of income and wealth, on a priority basis, while also assuring adequate growth.

17. Another aspect which deserves special attention centres round the question whether dependence on the strategy of growth alone, which has failed to reduce inequality in income distribution among the individuals, has reduced regional imbalances which was also another professed objective of our plans. Differences in the levels of development between State and State arise out of variations in the activities in different sectors of the economy. The tempo of economic activity is primarily dependent on three factors *i.e.* the size of investments, capital output ratio, and the level of efficiency and skill. The later two factors, however, do not vary so much between State to State, as the size of investment. Till the beginning of the Fourth Plan there was no fixed principle in the matter of allocation of investible funds between the States. The flow of Central assistance was higher in case of more prosperous States than others. As a result of this, the growth rate of the economy at the beginning of the Third Plan, in 1961 over 1951 was 78.7% in Maharastra, 46.6% in Punjab, 45.2% in Madras, 40.5% in Gujrat, 30.9% in West Bengal, while it was only 18.6% Orissa.

18. Economic indicators for different States show that in terms of per capita income, Orissa is second lowest in India, having a per capita income of only 52% of that of Punjab, the State with highest per capita income, Orissa's per capita rural consumption expenditure is only 74% of that of Assam and, in fact is the lowest in India; her per capita agricultural income is less than half of the corresponding income in Andhra Pradesh, Assam and Haryana; her per hectare income is also less than half of that of Haryana, Andhra Pradesh and one-third of that in West Bengal and Assam; her coverage of irrigation measured by percentage of net irrigated area to net cropped area is only 16.3 compared to 58.8 in Punjab 41.3% in Tamil Nadu, 37.8 in Haryana, 36.1 in Uttar Pradesh. Not only in the field of agriculture but also in case of infra-structure, Orissa has only 44 km of surfaced road per lakh of population compared to 61 km at all-India level and 2 km of such road per 100 square km of area as against 10 km in India. With 11 km of railway lines per 100 sq. km of area, Orissa is only better than Nagaland and at par with Assam. In the sphere of industrial development, Orissa has only 337 industrial workers engaged in registered factories per lakh of population, which is also lowest in India, and nearly one-seventh of industrially developed States like Maharastra and West Bengal. These are all familiar figures and continue to provide ample evidence that the problem of regional imbalance has remained as formidable as ever.

19. As a corrective measure, it is only in the Fourth Plan, that certain criteria were evolved which envisaged that 60% of the total Central assistance to States would be distributed on the basis of population, 10% for States with per capita income less than the national average, 10% on the basis of tax efforts, 10% on the basis of spill over projects of major irrigation and power schemes and 10% for special problems of States. This is certainly a welcome improvement, in-so-far as certain principles were laid down for the first time. But the problem of poorer States does not end there. Out of the five criteria there are two namely the 10% share to be distributed on low per capita income basis and another 10% to be allocated for special problems need more precise definition. Considering that Rs. 3,100 crores of central assistance are being distributed during the Fourth Plan, an amount of Rs. 620 crores will be shared by States under these two heads and any lack of precision in definition may deprive certain States from having a substantial share. Since this is important for States like Orissa, I may discuss it at some length.

20. The Planning Commission, in calculating the distribution under the criterion of per capita income had adopted a deviation method under which each State would get the allocation depending upon the variation of its per capita income from the all-India average. The formula used for this purpose seems to have attached greater weightage to population rather than to per capita income. This will be evident from the fact that where a State's per capita income is equal to the National per capita, the formula of allocation reduces itself to population basis rather than to the per capita income of the State. It is for this reason that States like U.P. and Bihar, which have comparatively large population base have benefited most. Since the intention of distribution of central assistance on the basis of low per capita income is to remove regional imbalance and to help in raising the standards of the backward States to the all-India level, it would be justified to apply the inverse ratio of per capita income of these States, so that a more backward State receives proportionately greater assistance. An estimate made on the above basis puts Orissa's share at Rs. 52.7 crores, as against Rs. 15.0 crores worked out by the Planning Commission.

21. Similarly, the distribution of another 10% of the central assistance to States on the basis of special problems provides a source, which is very flexible. If the method of central assistance is to be used as an instrument for removing regional imbalance, it is necessary that not only the existing economic and social backwardness of a State, indicated by concentration of tribal and other backward population, or lack of infra-structure, but future growth potentials represented by untapped natural resources etc , are to be considered as special problems.

22. One estimate puts that the share of Orissa in the distribution of central assistance, which has been fixed at Rs. 160 crores in the Fourth Plan, could be stepped up to Rs. 206 crores in case the above two items are redefined. All that it indicates is that though a set principles have been now evolved, still there is some degree of flexibility which should be made use of for providing higher resources for correcting regional imbalance.

23. The reasons why in spite of a favourable industrial Policy for attracting private capital to the State, which provides, not only cheap land, water supply, preparation of free project reports, concessional power tariff and other fiscal incentives, combined with availability of

cheap raw materials and local labour force, the private capital still prefers to flow to industrially advanced states like Maharastra and West Bengal can be ascribed to lack of adequate infra-structure, which provides a strong economic overhead but the building up of which is no longer a function of private capital. This aspect, to my mind, deserves special priority in our planning framework, for backward regions.

24. Secondly, Orissa's industrial base lacks what is known as 'external economies'. The concentration of industries in a locality is beneficial in that the industries need each others' services and collectively demand certain other services which can be cheaply and adequately met only when the need is sufficiently large. Neither Rourkela, nor Barbil nor Sunabeda have yet sufficiently developed their industrial structure to provide complementary services to different industries in the locality. Orissa being the least urbanised State in India, none of its urban centres which are only small sized towns, has been able to function as 'growth centres'. The remedy prehaps lies in reorienting our industrial policy for developing a number of centres of growth in the State.

25. Another aspect which is exercising our minds relates to the problem of unemployment. It is often said that in India, a very unusual phenomenon has developed where, in a period of inflation, there is large scale unemployment. The twin forces of cost push and demand pull which generate inflationary prices are still operating unchecked. Shortage of industrial and agricultural raw materials has pushed up prices. Industrial raw-materials for our textile mills continue to be in great short supply. Production of cotton has fallen to 45 lakh bales in 1970-71, as against the Fourth Plan assumed base level production of 60 lakh bales. Similarly, jute production in 1970-71 is only 49 lakh bales as against Fourth Plan base level production of 62 lakh bales. The compound annual growth rate of sugarcane production is only 4.4% during the first two years of the Fourth Plan as against a target of 5.0%. Coal output continues to fall far short of requirements. These shortages have pushed the cost upwards and hindered expansion, resulting in increasing unemployment.

26. Another and more important reason is the correctives applied for controlling the inflationary situation by way of reduction in Government expenditure which has worsened the unemployment situation.

Government is a major buyer of goods and services and any fall in Government demand affects employment level both in private and public sectors. Average annual increase in employment was 5% during the Third Plan, but it has fallen to less than 1% in subsequent years.

27. As regards the size of unemployment, there is the problem of estimation. In a country like India, where monetization of the employment market has not sufficiently developed and where family labour is still a dominant form of employment, there is the difficulty in obtaining a precise estimate of the volume of unemployment. The traditional methodology adopted by planners, which takes into account the three variables, namely, (*i*) the backlog of unemployment at the beginning of the plan, (*ii*) the addition to labour force during the plan period, (*iii*) employment generated during the plan, has been found to be inadequate. The estimate of backlog of unemployment at the end of the Third Plan was considered higher by some experts. One school of thought is of the view that in rural areas, not much open unemployment existed, but only a high degree underemployment. Another view holds that it is not very meaningful in the Indian context to make a sharp distinction between under-employment, if it is severe, and open unemployment.

28. However, defining unemployment as involuntary unemployment on the part of persons in working age group, which is generally taken between 15 to 59, volume of unemployment in Orissa has been variously estimated. The concept of 'willing to offer for work' creates special problem in estimation, in so far as 'females in household duty' are concerned, as what proportion of them will be willing to offer themselves for work, if work is available, is still an unknown quantity.

29. Then there is the question of under-employment. Defining underemployment as less than full employment, where full employment means 48 hours of work per week, one finds that in rural areas, 51.1% of female workers and 29.7% of male workers are under-employed, while in urban areas 31.7% of the female workers and 27.4% of the male workers are under-employed. On the basis of these ratios one finds that Orissa had 15.3 lakh of male workers and 3.5 lakh female workers, who were under-employed in 1971.

30. Presuming that 50% of the females in the working age group would offer themselves for work, one estimate puts that there are 31 lakh unemployed persons in Orissa, which includes 6.5 lakh of unemployed equivalent of under-employed persons.

31. In looking at the unemployment problem one gets alarmed because of the fact that while the backlog is formidable, the addition to labour force during a plan period is also quite substantial. It is estimated that about 2.1 lakh persons in the age-group 15-59 are entering into the labour force every year in Orissa, whereas the employment generated in a plan period as a result of plan investments, in central, state and private sectors is of the same order. Thus the problem of unemployment of the substantial backlog continues to the next plan.

32. For overcoming these three basic maladies, of increasing disparity in income distribution, rising gap in regional imbalance and the growing unemployment, some serious rethinking in our strategy and approach to planning is called for. Planning should not only aim at reduction of disparity in income distribution, but also in making the poorer sections of the population achieve a minimum standard of living, elimination of poverty in absolute magnitude. For this purpose, if the poverty line is represented by a percapita private consumption expenditure of Rs. 20/-per month at 1960-61 prices, in terms of present day prices, this would mean Rs. 37/- per month at the all-India level. As consumer prices are rising at a faster rate in Orissa than at all-India level, the poverty line in Orissa would stand at Rs. 40/- in 1971-72. At present, over 220 million persons in India and 17 million in Orissa are living below this poverty line. Elimination of low-end poverty cannot be attained as a corollary, to a certain accelerator in the growth rate of the economy alone, and therefore policy prescription must take into account how best to launch a direct attack, with direct state involvement, along with provision of gainful employment. The crash programme of employment in rural and urban areas launched in the Fourth Plan with 100 percent central assistance, has yet to make any impact. While income distribution through employment generation will be economically viable, a discriminatory pricing policy with state subsidy for essential consumption goods will be necessary in a large scale. For this purpose, not only food grains, but other basic items of consumption will have to be defined. Monopoly procurement of food grains and public distribution system does only one part of the job, but what has not been attempted till now is the state's

entry into production of mass consumption goods, like cotton textiles, sugar, edible oil. Price control is one thing, but 'goods-intervention' is a totally different thing. State trading in food grains will have to be supplemented by public sector production and distribution of other essential consumption goods. Why there is relative price stability in kerosene, compared to other basic consumption goods is a pointer in this direction. Our production and price policy and the pattern of investment and the composition of output will specifically need to take into account this aspect.

33. For ensuring a basic minimum level for everyone provision of a minimum social consumption pattern, in terms of social and economic overheads, is the new economic thinking in our planning model. The shift is emphasis in Approach to the Fifth Plan centres round a Basic Minimum Needs Programme. It envisages (*i*) 100% enrolment of boys in the age group 6-11 in elementary schools and 50% in the age-group 11-14 by 1975. (*ii*) A Primary school within 1.5 k.m. and a Middle school within 5 km. of each village. (*iii*) A public health centre for a population of 80,000 to 100,000, supported by sufficient number of sub-centres, so that the coverage for each sub-centre is reduced from 10,000 at present to 5,000. (*iv*) A home site to each landless rural labour. (*v*) Benefit of electricity to at least 40% of rural population. (*vi*) All-weather roads to every village with a population of 1,500 and above.

34. Thus the new approach combines economic growth with social justice and puts a premium on social justice. This is perhaps due to the realisation that not by growth alone that poverty can be eliminated, or economic growth is the means and cannot be a substitute of the end, which is social justice.

35. For tackling the problem of regional imbalance, so far as Orissa is concerned, while Economists and Statisticians are busy in exercises on techno-economic analysis and economic model building for determining what would be the size of investment which would raise Orissa's per capita income to the all-India level, or at the worst what investment is required for keeping Orissa's economy from sliding backward, the resources gap is so wide that at times one feels that all these exercises are futile. As for example, it was estimated that an investment of Rs. 1420 crores between 1961-71 would put Orissa in par with the all-India level,

but during this period only Rs. 418 crores were spent as State plan outlay and one does not know the exact size of central sector and private sector investments during this decade. It was again estimated that during the Fourth Plan, if Rs. 1200/- crores are invested, Orissa would come to the all India percapita income level. But Orissa's Fourth Plan size being Rs. 222.60 crores, it would be too ambitious to expect that without most generous central assistance, outside the plan ceiling, we can go anywhere half way. If I draw your attention to what would be our investment requirement in the Fifth Plan to achieve this goal, one would perhaps feel breathless, as it stands at Rs. 1787 crores at 1960-61 prices. I have not deliberately worked it out at current prices, though that is the correct price, as all investments must be done in current prices. The wholesale price index is likely to be double between 1960-61 and 1973-74 the end of the Fourth Plan and unless the current trend is checked, it would have multiplied two and half times by the end of the Fifth Plan. If so, the investment estimate of Rs. 1787 crores, would be equal to Rs. 4467 crores.

36. Even for the other alternative of keeping Orissa's economy from sliding backward an investment of Rs. 750 crores was considered necessary in the Fourth plan. On the same hypothesis, a figure of Rs. 1007 crores, also at 1960-61 prices, has been worked out for the Fifth Plan period. One of the limitations in these estimates, of course, is the imprecise nature of the capital-output ratio assumed at 2.7 : 1. This ratio was calculated about a decade back and technological advancement in the output technique must have improved the ratio in the meantime. But even then, the investment estimates would still be collosal figures which may not be within our reach.

37. Thus if the gap is not reduced in one Plan, the investment required for reducing it in the next Plan goes much higher and the greater the time lag, investment needs become more than proportionately higher.

38. Under such a situation, our planning outlook should be shifted from the traditional resource-based approach to a need-based one. This appears to be the thinking of the Central Planners who are approaching the Fifth Plan with the objective of ensuring a basic minimum physical consumption level. In terms of financial outlays the minimum need-based approach may demand an investment of about a thousand

crores in a backward State like Orissa. Considering our past investment targets, an investment of this size may appear too high, but if the objective is to be realised, resources have to be mobilised for the purpose.

39. In the total investment scale in a State, the central sector investment plays a very vital role. Hither to the size of the Central sector investment in a State has always remained an unknown quantity till the end of the plan period. It should now be possible to evolve a set of principles by which the quantum of central investments in the States could be determined at the stage of finalisation of both physical sizes of the plans. This will help the States to approach the Plan more effectively in realisation of the twin objective of economic growth and social justice.

RAPPORTER'S REPORT

EMPLOYMENT AND PRODUCTIVITY IN AGRICULTURE

Dr. Prafulla Kumar Das

Altogether 9 papers were discussed in the section, "Employment and productivity in Agriculture", with special reference to Orissa.

Dr. B. Misra and Sri A. K. Mitra jointly presented a paper on the "Employment and productivity in the Agricultural sector in Orissa".

Their paper reveals the following :

(1) Nearly 74 percent of the total working population in the State are engaged in Agriculture.

(2) Rice being the main crop in Orissa its cultivation utilises only 13 percent of the labour supply.

(3) Labour utilisation through other crops is found to be very low, since the coverage of such crops in the State is very small.

(4) The productivity of land and labour in Orissa is found to be very low as compared to its neighbouring States like Andhra Pradesh and West Bengal.

The authors have put forth some of the reasons for the surplus labour and low productivity situations in Orissa. These are as follows :

(1) heavy pressure of population on land, due to lack of development in other sectors of the economy,

(2) monoculture of unirrigated rice in almost 85 per cent of the cropped area,

(3) risks and uncertainties, particularly weather uncertainty in unirrigated regions,

(4) uncertainty caused due to land reform legislations, which has reduced the investment on land both by land owners and tenants.

The authors finally have suggested a few things in order to bring out certain improvement in the present situation. These suggestions are :

(*a*) extension of area under irrigation, (*b*) introducing multiple cropping, (*c*) diversification of farming, (*d*) adoption of high yielding varieties, (*e*) growing of commercial crops, (*f*) adequate supply of farm inputs including credit, (*g*) establishing agroindustries, (*h*) taking up of rural works programmes, and (*i*) giving definite shape to land reform legislation as early as possible.

Dr. Baidyanath Misra and Makhanlal Chakrabarty presented the findings of a study conducted in irrigated, partially irrigated and flooded zones of the Cuttack district in the year 1968. The study showed that

(*i*) There was no direct relation between size of farms and employment and productivity. On the other hand, smaller farms provide more employment and income per unit of land than larger farms.

(*ii*) Partially irrigated farms showed greater net profit than irrigated farms probably because irrigation potentialities were not fully utilized.

(*iii*) There was great deal of underemployment in agriculture irrespective of size and avilability of irrigation.

(*iv*) Though commercial crops are found to provide more employment per unit of land than paddy or green gram, the net profit in case of commercial crops was negligible probably because of the primitive techniques followed.

Dr. Baidyanath Misra and Dr. Prafulla Kumar Das made a regional study on the nature and extent of rural employment. This study pertains to Dhenkanal district of Orissa and it is based on survey data relating to the year 1971-72. The first part of their study covers the nature of rural labour market. In this part, the researchers have classified the entire rural population of the region into three categories according to the activity status of different population. These are : (1) workers, (2) not at work for want of work, and (3) not in labour force.

This empirical study indicates that nearly 52 per cent of the total population have remained outside of the rural labour market largely due to underage. However, quite a sizeable proportion of adult female population are found to be unemployed though the majority of the male persons above 14 years of age are engaged in some sort of productive activities, these persons suffer most from the seasonal underemployments.

Dr. Misra and Dr. Das observed that the employment opportunity in rural areas of Dhenkanal district is greater during Kharif than in Rabi season. This is chiefly attributed to the peculiarity of the cropping pattern in the locality which is largely influenced by the availability of water for the purpose of cultivation. In case of casual non-agricultural workers they observed that there is no evidence of seasonal influence on the employment of this category of workers. However, the size of the casual agricultural workers is nearly four times greater than the size of the casual non-agricultural workers.

Sri P. N. Das is his paper "Impact of Land Reforms on Agricultural Productivity and Employment in Orissa" has made a systematic attempt to test two hypotheses : (1) Whether or not the large sized holdings have higher yield rates than the small sized holdings, and (2) Whether or not the large sized holdings have higher employment potential than the small sized holdings.

From the statistical analysis he could find that there is negative correlation between rate of returns and size of holdings. This suggests that large size holdings are associated with lower yield rates. Therefore, in States like Rajasthan, Gujarat, Madhya Pradesh and Andhra Pradesh the productivity per acre is very low, though these states hold more than 25 per cent of large sized holdings of 30 acres and above. Similar result was also obtained in case of the study relating to productivity and size of holdings, while all the districts of Orissa were taken into consideration. Though the districts like Kalahandi, Sundargarh, Sambalpur and Koraput represent districts with higher sized holdings, the yield rates of these districts are significantly lower as compared to other districts of Orissa having more of lower sized holdings.

Regarding 2nd point, he has argued that small sized holdings will allow the intensity of cropping to increase and this will obviously provide more employment opportunities. Sri Das has further indicated in his paper that the land reforms will certainly promote employment opportunity by raising the status of many of the landless labourers to owner cultivators,

Dr. B. C. Hota and Sri S. K. Das jointly presented a paper on the "Effect of size of holding on employment and income". This paper is based on a survey conducted in Bhubaneswar block during 1966-67. The salient features of the findings are:

1. The percentage of families partly depending upon agriculture decreased with increase in size of holdings and correspondingly the percentage of families depending mainly and solely on agriculture increased.

2. The utilization of family labour in farm operations increases with increase in size of holdings up to 10 acres. The employment of family labour in the off-farm jobs correspondingly decreased with the increase in size of holdings up to 10 acres. Similarly, the average days of unemployment also decreased up to 10 acres size group.

Simple linear function fitted to the data showed that with addition of each acre to the farm, employment in farm increased by 5.33 days over a base of 72 days while off-farm job decreased by 7.94 days over a base of 233 days. The correlation coefficient were highly significant in both these cases.

3. Fortyfive percent of the holdings were in the income bracket ranging from Rs. 300 to Rs. 600, 28 per cent had income ranging from Rs. 600 to Rs. 900, 16 per cent had income between Rs. 901 and Rs. 1200 and only 12 per cent had income above Rs. 1200.

Percentage of income derived from farming increased with the farm size and the percentage of income derived from nonfarm sources declined.

Dr. P. K. Das and Dr. D. H. Srivastava presented a paper on the "Productivity of Farm Capital". In the view of the authors of this paper, this kind of study has greater practical utility, since within a framework of given resource constraints, it is important to optimally allocate the available farm funds. The data for this analytical study was drawn from the sampled holdings of Cuttack district of Orissa and 1970-71 was the reference year of the study. The data was divided into 3 size groups on the basis of the size of the holdings and separate analysis was made for each size group under irrigated and unirrigated condition. Cobb-Douglas product on function was used in this study as a tool of analysis. The results of the production functions were used (*i*) for estimating the marginal productivity of working capital, and (*ii*) for estimating the capital absorbing ability of the farms by equating the marginal value product of working capital with its marginal cost. The results revealed that the marginal value product of working capital was higher than its cost in all the size goups under both irrigated and unirrigated situations, indicating thereby the higher capital absorbing capacity of the farms.

The estimated results further indicated that the capital absorbing capacity was much higher in irrigated farms than unirrigated farms.

Sri S. K. Sinha in his paper on "Productivity of Agriculture in Orissa" has tried to analyse the growth rates of area production and productivity in agriculture. The author has further compared the figures of Orissa with all-India averages, with respect to the growth rates, in order to examine the relative performance of our State with that of others, in the field of agriculture. The growth rates refer to the period from 1952-53 to 1964-65.

Sri Sinha has indicated that for Orissa the growth rate of area under crops is only 0.84 percent, while for India as a whole it is 1.28 per cent. Similarly, the growth rate with respect to production, in case of Orissa is 2.72 per cent, as against all India average of 3.42 percent. In case of the growth rate of productivity for Orissa, while it is 1.78 percent, for India as a whole it is 1.91 percent, during the same period. The writer of this paper has, therefore, concluded that in the field of agriculture the performance of the state is not very encouraging. Even though Orissa is specialising in rice production the growth rate of rice production for the State during the period mentioned above, is only 2.88 percent, while in case of India as a whole it comes to 3.64 percent. The author has pointed out some of the important causes of low productivity in agriculture in this state. These are: (1) lack of adequate irrigation facilities, (2) general economic backwardness of the farmers and consequent low investment in agriculture, (3) uneconomic holdings and (4) ignorance of farmers about modern technology. He has held out the hope that certain measures, such as land reforms and extension education would improve the present situation of the state. Finally, the writer has emphasised on making of the organisations dealing with agriculture most effective and efficient.

The paper entitled "Employment of family Labour in Pipli Block of Puri District" was the result of a study conducted by Dr. B. C. Hota and Sri M. Champati. The study reveals the following :

1. Family labour was utilized to the maximum extent during the month of February, May, August and December.

2. With respect to the percentage distribution of family labour in different activities, it was found out that maximum labour days were

absorbed in crop production, followed by hire work. It was also found out that the percentage of employment of family labour in crop production increased, while that of hiring out decreased with the increase in the size of holding.

3. The extent of under employment in Agriculture decreased with availability of irrigation water whereas the percentage of under-employment decreased with increase in the size of holding in the fully irrigated zone.

4. The percentage of under employment in agriculture reached alarming proportion in the nonirrigated zone, reaching 79 percent of the total availability of labour.

The authors concluded that the monthwise distribution of family labour in irrigated area can be more uniform by adoption of suitable farm plans. Inclusion of supplementary and complementary enterprises will make better utilization of family labour. For this, steps may be taken to enlighten the cultivators to take up the supplementary enterprises like dairying, poultry keeping, apiculture, pisciculture, etc. A part of the labour force may also be utilized by introducing the agro-industries. If these steps are taken, the uneven distribution of labour between months, underemployment and unemployment in the rural sector can be solved to a considerable extent.

H. K. Das Gupta, S. P. Das and P. K. Das presented a paper on the "Productivity of Local Breeds of Cows through Differential Feeding levels." For the purpose of this study, the researchers collected data from 30 stalls representing rural and urban areas of Bhubaneswar locality selected on random basis. The study highlighted the followings.

1. The milk yield of our local breeds are very low as compared to breeds like Haryana, Red Sindhi and Sahiwal.

2. The estimated yield rates of milk per cow per annum is 277 litres in rural ordinary stall, whereas the corresponding estimate is 336 litres for urban stalls.

3. Considering the quality of the cows being same between rural and urban areas, the higher productivity of urban cow be ascribed to higher levels of feeding.

4. The coefficient of correlation between TDN and productivity of cows is estimated at 0.65, which is significant at 5 per cent level of probability. There is reason, therefore, to believe that productivity of local cows increases with increasing feeding level.

5. While the cost of production of milk per litre is around 52 paise in both the urban and rural specialised stalls, this comes to 75 paise in the case of rural ordinary stalls.

6. Return over variable cost per cow is estimated at Rs. 102, Rs. 124 and Rs. 181 in rural ordinary, rural specialised and urban stalls respectively.

EMPLOYMENT AND PRODUCTIVITY IN THE AGRICULTURAL SECTOR IN ORISSA

Dr. B. Misra
&
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Agriculture is the most important industry in Orissa. The Census of 1961 showed that the total number of workers engaged in agriculture was 56,56,523. This is 32.24 per cent of the total population or 73.8 per cent of the total working population in the State. The annual rate of growth of the agricultural working population between 1951 and 1961 was 4.7 per cent per annum. Assuming that the same growth rate was maintained during the sixties, the working population engaged in agriculture was supposed to be 83,15,809 in 1971. Thus, from the point of view of the total number of persons engaged in agriculture, it is the most important industry in the State. But the agriculture in this State has remained almost stagnant with compound growth rate of production at 2.3 per cent from 1950-51 to 1964 and the same old traditional techniques of production are applied in various agricultural operations. Besides, in the inland tribal areas of the State, agricultural operation is carried on in the most superfluous way. As a result, large number of agricultural workers do not have fruitful engagement throughout the year. Although continuous studies on the extent of surplus labour in the State are almost non-existent, whatever scanty materials are available from different sources suggest that its magnitude is very high. Thus, long back the findings of the First Agricultural Labour Enquiry revealed that in Orissa men on the average get work for 237 days and women for only 150 days in the year. Dr. S. Misra in his Economic Survey of Orissa conducted in 1954-55 made an enquiry on the employment position of farm labour and found that "a labourer working in the countryside of Orissa gets work on the average* for 238 days in a year".[1] In this paper an attempt has been

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* This is an average for men and women workers taken together.

(1) Misra, S.—*Economic Surve yof Orissa* (1961), p. 335

made to estimate the extent of surplus labour in the agricultural sector in 1971 with help of some secondary data. The paper also indicates some of the factors responsible for the existence of surplus labour and suggests a few measures to increase employment and productivity in the agricultural sector.

Methodology of estimation of surplus labour

In this study an attempt is made to estimate the extent of surplus labour in 1970-71 at the macro-level with the help of some secondary data. For this purpose, at the outset the total supply of labour-days is estimated. This is arrived at by multiplying the total number of persons engaged in agriculture in 1971 by 300. For estimating the demand for labour the crop-pattern of the State is considered and the data relating to the area under different crops are collected from the records of the Bureau of Statistics and Economics. Then data relating to the labour requirement for different crops are collected from the studies conducted by Orissa University of Agriculture and Technology and some other farm management studies. To estimate the demand for labour, area under each crop is multiplied by the per hectare requirement of labour for that crop. Then to arrive at the total demand for labour, the labour requirement of all the crops are added up. To show the extent of surplus labour in the agricultural sector, the total supply of labour is compared with the total demand for labour.

One of the important limitations of this estimate is that due to lack of relevant data, it covers only about 90 per cent of the total cropped area in the State.

Findings of the Study

This estimate shows the existence of high percentage of surplus labour in the agricultural sector of the State. From Table 2, it can be seen that rice, which is the principal crop of the State and covers about 64 per cent of the cropped area utilises only 12.09 per cent of the total labour days supplied. Other crops like jowar, bajra, maize, millet, ragi, wheat, pulses, groundnut, jute, sugarcane, etc. utilises about 8.7 per cent of labour days. Thus, a group of 21 crops, which covers about 90 per cent of the total cropped area, utilised only 20.8 per cent of the total supply of labour days. This clearly indicates the extent of surplus labour existing in the agricultural sector of the State. This

problem becomes more complex when one considers the various forms in which it usually exist. It exists not only in the form of open unemployment but also in the form of disguised unemployment, seasonal unemployment and intermittent unemployment. This also gives indication about the extent of population pressure on land and the relative underdevelopment of other sectors of the economy. It is largely due to this fact that the productivity in the agricultural sector is also very low. Available statistics show that the average productivity in the agricultural sector is very low, whatever criteria may be adopted to measure this productivity. When productivity is measured in terms of per acre average yield, it is very low. The per acre average yield of rice, the principal crop of the State is very low : winter rice—9.35 mds (3.49 quintals), autumn rice—4.34 mds (1.62 quintals), summer rice—10.59 mds. (3.59 quintals).[2] Again, when productivity is measured in terms of units of labour, it is found to be very low. In Orissa the rice output per labour day is 0.18 quintals, whereas in some of the neighbouring rice-producing states like Andhra Pradesh and West Bengal, it is 0.24 quintals and 0.83 quintals respectively. (3) An all-India ranking of the Indian States according to their growth rate of agricultural productivity shows that out of the 15 States, Orissa occupies the 9th position.[4]

The existence of surplus labour and consequent low productivity in the agricultural sector of the State is a product of a complex set of factors.

First, there is heavy pressure of population on land. As other sectors of the economy are not developing commensurate with the growth of population, increasingly larger population is depending on agriculture. As a result, land available for cultivation is constantly being sub-divided and fragmented. It has been found that more than 75 per cent of the cultivable holdings are less than 5 acres in size. Such small holdings with the absence of irrigation in most cases and traditional mode of cultivation are not suitable to provide adequate

2. Bureau of Statistics and Economics *Statistical Abstract of Orissa* 1965. Year of reference—1963

3 Gangwar, A. C. Inter-regional Differences in Agricultural Labour Use, Efficiency and Wages. *India Journal of Agricultural Economics*, Vol. XXV No. 3, July-Sept. 1970, p. 42

4. *Eastern Economist*...Annual Number, 1969, p 1216.

employment to the farm family. Bulk of what is produced in such small farms is used for consumption purpose of the family and sometimes it so happens that they are not in a position to preserve sufficient amount of grain for utilisation as seed. In these circumstances employment and productivity in the agricultural sector has remained at a low-level.

Secondly, large part of the cropped area in the State is under Sarad Paddy (winter paddy) cultivation. The cultivation of the winter paddy keeps the land engaged for eight to nine months and by the time land is released, there is hardly any time for the cultivation of the second crop. And this task of raising a second crop is made increasingly difficult when one takes into consideration the fact that only 16 per cent of the total cropped area receives irrigational facility. It is because of this difficulty almost 85 per cent of the cropped area is under single cropping system.

Thirdly, agriculture in the State has remained largely as 'a way of life' and as such very little effort is made by the farmers to invest greater resources on the agricultural development. As a result, agriculture has remained stagnent and its productivity and employment capacity has not increased to support a fast-growing population.

Fourthly, as only 16 per cent of the total cropped area receives irrigational facility, agriculture depends to a considerable extent on the monsoons. But the outbreak of the monsoon is quite irregular and floods and droughts have become a recurring feature of the agrarian economy of Orissa. To a considerable extent this entails forced idleness on the agricultural workers. Besides, uncertain weather conditions discourage the small farmers, whose risk-bearing capacity is very low to invest greater resources on the agricultural development.

Finally, in recent years uncertainties created by the introduction of various landreforms legislation have done considerable harm to the agricultural development of the State in the sense that it has reduced to a considerable extent the investment made on the land by the land-owner and the tenant. As a result, agricultural growth has failed to keep pace with the population growth. So all these factors have contributed to low employment capacity and low productivity in the agricultural sector of the State.

When one considers all these facts seriously, he is bound to take a pessimistic view about the agricultural development and proper utilisation of the surplus labour now existing in the agricultural sector of the State. There appears to be no short-cut way to overcome these problems. The long-term solutions to these problems obviously lie in the development of other sectors of the economy so as to reduce population pressure on agriculture and organisation of agriculture on commercial lines. In the short-run, however, the following measures may be taken up to increase employment and productivity to some extent within the existing agricultural set-up.

First, agriculture should be diversified and there should be more intensive system of cultivation. A sense of commercialisation should be instilled in the minds of the agriculturists. At least in 30 to 40 per cent of the area, where at present only winter paddy is grown, one more crop, either paddy or some other suitable cash crop or vegetables, should be grown. This will give additional employment and income to the farmers and facilitate further investment in land or at least prevent capital consumption in the agricultural sector. For this purpose it is desirable to tap all sources of irrigation to the maximum possible extent. At present due to the existence of various bottlenecks, irrigation potentials already created are sometimes wasted. If these could be prevented and at least 40 per cent of the total cropped area could be irrigated, it will not be difficult to raise a second crop after the harvest of the winter paddy in the month of January and February. Besides, where irrigational facility already exists some sort of change should be brought about in the traditional system of cultivation. In these areas instead of cultivating 'Sarad' paddy, greater scope should be given to HYV of cultivation. In this system of cultivation not only it is possible to produce larger amount of crop within a short time, but the different stages and processes of production in this system of cultivation are relatively labour-intensive. The preparation of the field for cultivation, transplanting of the plants, use of fertilisers and pesticides, etc., which are essential for HYV programme will require relatively greater amount of labour. It has been estimated that per hectare labour requirement for cultivation of Sarad paddy by traditional method is only 68 labour-days, whereas in the case of HYV paddy cultivation by direct sowing method, the requirement is 170 labour-days per hectare and by transplantation method 220 labour-days per hectare. Besides, creation and maintenance of irrigational

structures will create newer employment opportunities in the agricultural sector. Further, if HYV of production will be pursued, it will not be difficult to raise up two or three crops in a year. In the inland districts of Orissa, where it is difficult to create irrigational facility, suitable dry farming system may be introduced.

Secondly, along with this change in the cultivation of paddy or food-grains production, suitable changes in the overall cropping pattern are necessary. There must be some change in the cropping pattern in favour of cash-crop cultivation like jute and sugar-cane. The labour-utilisation capacity and income from the production of these crops will be relatively higher. For example, per hectare labour requirement for jute is 215 labour-days, for sugar-cane 655 labour-days. So in order to change the cropping pattern and encourage production of the cash-crops like jute and sugar-cane, it is necessary to start agro-based processing industries like jute mills, sugar mills, etc.

Thirdly, introduction of diversification in the agricultural system will increase the demand for credit, various other inputs and extension services. So the institutions supplying these inputs as well as extension services system should be developed and strengthened in the agricultural sector.

Fourthly, as is well known, the nature of the agricultural operation is such that it is bound to give rise to certain amount of seasonal and intermittent unemployment or idleness. In order to overcome this problem suitable agro-based cottage industries, dairy and fisheries should be developed. Besides, suitable rural works programme should be undertaken during the period of seasonal unemployment. This will give some additional income to the rural worker and at least prevent to some extent capital consumption in the agricultural sector.

Finally, the present uncertain state of affairs with regard to land-ceiling measure, tenancy rights should go. The Government must take a firm stand on these matters as early as posible. The present state of uncertainty created by the vacillating position of the Government with respect to these measures, has considerably affected investment in the agricultural sector. This has retarded agricultural growth to some extent and is at least partially responsible for the existence of surplus labour and low productivity in the agricultural sector.

Conclusion

Thus, it may be stated, in conclusion, that although agriculture is the most important in the State, its effective employment capacity and productivity are very low. This state of affair is a product of a complex set of factors. It is not possible to change this unhappy situation within a short time. But the situation can be improved to some extent at least if a fair trial is given to the above-mentioned measures.

APPENDIX

TABLE 1

SUPPLY OF LABOUR IN AGRICULTURAL SECTOR OF ORISSA IN 1971

1. Total Number of workers in Agriculture (1961 census)	56,56,523
2. Annual rate of growth of the Agricultural workers between 1951 and 1961.	4.7 per cent
3. Assuming the same rate of growth between 1961 and 1971, the total number of workers in agriculture.	83,15,089
4. In order to be fully employed, it is assumed that the labourer must be employed for at least 300 days in a year. So the total supply of labour days.	8,315,089 × 300 = 24,94,526,700 days

TABLE 2

DEMAND FOR LABOUR IN THE AGRICULTURAL SECTOR IN 1970-71

Crops	Area (in hectares)	Requirement of labour days per hectare	Total requirement of labour days for the crop (Col. 2 × Col. 3)
1. Paddy	4434460	68	301543280
2. Jawar	14,000	200	28,000,00
3. Bazra	1,000	210	210,000
4. Maize	68,000	210	14280000
5. Ragi	153,000	143	21,879,000
6. Millet	164,000	140	22,960,000
7. Wheat	15,000	113	1,695,000
8. Gram	25,000	72	1,800,000
9. Tur or Arhar	34,000	72	2,448,000
10. Pulses other than grams and Tur	835,000	70	58,450,000
11. Chillies	26,000	340	8,840,000
12. Groundnut	71,000	173	1 2,283,000
13. Sesamum	109,000	90	9,810,000
14. Castor-seed	23,000	143	3,289,000
15. Rape and Mustard	64,000	100	6,400,000
16. Lin-seed	19,000	100	1,900,000
17. Cotton	5,000	273	1,365,000
18. Jute	45,000	215	9,675,000
19. Mesta	30,000	165	4,950,000
20. Potato	30,000	285	8,550,000
21. Sugar-Cane	40,000	655	26,200,000
Total requirement of Labour Days	—	—	52,13,27,280

EMPLOYMENT AND PRODUCTIVITY IN AGRICULTURE IN CUTTACK DISTRICT*

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Agriculture has importance both for providing employment and assisting in the development of the economy besides supplying food grains to meet the daily requirements of the people. The major requirements for achieving these objectives are to increase the productivity of land by applying modern inputs, increasing irrigation facilities and improving cropping pattern. All these have direct correlation with employment. This paper presents the findings of an investigation carried out on cost accounting method in three zones *i.e.* irrigated, partially irrigated and flooded of Cuttack district in the year 1968-69 which has made an attempt to study the impact of irrigation, cropping pattern and size of holding on employment of human labour and the productivity of land. The hypotheses of the study are following :

(*i*) The size of farms has no direct relation with employment or productivity per acre.

(*ii*) Irrigated zones have greater employment and income potential than the partially irrigated or flooded zones.

(*iii*) In agriculture, there is a great deal of underemployment.

(*iv*) Commercial crops are likely to provide more employment and income than food crops.

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Design of the study

The district under study comprising of 41 blocks was divided into three homogeneous zones *viz.* irrigated with 50 per cent or more of cultivated area under irrigation; partially irrigated with less than 50 per cent of cultivated area under irrigation and flooded which is subject to recurrent floods, on the basis of land utilisation, cropping pattern and intensity of cropping. From these three zones, 15 villages were drawn up with the probability proportional to cultivated area in the zone, as a result of which 6 villages were allocated to each of the irrigated and partially irrigated zones and 3 villages to the flooded zone. From the list of operational area of the cultivators of 15 villages, sample holdings were selected at random dividing the cumulative total to 5 equal parts or size groups and 2 from each zones. Thus the total number of selected holdings came to 150 in five size groups *i.e.* 0-0.81 hectares, 0.82-1.32 hectares, 1.33-2.03 hectares, 2.04-3.64 hectares and 3.65 hectares and above.

Economic background of the sample holdings and zones

The most important crop of the region is paddy which covers 73.08 percent of the cropped area of the sample farms. The next important crop is greengram accounting for 10.40 per cent of the cropped area. The position of commercial crops in the list of cropping pattern is negligible, jute only covering 0.64 per cent of the cropped area, potato 0.93 per cent, groundnut 0.01 per cent and sugarcane 0.76 per cent. All these commercial crops are confined to the tracts which have assured irrigation facilities. As compared to the specialisation of paddy in all the three zones, there is greater degree of diversification in the irrigated zone than in the other two. The intensity of cropping is 150.60 per cent in the irrigated zone, while it is 140.20 per cent for the partially irrigated and flooded zone respectively. The average gross cropped area comes to 1098.25 hectares in the irrigated zone, 934.25 hectares in the partially irrigated zone and 506.95 hectares in the flooded zone. The cultivated area per pair of drought cattle comes to 1.54 hectares in the irrigated, 1.76 hectares in the partially irrigated and 2.19 hectares in the flooded zone.

Pattern and extent of employment

Among other things, the pattern and extent of employment are influenced by the cropping pattern, farm sizes and irrigation.

Table I which shows the extent of employment of labour in different zones indicates that with an increase in farm sizes, the per hectare total employment of human labour units generally decreases in all the three zones with slight deviation in the partially irrigated and flooded zones. On an average the total employment of human labour per hectare comes to 123.36 days (8 hour man days) in the irrigated farms, 115.14 days in the partially irrigated farms and 88.61 days in the farms subject to frequent floods. Per hectare employment of female workers comes to 4.69 days in the irrigated zone, 3.15 days in the partially irrigated zone and 4.15 days in the flooded zone of which the share of family female workers constitutes 1.03, 1.10 and 2.75 days in the above three zones respectively. In the said zones, the employment of family female workers is confined to the farms of lower size groups. The Table further reveals that the employment of family labour and hired labour is complementary in nature and with the increase in farm sizes, the family labour units decrease being compensated by hired human labour and annual farm servants. Annual farm servants are maintained in the well-to-do farms for multifarious activities in and outside the farms. Coming to the percentage contribution of family labour in the total employment pattern, it is seen that the irrigated zone provides 54.77 per cent, partially irrigated zone 52.75 per cent and flooded zone 67.12 per cent. Higher per cent of family labour employment in the flooded zone is ascribed to adverse weather conditions. Because of this, the farmers of this zone do not take the risk of employing hired labour and utilise the available supply of family labour force to the maximum extent.

Table II illustrates per hectare employment of agricultural labourers in some major crops in different operational holding sizes. It is observed from the Table that the labour utilisation of paddy crop on an average comes to 150.15 days per hectare in the irrigated zone, 145.35 days in the partially irrigated zone and 96.88 days in the flooded zone showing a decreasing trend in the utilisation of labour with an increase in farm sizes except the lowest size of partially irrigated farms.

It is further observed that the farms in the lower size groups are family operated farms, utilising maximum farms family workers to cater to the requirements of farm operations in the peak season.

With regard to the extent of employment in greengram, it is seen that the said crop provides employment for 43.00 units of labour in the farms of irrigated zone, 44.44 units in the partially irrigated zone and 22.39 units in the flooded zone. The low level employment of labour in

the flooded zone is due to the fact that greengram is taken up here only to maintain the natural fertility status of the soil. This crop is not also successful in the irrigated and partially irrigated farms due to water stagnation. All the same, it is the second major crop and taken up as it does not involve much cost.

The statistical findings show that in case of paddy, the impact of irrigation on employment is not significant, 't' value being 0.565 when irrigated and partial irrigated farms are compared with non-irrigated farms operated under favourable weather conditions. But when the employment pattern is compared with the flooded zone, the impact of irrigation exhibits significant difference, the 't' value being 2.2108 at 5 per cent level and 148 degrees of freedom. But the impact of partially irrigated farms on employment compared to flooded farms is not significant ('t' value–1.839).

Impact of commercial crops on employment

Since the number of farms growing commercial crops is small and the area covered is negligible, a comparison between size groups is not possible. Table III therefore shows the average employment of labour in different commercial crops by zones. It is seen from the Table that in comparison to paddy and greengram, commercial crops provide more employment opportunities for labour. Though it may be said that the figures do not reflect real position as the average figure per hectare has been calculated from small fragment, the Table gives an indication that commercial crops are more labour intensive than paddy or greengram.

Extent of underemployment

Though agriculture provides employment to a large number of labourers, it does not provide full employment to all of them. As it is said, there is a great deal of disguised unemployment in agriculture. The disguised employment or underemployment can be studied by converting the total hours of employment of family labourers by standard man days of 8 hours and dividing by 300 man-days. In this case 300 days have been taken as full employment for an agricultural worker in a year assuming 52 days leave in 52 weeks and 13 days for sickness.

Table IV which presents the extent of under-employment by farm sizes in three zones shows that there is underemployment of human

labour in every zone. Even in the irrigated zone, underemployment has not been controlled due to the fact that irrigation facilities have not been fully utilised.

The Table also does not show that there is any correlation between size of farms and extent of underemployment.

Productivity

In regard to productivity of land, an attempt has been made here to study the productivity of sample farms on the basis of return to land pre hectare in terms of value, per rupee invested at operational cost, total cost and per unit of labour employed in production.

Table V illustrates the productivity of the selected farms as a whole from the crop husbandry. It is seen from the table that in the farm economy as a whole, the farms in the partially irrigated zone has done better than the farms in the irrigated zone because of the favourable weather conditions and lack of effective utilisation of irrigation facilities in the irrigated farms.

Table VI shows the measures of farm productivity taking into account the two common crops *i.e.*, paddy and greengram by operational holding sizes in three different zones.

It shows that the average value of production of paddy per hectare in irrigated farms comes to Rs. 1281.85 whereas it is Rs. 1227.77 in the partially irrigated farm and only Rs. 863.06 in the farms subject to frequent floods. It is further seen that the return to investment at operational cost and total cost is maximum in the flooded zone due to less cost per hectare than in other farms. Further scrutiny reveals that the return to entrepreneur for his management and return per labour day are more in the partially irrigated farms than in others. This implies that the available irrigation potential in the irrigated farms has not been fully utilised.

The cultivation of greengram is not a profitable proposition in the irrigated and flooded farm due to water stagnation in the former and water scarcity in the latter. Only the farms in the partially irrigated zone provide the cultivators a net profit of Rs. 132.19 per hectare.

The statistical tests with regard to productivity establish the findings that there is no significant difference between irrigated and partially irrigated farms. The productivity differ significantly when irrigated and partially irrigated farms are compared with the flooded farms separately,

the calculated 't' values are 7.24 and 5.65 which confirm the significance at 5% level and 88 degrees of freedom.

Table VII makes an attempt to analyse the majors of productivity of some commercial crops grown in the sample farms of different zones of the district. It is seen from the Table that the profitability of cash crops in different zones is much below the expectation and potato provides a negative return to the farmers in the irrigated and flooded zones. And the return of jute, groundnut and sugarcane though not so deplorable do not add much to the farm income due to heavy investment and poor return.

Summary and conclusion

The study of 150 holdings taken at random from the irrigated, partially irrigated and flooded zone of Cuttack district shows the following :

(*i*) There is no direct relation between size of farms and employment or productivity. On the other hand, smaller farms provide more employment and income per unit of acre than larger farms. Due to low level of technology in the district, larger farms do not seem to have economies of scale. The first hypothesis has been proved by the study.

(*ii*) The second hypothesis has not been proved. Irrigation facilities have neither increased employment opportunities nor income level of the cultivators. On the other hand, partially irrigated farms are providing more net profit. This means that irrigation potentials have not been fully utilised by the cultivators of the district. The capacity of cultivators to absorb irrigation is severely limited under the present state of technology and knowledge.

(*iii*) The third hypothesis is proved. There is a great deal of underemployment in agriculture irrespective of size and availability of irrigation. This implies that intensive crops are not grown, and crop planning is yet to emerge as a strategy of agricultural planning.

(*iv*) The fourth hypothesis is partially proved. Though commercial crops are found to provide more employment per unit of acre than paddy or greengram, the net profit per acre in case of commercial crops is negligible; in some cases, it is negative. This shows that agriculture is still primitive and operated on traditional lines. The impact of green revolution is yet to be seen in the district of Cuttack, which is considered to be a progressive district in the State.

APPENDIX

TABLE I

ZONEWISE PER HECTARE EMPLOYMENT OF FARM WORKERS
(FAMILY, HIRED AND ANNUAL SERVANT)
IN DIFFERENT FARM SIZE GROUPS

Farm sizes in hectares	Adult male	Adult female	Annual servant	Total
1	2	3	4	5
		IRRIGATED		
0–0.81	146.41	2.56	2.95	151.92
	(62.79)	(—)		(12.79)
0.82-1.32	108.85	3.53	22.20	134.58
	(72.62)	(2.85)		(81.47)
1.33-2.03	144.23	6.14	7.96	128.33
	(67.67)	(1.35)		(99.02)
2.04-3.64	76.42	6.43	30.20	113.05
	(52.01)	(0.52)		(52.53)
3.65 & above	60.26	4.79	23.90	88.95
	(25.75)	(1.27)		(27.02)
All farms	101.23	4.69	17.44	123.36
average	(66.54)	(1.03)		(67.57)
		PARTIALLY IRRIGATED		
0-0.81	120.59	1.66	—	122.25
	(69.65)	(—)		(79.65)
0.82-1.32	110.08	7.60	—	117.68
	(69.46)	(4.83)		(84.29)
1.33-2.03	105.77	2.70	6.93	115.40
	(83.64)	(0.29)		(83.93)
2.04-3.64	74.59	2.02	17.25	93.86
	(46.63)	(0.52)		(47.15)
3.65 & above	73.65	1.76	21.00	96.41
	(33.99)	(0.19)		(34.18)
All farms	96.93	3.15	15.06	115.14
average	(59.64)	(1.10)		(60.74)

1	2	3	4	5
		FLOODED ZONE		
0.-0.81	98.04	—	—	98.04
	(58.04)			(58.04)
0.82-1.32	64.24	6.70	0.29	71.23
	(56.01)	(2.75)		(58.76)
1.33-2.03	84.06	3.46	16.22	103.74
	(64.11)	(—)		(64.11)
2.04-3.64	71.45	0.44	5.02	76.91
	(50.78)	(—)		(50.78)
3.65 & above	41.46	6.01	28.91	76.38
	(14.72)	(—)		(14.72)
All farms avg.	71.85	4.15	12.61	88.61
	(56.73)	(2.75)		(59.48)

N- B.—Bracketed figures stand for family labour.

TABLE 2

PER HECTARE EMPLOYMENT OF AVAILABLE AGRICULTURAL LABOURERS IN STANDARD MAN-DAYS OF 8 HOURS IN COMMON CROPS BY SOURCES

Holding size groups	Family Labour			Hired labour			Annual servant	Total
	Male	Female	Total	Male	Female	Total		
1	2	3	4	5	6	7	8	9
				IRRIGATED PADDY				
0-0.81	136.32	—	136.32	26.44	2.56	29.00	2.33	167.65
0.82-1.32	89.86	1.86	91.72	49.62	1.01	50.63	21.57	163.92
1.33-2.03	96.88	1.19	98.07	41.12	1.03	42.15	6.99	147.21
2.04-3.64	68.23	0.66	68.89	46.93	1.05	47.98	24.29	141.16
3.65 and above	46.24	1.58	47.82	57.48	1.29	58.77	22.61	129.20
All farms average	80.92	1.60	82.52	50.32	1.35	51.67	15.96	150.15
				GREENGRAM				
0-0.81	37.05	—	37.05	5.89	—	5.89	1.40	44.34
0.82-1.32	26.49	1.09	27.58	—	—	—	8.87	36.45
1.33-2.03	31.70	0.88	32.58	1.96	0.52	2.48	—	35.06
2.04-3.64	19.33	—	19.33	3.32	1.44	4.76	3.40	27.49
3.65 and above	17.89	—	17.89	—	0.21	0.21	10.00	28.10
All farms average	22.16	0.85	23.01	13.76	0.72	14.48	5.51	43.00

1	2	3	4	5	6	7	8	9
			PARTIALLY IRRIGATED PADDY					
0-0.81	89.95	—	89.95	46.84	2.07	48.91	—	138.86
0.82-1.32	83.38	1.25	84.63	56.24	2.25	58.49	—	143.12
1.33-2.03	104.62	0.43	105.05	33.09	1.33	34.42	5.61	145.08
2.04-3.64	55.83	0.77	56.60	46.93	1.23	48.16	16.98	121.74
3.65 and above	39.93	—	39.93	58.67	—	58.67	20.94	119.54
All farms average	79.95	0.85	80.80	45.95	1.42	47.37	17.18	145.35
			GREENGRAM					
0-0.81	39.59	—	39.59	9.19	—	9.19	—	48.78
0.82-1.32	27.12	1.23	28.35	5.92	1.83	7.75	—	36.10
1.33-2.03	33.86	0.17	34.03	—	0.17	0.17	4.59	38.79
2.04-3.64	15.24	0.21	15.45	10.70	0.21	10.91	4.62	30.98
3.65 and above	18.43	—	18.43	3.88	—	3.88	11.28	33.59
All farms average	27.84	0.83	28.67	8.67	0.94	9.61	6.16	44.44

1	2	3	4	5	6	7	8	9
				FLOODED ZONE PADDY				
0-0.81	117.94	—	117.94	—	—	—	—	117.94
0.82-1.32	94.07	—	94.07	39.36	8.51	47.87	—	91.94
1.33-2.03	90.64	—	90.64	16.37	4.12	20.49	14.50	89.63
2.04-3.64	66.31	0.02	66.33	20.00	0.69	20.69	4.60	81.60
3.65 and above	45.20	—	45.20	36.41	6.01	42.42	25.58	67.20
All farms average	80.83	0.02	80.85	36.03	4.83	40.86	10.17	96.88
				GREENGRAM				
0-0.81	19.56	—	19.56	—	—	—	—	19.56
0.82-1.32	18.93	—	18.93	2.24	—	2.24	—	21.17
1.33-2.03	16.14	—	16.14	0.65	—	0.65	1.31	18.10
2.04-3.64	12.53	—	12.53	5.44	0.11	5.55	2.76	20.84
3.65 and above	6.08	—	6.08	2.20	1.62	3.82	9.44	19.34
All farms average	14.65	—	14.65	2.38	0.86	3.24	4.50	22.39

TABLE III

AVERAGE EMPLOYMENT OF HUMAN LABOUR IN SOME COMMERCIAL CROPS BY ZONES PER HECTARE

Name of the crops	Family labour			Hired labour			Annual servant	Total
	Male	Female	Total	Male	Female	Total		
IRRIGATED								
Potato	299.36	—	299.36	145.77	—	145.77	75.23	520.36
Jute	194.35	—	194.35	52.60	20.00	72.60	51.05	318.00
Groundnut	111.02	—	111.02	70.00	—	70.00	184.63	365.02
Sugarcane	103.70	—	103.70	65.50	—	65.50	270.35	439.55
PARTIALLY IRRIGATED								
Potato	288.63	7.02	295.65	84.13	—	84.13	35.59	415.37
Jute	181.50	—	181.50	—	—	—	—	181.50
Sugarcane	301.53	—	301.53	32.39	—	32.39	4.32	338.24
FLOODED ZONE								
Potato	121.66	—	121.66	98.61	—	98.61	131.63	351.90
Jute	172.34	—	172.34	34.79	—	34.79	—	207.13
Groundnut	103.33	—	103.33	161.36	—	161.36	—	350.00
Sugarcane	188.64	—	188.64	85.00	—	85.00	90.15	278.48

TABLE IV

DISTRIBUTION OF TOTAL MAN-DAYS OF FAMILY LABOUR ENGAGED IN AGRICULTURAL AND DISGUISED EMPLOYMENT

Farm size groups	No. of family workers in agriculture (M+F.)	Total man-days (8 hr. days).	Average number of man-days devoted to agricuture by each earner.	Number of persons engaged for 300 man-days a year.	Surplus worker
		IRRIGATED ZONE			
0-0.81	19	2037.23	107.22	7	12
0.82-1.32	13	2196.07	168.93	7	6
1.33-2.04	25	4100.60	164.03	13	12
2.04-3.64	22	2998.36	136.29	10	12
3.65 & above.	11	1532.04	139.27	5	6
All farms.	90	12864.30	142.94	42	48
		PARTIALLY IRRIGATED ZONE			
0-0.81	10	1044.20	104.42	3	7
0.82-1.32	29	2601.22	89.70	9	20
1.33-2·03	27	3976.71	147.28	13	14
2.04-3.64	22	2547.63	115.80	8	14
3.65 & above	13	1071.09	82.39	3	10
All farms	101	11240.85	111.29	36	65
		FLOODED ZONE			
0-0.81	3	357.84	119.28	1	2
0.82-1.32	14	767.30	54.81	2	12
1.33-2.03	11	1736.03	157.82	5	6
2.04-3.64	18	2097.30	116.52	7	11
3.65 & above	10	633.32	63.31	2	8
All farms	56	5591.79	99.85	17	39

TABLE V

INTERZONAL EFFECT OF CROP HUSBANDRY ON PRODUCTIVITY

Measures of Productivity	Irrigated zone	Partially irrigated	Flooded zone
(*i*) Production per hectare in rupees.	1403.93	1033.24	652.97
(*ii*) Return to investment at operational expenses.	2.16	2.27	2.49
(*iii*) Return to investment at total cost.	1.39	1.40	1.45
(*iv*) Net profit per hectare or return to entrepreneur.	394.74	297.03	201.83
(*v*) Return per labour day in rupees.	1.60	1.37	1.70

TABLE VI

PRODUCTION AND PRODUCTIVITY OF TWO MAJOR CROPS IN THE FARMS OF IRRIGATED, PARTIALLY IRRIGATED AND FLOODED ZONES

Measures of productivity	Holding size groups					All farms
	0-0.81.	0.82-1.32	1.33-2.03	2.04-3.64	3.65 & above	
1	2	3	4	5	6	7
			IRRIGATED—PADDY			
(*i*) Production per hectare in Rs.	1591.98	1550.52	1301.19	1291.37	982.23	1281.85
(*ii*) Return to investment at operational cost (A1)	3.96	2.79	2.72	2.72	2.02	2.81
(*iii*) Return to investment at total cost (cost-C)	1.39	1.47	1.31	1.49	1.09	1.35
(*iv*) Net profit per hectare or return to entrepreneur.	446.17	495.05	308.75	427.80	83.80	344.83
(*v*) Return per labour days in rupees.	4.99	3.71	4.15	4.10	1.98	3.00

1	2	3	4	5	6	7
			GREENGRAM			
(*i*) Production per hectare in rupees.	311.44	270.70	260.51	388.16	367.40	319.64
(*ii*) Productivity per rupees invested at operational cost.	1.31	2.18	1.40	1.93	1.86	1.74
(*iii*) Productivity per rupee invested at total cost.	0.75	1.09	0.76	1.17	0.95	0.94
(*iv*) Net profit per hectare or return to entrepreneur.	−104.31	21.45	−79.16	56.88	−18.38	−22.98
(*v*) Return per labour day.	−0.27	2.37	0.39	3.87	0.64	1.16
			PARTIALLY IRRIGATED PADDY			
(*i*) Production per hectare in rupees.	1117.11	1224.03	1254.57	1159.34	1329.66	1227.77
(*ii*) Productivity per rupee invested at operational cost.	2.08	2.76	2.99	3.09	2.90	2.84
(*iii*) Productivity per rupee invested at total cost.	1.01	1.38	1.34	1.60	1.88	1.52
(*iv*) Net profit per hectare or return to entrepreneur.	775.83	312.25	319.49	436.40	623.91	419.40
(*v*) Return per labour day.	1.67	2.19	2.32	1.91	7.62	3.14

1	2	3	4	5	6	7
			GREENGRAM			
(*i*) Production per hectare in rupees	299.80	334.80	511.79	365.10	639.45	340.21
(*ii*) Productivity per rupee invested at operational cost.	2.15	2.02	3.89	2.93	4.40	3.08
(*iii*) Productivity per rupee invested at total cost.	1.13	1.07	1.15	1.24	2.05	1.43
(*iv*) Net profit per acre or return to entrepreneur.	35.91	24.21	201.86	70.43	328.47	132.19
(*v*) Return per labour day.	2.71	2.55	6.55	5.28	6.74	4.78
			FLOODED ZONE—PADDY			
(*i*) Production per hectare in rupees.	1208.60	914.18	677.10	861.31	653.84	863.06
(*ii*) Productivity per rupee invested at operational cost.	2.75	3.42	2.26	3.67	1.77	2.96
(*iii*) Productivity per rupee invested at total cost.	1.10	1.44	1.26	1.76	1.30	1.60
(*iv*) Net profit per hectare or return to entrepreneur	108.14	229.38	138.52	373.37	152.16	324.95
(*v*) Return per labour in rupees.	2.79	2.25	0.91	3.80	2.06	2.55

1	2	3	4	5	6	7
			GREENGRAM			
(*i*) Production per hectare in Rs.	276.25	102.35	229.87	146.77	106.45	172.34
(*ii*) Productivity per rupee invested at operational cost.	2.47	1.04	2.07	1.42	0.63	1.53
(*iii*) Productivity per rupee invested at total cost.	1.51	0.57	0.96	0.89	0.59	0.94
(*iv*) Net profit or return to entrepreneur in Rs.	93.44	−76.49	−8.68	−18.10	−110.17	−24.00
(*v*) Return per labour day in Rs.	7.28	−1.53	1.94	0.65	−4.91	0.61

TABLE VII

MEASURES OF PRODUCTIVITY OF SOME COMMERCIAL CROPS IN THE FARMS OF DIFFERENT ZONES

Measures of productivity	Name of the crops			
	Potato	Jute	Ground-nut	Sugar-cane
1	2	3	4	5
IRRIGATED				
i) Productivity of land per hectare in rupees.	2075.79	1456.83	1047.39	—
ii) Return to investment at operational cost.	0.86	2.84	1.79	—
iii) Return to investment at total cost.	0.67	1.21	1.08	—
iv) Return to entrepreneur.	(—) 1025.82	260.42	79.59	—
v) Return per labour day.	(—) 3.70	3.65	1.18	—
PARTIALLY IRRIGATED				
i) Productivity of land per hectare in rupees.	3459.80	1600.00	—	2713.52
ii) Return to investment at operational cost.	2.34	2.27	—	1.55
iii) Return to investment at total cost.	1.33	1.20	—	1.01
iv) Return to entrepreneur.	857.26	267.50	—	45.64
v) Return per labour day in rupees.	5.60	3.81	—	1.09

1	2	3	4	5
	FLOODED ZONE			
i) Productivity of land per hectare, in rupees.	1637.60	781.55	999.91	1836.36
ii) Return to investment at operational cost.	0.96	3.17	1.54	1.57
iii) Return to investment at total cost.	0.62	1.40	1.18	1.03
iv) Return to entrepreneur.	(—) 996.30	222.33	153.03	762.79
v) Return per labour day in rupees.	(—) 4.73	3.75	0.99	1.10

NATURE AND EXTENT OF RURAL EMPLOYMENT IN DHENKANAL DISTRICT OF ORISSA

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India's main concern today is poverty. If one tries to examine the problem of poverty in this country, one will find that poverty is basically associated with the serious problems of under-employment and unemployment. In other words, many people are now living in poverty due to lack of enough employment opportunities. Recent studies show that about 40 per cent of the rural population and slightly more than 50 per cent of the urban population live at a level which does not permit them to have the minimum standard of living. In spite of 25 years of massive effort through planning for speedy economic development in India, per capita income remains low and unemployment problem has already reached alarmingly high proportion : The main reason for these shortfalls is that India had to absorb as big as 180 million additional people during the quarter of a century.

In view of the mounting unemployment situation facing the rural sector, the government of India felt it imperative to control the situation by undertaking several employment-cum-production oriented schemes on a wide basis. However, it has been realised that in the absence of adequate information on man-power utilisation it would be difficult to plan out and execute the job creating schemes more effectively and purposefully. In the light of this a regional study on the nature and extent of rural employment was taken by the researchers.

Dhenkanal district of Orissa was selected for the purpose of making a study of employment pattern both in Kharif and Rabi seasons. While the first round field investigation in connection with Kharif season was conducted during December, 1971, the second round survey for Rabi season was undertaken during April, 1972.

Sampling design

The district was divided into three agroclimatic zones based on geographical contiguity, soil type, irrigation facilities and cropping pattern. From each zone, a block was selected on simple random basis as the first stage sampling. The selected blocks are (1) Kishorenagar, (2) Banarpal and (3) Bhuban. From each of these selected blocks, four villages were selected on a random basis with probability proportional to the number of agricultural labourers. In total 12 number of villages were selected as the 2nd stage of sampling for the purpose of this study. In the final stage of sampling, 10 households from each of the selected villages were randomly selected. Thus, a total of 120 households were selected as the final units of this study.

Result and discussion

The distribution of sample persons by age, sex and activity status of the rural households under this study are shown in Table I.

From this table, it can be seen that there are altogether 832 persons in 120 rural families. The average size of the family in this region, therefore, comes to seven. While the male population in this sample comprises of 54 per cent of the total, the female population constitutes only 46 per cent. It can be further seen that 47 per cent of the total sample population fall under the age group of below 15 years, whereas 25 per cent come in the age group 15-29; 15 per cent come in the age group 30-44; 8 per cent come in the age group 45-59, and remaining 5 per cent fall in the age group of 60 and above. In other words, majority of the population in the area under the study are children and youth.

The activity status of the population has been broadly classified into three categories. These are : (1) workers, (2) 'not at work for want of work' and (3) 'not in the labour force'. Those who are actually engaged in some kind of economic activities, have been considered as workers. Likewise, those who are physically capable as well as interested to do the work at the given wage rate, but have remained idle due to lack of employment opportunities are taken as persons 'not at work for want of work'. Persons grouped under the category 'not in the labour force' are those who are unable to work either due to underage or social restrictions. Thus, the physically handicapped persons have also been included in the third category of the activity status.

It is seen from Table 1 that the persons below 15 years of age, by and large, are not in labour force, irrespective of sex. This is not unexpected, since majority of the children of this age group are school going. Even those who are not going to school are simply engaged in some kind of activities which are unproductive in nature. In the age group 15-29, out of a total of 111 male persons, 76 per cent are found to be workers, 19 per cent are 'not at work for want of work' and 5 per cent are not in labour force. Similarly, out of 97 female persons, 60 per cent are workers and the rest 40 per cent are not at work for want of work'.

In the age group, 30-44, out of 71 male persons, while 97 per cent are workers, only 3 per cent are 'not in work for want of work'. But in case of females, 63 per cent of the total female population are workers, 20 per cent are 'not at work for want of work', and other 17 per cent are 'not in labour force'.

All the male persons included in the age group 45-59 are found to be workers. However, as big as 70 per cent of the female in this age group are found to be 'not at work for want of work', 23 per cent are not included in the labour force and merely 7 per cent are considered as workers.

Likewise, among the males who are above 59 years of age 65 per cent are workers, 4 per cent are not at work for want of work and 31 per cent are taken as not in labour force, whereas in case of females, all the persons are included in the category not in labour force, since they were physically unfit to do any productive work.

From these, it can be concluded that majority of the male persons above 14 years of age are engaged in some kind of productive services. However, quite a sizeable proportion of adult female population are found either unemployed or not included in labour force. From the detailed investigation it was observed that the social constraints stood on the way of some of the female persons to opt for work, even though the economic condition of these families demands that they should work and earn some livelihood.

Table 2 shows the distribution of casual agricultural workers by number of days worked during Kharif and Rabi seasons. The casual agricultural workers are those who work mostly as hired labourers in farm operations. While Kharif season spreads from June to November, Rabi season is distributed over December to May.

From Table II it can be seen that during kharif season, out of the total casual agricultural workers of 170 in the sample, 39 have worked for less than 31 days. In other words, 22.94 per cent of the total casual agricultural labourers could get employment only for a month or less out of six months of busy agricultural season in this locality. Likewise, 78 casual agricultural labourers or 45.88 per cent of the total casual agricultural workers have worked for 31 to 60 days during Kharif months. The number of such labourers working within 61 to 90 days of kharif was 28, which constituted 16.47 per cent of the total casual agricultural labour force. However, it is observed that 10 per cent of the casual agricultural labour force worked within 91 to 120 days, 4.12 per cent worked within 121 to 150 days and only 0.59 per cent worked within 151 to 180 days.

It is, however, observed that as large as 167 out of the total casual agricultural workers of 170 could get employment for less than 31 days during rabi season. The other 3 such workers were employed for 31 to 60 days during the rabi months. Comparative trends of employment of casual agricultural labourers between kharif and rabi seasons in the year under the study reveal that the employment opportunity in rural areas is relatively greater during kharif than in rabi. This is chiefly attributed to the cropping pattern in the locality. Lack of irrigation facilities as well as subsidiary occupation in most of the areas under study contribute to such an alarming situation of both unemployment and underemployment in case of casual agricultural labourers.

Table III indicates the distribution of casual non-agricultural labourers by number of days worked, season-wise. The casual non-agricultural workers are those who work mostly in the activities other than agriculture but on hire basis.

From this Table it can be observed that there are 43 casual non-agricultural workers in the sample. Out of these workers, 11 have worked for less than 31 days during Kharif season mainly in different non-agricultural operations. They constitute 25.58 per cent of the total casual non-agricultural labour force under the investigation. Likewise, 22 casual non-agricultural workers or 51.16 per cent of the total have worked within a period of 31 to 60 days and the rest 10 persons or 23.26 per cent of the total could get productive employment for 61 to 90 days, during kharif months.

The observation about this type of labour force during rabi season indicates that 20.93 per cent of the total casual non-agricultural labourers worked for less than 31 days. However, 60.46 per cent of the total had to work within a period of 31 to 60 days, whereas only 16.28 per cent got the employment opportunity for 61 to 90 days, and merely 2.33 percent for 91 to 120 days during rabi season. There was no evidence of seasonal influence on the employment of this category of workers. However, it was observed that the size of the casual agricultural workers was nearly four times greater than the size of the casual non-agricultural workers.

TABLE I

DISTRIBUTION OF SAMPLE PERSONS BY AGE, SEX AND ACTIVITY STATUS

Age group	Activity status									Grand Total		
	Workers			Not at work for want of work			Not in labour force					
(years)	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Below 15	8	0	8	6	1	7	196	183	379	210	184	394
15-29	84	58	142	21	39	60	6	0	6	111	97	208
30-44	69	34	103	2	11	13	0	9	9	71	54	125
45-59	31	2	33	0	21	21	0	7	7	31	30	61
above 59	19	0	19	1	0	1	9	15	24	29	15	44
total	211	94	305	30	72	102	211	214	425	452	380	832

TABLE II

DISTRIBUTION OF CASUAL AGRICULTURAL LABOURERS BY NUMBER OF DAYS WORKED IN KHARIF AND RABI SEASONS DURING 1971-72

Number of days worked	Kharif			Rabi		
	Mala	Female	Total	Male	Female	Total
0-30	30	9	39	128	39	167
31-60	62	16	78	3	—	3
61-90	19	9	28	—	—	—
91-120	13	4	17	—	—	—
121-150	6	1	7	—	—	—
151-180	1	—	1	—	—	—

TABLE III

DISTRIBUTION OF CASUAL NON-AGRICULTURAL LABOURERS BY NUMBER OF DAYS WORKED IN KHARIF AND RABI SEASONS DURING 1971-72

Number of days worked	Kharif			Rabi		
	Male	Female	Total	Male	Female	Total
0-30	7	4	11	13	6	19
31-60	16	6	22	18	8	26
61-90	3	7	10	5	2	7
91-120	—	—	—	—	1	1
121-150	—	—	—	—	—	—
151-180	—	—	—	—	—	—

LAND REFORM AND AGRICULTURAL PRODUCTIVITY IN ORISSA

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Introduction

In the wake of a vigorous land reforms programme now decided to be undertaken on a priority basis throughout the country; the orthodox school has again raised the old controversy that land reforms with lowering of ceiling and distribution of surplus land would lead to lowering down of agricultural productivity. It is further argued by the proponents of this view that as large sized holdings provide employment to bulk of landless agricultural labourers, any reform which cuts the big holdings into size, will add to rural unemployment and under-employment. They, therefore, contend that the policy of lowering land ceiling and distribution of ceiling surplus land tantamounts to distribution of poverty. Whether the views are based on any sound economic consideration and whether there are sufficient statistical evidences in support of these contentions need to be examined.

2. The productivity criterion on which land reform is opposed are based on the following two assumptions :

(*i*) The large-sized holdings have higher yield rates than small sized holdings.

(*ii*) The large-sized holdings have higher employment potential than smaller ones.

3. Relationship between the size, class of holdings and the agricultural productivity may be analysed with reference to the data available for different states. By analysing the National Sample

Survey data on percentage distribution of area-owned according to size-class of holdings, in different states in India, it is found that Rajasthan, Gujrat, Andhra Pradesh and Madhya Pradesh are the States where there are heavy concentration of large sized land holdings. Presuming that land-holdings of 30 acres and above would be treated as sufficiently large, even when it is converted in terms of standard areas, it is found that such holdings account for 44.71 per cent of total agricultural land-owned in Rajasthan, whereas it is 30.12 per cent in Gujrat, 28.62 per cent in Andhra Pradesh and 26.88 per cent in Madhya Pradesh. These are the four states in India where 30 acre and above size holdings cover more than 25 per cent of land. On the other hand, states, where large-sized holdings cover only small percentage of land, say, below 5 percent of area are Assam with 0.64 per cent, Maharastra 1.57 per cent, West Bengal 1.58 per cent and Jammu and Kashmir 1.78 per cent. All other states, figure in-between these two limits. Orissa with 14 per cent of land covered by large-size holdings of above 30 acres ranks seventh in the inter-State position.

4. If the premise that large-sized holdings have higher rate of productivity than small-size holdings has any validity, it has to be assessed whether States with concentration of large-sized holdings have higher rate of productivity per acre than States with small-sized holdings. For this purpose, utilising the latest available data on net income from agriculture per acre in different states for the year 1968-69, it is found that of the four states where there was heavy concentration of large-size holdings, three are the states which have the lowest per acre net income among all States in India. On the other hand, Assam and West Bengal, which have very small percentage of land under large sized holdings occupy second and third highest position in terms of net value of return per acre from agriculture.

5. For determining whether there is any correlation between these two factors, a rank-correlation coefficient has been fitted to the data. in Table 1 by the equation—

$$r = 1 - \frac{6 \Sigma D^2}{N (N^2 - 1)},$$

Where r refers to rank correlation coefficient

D means the difference between the two rankings,

N means the number of states.

TABLE 1

PERCENTAGE DISTRIBUTION OF AREA UNDER LARGE-SIZED HOLDINGS AND PER ACRE NET INCOME IN DIFFERENT STATES IN INDIA

Sl. No.	States	Percentage of area in the size holdings 30 acres and above	Rank	Average net income per acre (1968-69)	Rank	D	D^2
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	28.62	3	416	9	—6	36
2.	Assam	0.64	15	923	2	13	169
3.	Bihar	10.10	9	535	7	2	4
4.	Gujrat	30.12	2	259	12	—10	100
5.	Jammu and Kashmir	1.78	12	662	5	7	49
6.	Kerala	11.63	8	1114	1	7	49
7.	Madhya Pradesh	26.88	8	210	14	—10	100
8.	Tamil-Nadu	6.87	11	517	8	3	9
9.	Maharastra	1.57	14	225	13	1	1
10.	Mysore	23.75	5	340	11	—6	36
11.	Orissa	14.00	7	364	10	—3	9
12.	Punjab	22.98	6	770	4	2	4
13.	Rajasthan	44.71	1	144	15	—14	196
14.	Uttar Pradesh	7.87	10	536	6	4	16
15.	West Bengal	1.58	13	832	3	10	100
							$\Sigma D^2=878$

$$r=1-\frac{6\Sigma D^2}{N(N^2-1)}=1-\frac{6\times 878}{15\,(225-1)}=1-\frac{5268}{3360}$$

$$=1-1.567=-0.567$$

Source : 1. National Sample Survey – 17th Round, 1961-62

2. Central Statistical Organisation.

5. A negative correlation at —0.567 indicates that the rate of return varies inversely with the increase in concentration of large size

holdings. This provides ample evidence to show that under productivity criterion opposition to lowering down of the land ceiling cannot be sustained; on the contrary, it adds force for expediting the process of cutting down the large-sized holdings into size, so that productivity may go up.

6. Coming to Orissa, it is estimated that on the basis of 14% of area being in 30 acres and above size-holdings, we find that in the State, there are 17.13 lakh acres of land which are under large-sized holdings. On the presumption that distribution of area under large sized holdings between the districts is in the same proportion as the distribution of households owning such land, these lands are distributed in different districts as follows :

TABLE 2

DISTRIBUTION OF LARGE-SIZED HOLDINGS IN DIFFERENT DISTRICTS OF ORISSA

Sl. No.	District	Percentage of area in 30 acre and above size holdings
1.	2	3
1.	Kalahandi	20.7
2.	Koraput	11.6
3.	Sambalpur	16.8
4.	Bolangir	15.8
5.	Phulbani	2.8
6.	Ganjam	5.4
7.	Sundergarh	6.5
8.	Dhenkanal	3.6
9.	Puri	3.5
10.	Keonjhar	2.1
11.	Cuttack	3.8
12.	Mayurbhanj	3.2
13.	Balasore	4.2

Source : 1. National Sample Survey—17th Round.
2. Census of India, 1961.

7. It is significant to note that of the 13 districts in the State, it is in the 4 Western districts that there is concentration of large sized holdings. These four districts, namely, Kalahandi, Sambalpur, Bolangir and Koraput account for 65% of the State's land in 30 acre and above size holdings.

8. For determining relationship between large-sized holdings and productivity, in the absence of districtwise data on per acre income for recent period, we may utilise the yield rate of paddy as a close approximation. Thus for the year 1968-69, which was a normal crop year, we get the inter-district yield rate of paddy as follows.

TABLE 3

INTER-DISTRICT YIELD RATE OF PADDY IN ORISSA (1968-69)

Sl. No.	District	Yield rate of winter paddy (in Quintals per Hectare)
1	2	3
1.	Balasore	16.36
2.	Bolangir	14.42
3	Cuttack	16.38
4.	Dhenkanal	18.79
5.	Ganjam	14.29
6.	Kalahandi	11.43
7.	Keonjhar	19.39
8.	Koraput	13.18
9.	Mayurbhanj	16.98
10.	Phulbani	14.91
11.	Puri	18.79
12.	Sambalpur	12.32
13.	Sundergarh	11.45

Source :— (Report on Estimation of Area, Production and yield rate of paddy in Orissa—Bureau of Statistics & Economics, Orissa.)

9. Correlating the data on large-sized holdings and the productivity of the staple crop, winter rice, and ranking the districts accordingly, we obtain the correlation coefficient,

$$r = 1 - \frac{6 \Sigma D^2}{N (N^2 - 1)} = 1 - \frac{6 \times 644}{13 (169 - 1)} = -0.768$$

A negative correlation coefficient of 0.769 suggests that in Orissa there is higher degree of negative relationship between large-sized holdings and agricultural productivity.

10. The above inference is also corroborated by the recent study of National Council of Applied Economic Research, which in its final report on 'Factors Affecting Agricultural Productivity in Orissa' found that input use and specially use of manure was the most important factor affecting productivity and that 'the size of distribution of holding does not appear to be influencing yield rates (except in Phulbani district).

11. On the other hand, micro-economic studies have revealed that small farmers rather cultivate lands better and that small-sized farms have higher rate of productivity than large-sized ones. A study on the 'Benefits of Hirakud Irrigation' shows that on the basis of yield rates of different crops both in irrigated and un-irrigated areas in Sambalpur and Bolangir districts, small and medium sized farms are more efficient and more productive than very large farms say above 50 acres. The relevant data are given in the Table 4 below.

TABLE 4

YIELD OF DIFFERENT CROPS PER ACRE (In Mds) ACCORDING TO SIZE OF HOLDINGS 1964-65

Sl No.	Size of holding	Irrigated				Un-Irrigated		
		Winter paddy (Kharif)	Summer paddy	Groundnut Kharif	Sugarcane Gur (Kharif)	Sugarcane Kharif control	Ground-nut Kharif control	Potato (Rabi)
1	2	3	4	5	6	7	8	9
1.	0.01-2.49	19.35	10.60	6.67	51.79	48.77	8.10	70.50
2.	2.50-4.99	16.20	11.43	6.65	43.27	41.99	8.51	57.03
3.	5.00-9.99	19.25	10.03	7.63	46.75	50.19	8.40	59.02
4.	10.00-19.99	18.16	9.21	7.20	51.16	68.08	8.38	53.42
5.	20.00-49.99	16.77	11.39	7.91	46.30	42.42	7.56	46.84
6.	50.00 & above	14.17	9.91	—	44.72	—	4.75	46.97

Source : Report on the Benefit of Hirakud Irrigation
Bureau of Statistics and Economics.

12. In view of this objective position, the contention that lowering down of the ceiling will reduce agricultural production and affect crop productivity has no economic basis.

13. Aggregate employment in agriculture takes the form of either farm employment or non-farm employment. Studies on Economics of Farm Management reveal that manpower requirement in agriculture varies depending on the type of crops grown. It is high in case of commercial crops, whereas in case of food crops it is nearly half as that. Thus we find that in case of Orissa and West Bengal the number of man-days required for cultivation of per acre of sugarcane, jute, fibres and oilseeds are 119 days, whereas for food crops like rice it is 58 days and for pulses it is only 22 days and for vegetables like potato, it is 164 days. It is estimated that the average number of working days for which an agricultural worker finds employment in farm work is 120 days in a year, whereas for non-farm work it is 72 days. When large sized farms are converted into middle-sized or small-sized viable farms, either by redistribution of surplus land or by fixation of, a flooring (in Orissa, however, till now no provision of flooring has been made, though in Kerala it is fixed at 1 acre, in U. P. at 2 acres and in Maharastra, M. P., Gujarat and Mysore at still higher levels) such reform may not by itself induce any significant change in the total cropping pattern, which will be done by other measures, but this may induce an increase in the cropping intensity.

14. The immediate effect of the conversion of landless agricultural labourers into owner-cultivators by way of redistribution of ceiling surplus land will be to bring about a qualitative change in the motivation factor in the production process. This will raise the gross cropped area per unit of net area sown, which will provide fuller employment to underemployed persons. It is estimated that there are 17 lakh underemployed persons in the rural areas of Orissa in 1971, and there were 17 lakh acres of land above 30 acre size holdings in 1961. One does not precisely know how much of it is still available as surplus. If, about 25 percent of this land is distributed as ceiling surplus land then much of the regions of unemployment and underemployment can be mitigated. This will be largely spread in the farm employment sector.

15. But for increasing the size of non-farm employment, much depends on the growth of marketable surplus in agriculture. From the following Table, it will be seen that the marketable surplus of different crops vary widely. In case of commercial crops, it varies from 60% upwards, whereas for food crops it varies from 30 to 40 percent of production.

TABLE 5

MARKETABLE SURPLUS OF DIFFERENT CROPS IN ORISSA

Sl. No.	Crops	Percentage of production
1.	Rice	32
2.	Mung, Biri	43
3.	Potato	80
4.	Sugarcane (Gur)	60
5.	Groundnut	70
6.	Mustard	55
7.	Jute	95
8.	Tobacco	75
9.	Turmeric	90

Source : Bureau of Statistics and Economics, Orissa

16. As productions of commercial crops are more price-elastic and as prices of such crops are rising at a faster rate than other crops, together with the Fourth Five Year Plan Provisions for raising area and production of such crops, it is likely that larger areas which were growing only food crops will have a second commercial crop. Thus larger volume of marketable surplus will be available, which will provide additional non-farm employment opportunities in the countryside. The motivation for growing a commercial crop, or a high yielding variety is more in owner-cultivator's holdings than in others. Once the constraints imposed by credit and higher input costs are taken care of by nationalised credit institutions, this motivation can be transformed into reality. Therefore, from the point of employment generation, land reform and land distribution can play a vital role in accelerating the process. Neither from the point of productivity, nor from employment generation, leaving apart the question of distributive justice, large-sized farms have no special merit for their retention.

EFFECT OF SIZE OF HOLDINGS ON EMPLOYMENT AND INCOME OF FARMERS

Dr. B. C. Hota
&
Shri S. K. Das

Introduction

One of the most disturbing features of our rural economy is the rapid growth of agrarian population. The latter has not only put excessive pressure of population on land but this has also accentuated the problem of unemployment and under-employment of agricultural workers. These twin problems of population pressure on land and unemployment have laid bare a danger spot in our rural economy and stood as obstacles in our objective of achieving an egalitarian society.

Study by Holstrom (1957) about movement of people from farm to urban area revealed that the income differences of agricultural population and other groups have greatly contributed to rapid population redistribution. Hathway (1960) pointed out that for the last four decades a large out migration from agriculture to non-farm sector continued to improve the ills of Agriculture, Tomczak (1965) observed that on small peasant farms in Poland, the scarcity of land and capital and surplus man-power led to low labour productivity and low income. The population pressure on land is not only responsible for fragmented and scattered holdings but it is also responsible for diminution in the size of holding. This paper seeks to find out the effect of size of holding on the employment and income of rural population, the hypothesis being increase size of holding increases farm employment and income.

Methodology

This study was undertaken in eight villages under the jurisdiction of Bhubaneswar block during the year 1956-67. Out of the total villages in the block, eight villages constituting 10 percent of villages over a population of 100 were selected at random. Ten percent holdings from each sample village were selected at random. Thus through two stage random sampling 77 households were selected. After collection of data the holdings were divided into the following five size groups 0-2.5 acres, 2.5 to 5.0 acres, 5.0 to 7.5 acres, 7.5 to 10 acres and above 10 acres. The number of sample holdings of various size selected from the eight villages are given in Table I.

Income, in this study, included total earnings both from farm and non-farm occupations. Wages earned from agricultural employment outside one's own farm was included in agricultural income. Net income was calculated after deducting cost of inputs in the farm sector and other expenditures in the non-farm occupation.

The informations were collected by survey method through personal interview with the respondents.

Results :

A. Degree of dependence on Agriculture with relation to the size of holdings.

The degree of dependence of the families on farm and non-farm occupations as related to different size groups in the sample holdings is given in Table I.

It may be observed from the Table that about 36 per cent of the families possessed less than 2.5 acres of land. Thirtynine per cent of this group did not depend upon agriculture for their livelihood, while 46 per cent partly depended on agriculture, their main source of earning coming from sources other than agriculture. About 11 per cent of the families mainly depended on agriculture, major share of their income being contributed by agriculture. Only a very small percentage, comprising of 4 per cent of the families solely depended on agriculture for their livelihood. It appears that the income received by these families from farming was not sufficient to meet their family requirement. This economic reason might have forced them temporarily to move to

off-farm jobs to supplement earnings from agriculture. Perhaps those not depending on agriculture belonged to the classes of village artisans. It is probable that the earning members of about 4 per cent of the families who depended solely on agriculture might be in the older age group and were incapable of taking up any off-farm iob or they might be from higher caste who were reluctant to take up the job outside their farms.

Twentytwo percent of the families belonged to 2.5-5.0 acres group. Out of this 23.56, 70.55 and 5.88 percent were in order mainly, partly and fully dependent on agriculture. This shows that the people partly depending on agriculture outnumber the combined strength of those solely and mainly depending on agriculture. Here again economic motives might have forced the temporary mobility of labour of this group to non-farm jobs to supplement their meagre earning from land.

In the 5.0 to 7.5 acre group comprising of 19 per cent of the total samples, 7 per cent were fully dependent on agricultural occupation while 50 per cent and 43 per cent respectively depended mainly and partly on agriculture.

Thirteen per cent of the families belonged to 7.5 to 10.0 acres group. Of this 10 per cent of families earned their livelihood entirely from farming. But majority of them, comprising of 60 per cent families of this group were mainly dependent on agriculture, supplementing a part of their income from non-farm employments. Thirty percent depended partly on agriculture. None of this group depended solely on non-farm occupation.

The last group having more than 10 acres of land constituted about 10 per cent of the total sample. In this group 25 per cent of the families derived their entire requirement from farming whereas 62.5 per cent depended mainly on agriculture. Only 12.5 per cent of the families were partly dependent on agriculture. Although farm income from bigger size groups was sufficient to meet their family requirements, it appears that the surplus family members and the operator himself might have taken up some non-farm occupation for full time employnent.

On the average 7.79 per cent, 32.46 per cent, 45.45 per cent and 14.30 per cent of the families in the sample were fully, mainly, partly and non-dependents on agriculture respectively.

The number of families partly depending on agriculture gradually decreased with increase in the size of holdings in favour of those mainly depending on agriculture and solely depending on agriculture. It appears, that the large size holdings found it more paying to devote major part of their time to agriculture and go to non-farm occupation just to keep themselves employed during the slack agricultural season.

B. Position of employment in relation to size of holdings

Table II shows the average days of employment of the operator in farm and non-farm sectors in relation to size of holdings and these are depicted in Tables III and IV.

The above Table reveals that the utilization of operators' labour in the farm was minimum in 0-2.5 acres group and above 10 acres farm. With the increase in the size of the farm, the average number of days of employment in off-farm jobs decreased and correspondingly the number of days employed in farm increased, the exception being those above 10 acres land. This exception is perhaps due to the fact that these operators who are well-to-do exert themselves sparingly for manual work in the farm, and they prefer leisure to work.

It may be also due to the fact that they did not employ family labour in field work for the sake of prestige. The female members did the household work and the male members planned and supervised the field works. In general, they employed casual or permanent labour for the field work. Since they get sufficient income from farming to maintain their family, they did not engage the family members for manual field work especially on prestige issue.

The range of unemployment in different size of holdings varied from $2\frac{1}{2}$ months to $5\frac{1}{2}$ months. This happened perhaps because the small size farms could not provide full time employment. In addition, insufficiency of income from the small size farms forced the workers to go in search of farm jobs. In spite of this they remained unemployed for about three months a year for want of employment and for attending to other social functions.

Most of the people remained unemployed or underemployed for a certain period not because they preferred idleness to work but because there was an insufficiency of cooperant factors of production to set them

to work. The seasonal character of agricultural operations resulted in an uneven distribution of labour power. This waste of labour was primarily due to the enforced unemployment and underemployment which existed side by side in the region under study. The period of complete inactivity in this region varied with the nature and variety of crops and cropping pattern.

Three separate linear functions were fitted by taking size of holding as the independent variable (X) and each of days of employment in farm, days of off-farm employment and days of unemployment as the dependent variable (X). The coefficients obtained from these relationships are presented in Table 3.

The correlation coefficient (r) between size of holdings and the days of employment of the operator in the farm is highly significant. This indicates that as the size of holdings increased, the number of days of employment in farm also increased. For each acre increase in the size of the holding, farm employment increased by 5 days over a base of 72 days.

The correlation coefficient (r) between size of holdings and the days of employment of the operator in non-farm occupation is also highly significant. The relationship indicates that there is an inverse correlation between the two factors showing that as the farm size increased the days of employment in the farm decreased and vice versa. For each increase in farm size, non-farm employment decreased by about 8 days over a basic of about 233 days.

There also exists a positive correlation between the size of holdings and the days of unemployment. This correlation coefficient (r) is highly significant. The relationship was positive thereby showing that as the farm size increased the days of unemployment increased correspondingly. For each addition to the acreage days of unemployment increased by 3 days over a base of 60 days. But this relationship is not consistent with the trend observed from Table 4. This inconsistency may be due to the abnormally high level of unemployment exerted by this size yielded positive relationship to the function. This may be due to the fact that because of higher income the farmers in the higher size of holdings did not exert themselves for doing manual work. They only did the supervision work for which there is no proper yard-stick measuring employment status.

Size of ho dings and income

The distribution of sample holdings in different farm income groups is given in Table 4.

From the above Table it is found that only 12 per cent of the farm families comprising of 12 per cent of the working population received more than twelve hundred rupees per annum from their farm business. Fortyfive per cent of the holdings were in the lowest group (Rs. 300-600). It appears that since their farm income was not sufficient to meet the entire family expenditure, the workers in this group used to go to industrial area, or take up some other occupations to supplement their farm income. Thus, it is evident from the above that incentive to supplement income was a major factor influencing the small holders to take up other jobs in the locality or in the nearest town in the slack season.

The total and per capita net income from farm and non-farm sources for various size of holdings are given in Table 5.

It may be observed from the table that 32 per cent of the families belonging to 0-2.5 acre group received only 28.55 per cent of their total income from farms and the remaining 71.45 per cent from non-farm works. The per capita farm income of this group was less than those having large farm size.

About 26 per cent of the families belonging to 2.5-5.0 acre group received 34 per cent of their total income from farming and 66 per cent from non-farm sources while those in the 5.0-7.5 acre group got 44 per cent of their income from farms. Families in the 7.5-10.00 acre group obtained 51 per cent of the income from the farms and 49 per cent from non-farm occupation. The families having more than 10 acres derived onethird of their total income from non farm source and the rest two-third from the farm. The per capita income derived from farm increased with the size of holding. The non-farm income decreased correspondingly. The total per capita income increased with increase in farm size.

The average farm income of individual sample holding was 40 per cent while the average non-farm income was 60 per cent in the region under study. It may be noticed from the table that the percentage of income derived from farming increased with the increase in the farm size and the income derived from non-farm source declined correspondingly. Both in percentage and absolute terms the per capita income derived

from farming increased with the size of the holdings. Per capita income derived from non-farm sources declined both in percentage and absolute terms with the increase in size of holdings. The traditional system of cultivation, lack of irrigation facilities and monocropping system may be responsible for this meagre income from agriculture. It appears that due to mono-cropping, agricultural workers have less opportunity for full time employment in their own farms. Consequently during the offseason and when they do not have work in their own farms, these small holders take up some other occupation or go in search of employment in the same village or elsewhere depending upon the availability of jobs.

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APPENDIX

TABLE I

RELATIONSHIP BETWEEN SIZE OF HOLDING AND DEGREE OF DEPENDENCE ON AGRICULTURE IN THE SAMPLE HOLDINGS, 1965-66

Size of holding	No. of Families				Total no. of holdings.	Percentage
	Fully dependent on agriculture.	Mainly dependent on agriculture.	Partly dependent on agriculture.	Not dependent on agriculture.		
0-2.5	1	3	13	11	28	36.36
Percentage	3.57	10.72	46.43	39.28	100	—
2.5-5.0	1	4	12	0	17	22.08
Percentage	5.88	23.56	70.56	—	100	—
5.0-7.5	1	7	6	0	14	18.18
Percentage	7.14	50.00	42.86	—	100	—
7.5-10.0	1	6	3	0	10	12.99
Percentage	10.00	60.00	30.00	—	100	—
10.0 and	2	5	1	0	8	10.39
above	25.00	62.50	12.50	—	100	–
Total	6	25	35	11	77	100
Percentage	7.79	32.46	45.45	14.30	100	—

Note : Fully depend on agriculture : Farm business is the only source of income. Mainly dependent on agriculture. More than 50 per cent of gross income is derived from agriculture: Partly dependent on agriculture : Less than 50 per cent of gross income derived from agriculture. Not dependent on agriculture : Farming does not contribute anything to income.

TABLE II

AVERAGE NUMBER OF DAYS OF EMPLOYMENT OF THE OPERATOR IN FARM AND NON-FARM ACCORDING TO SIZE OF HOLDINGS IN SAMPLE HOLDINGS

1965-1966

Size of holding (in acres)	Total no. operators	Total working days	Average days of employ-ment in own farm	Average days of outside employment	Average days of unemploy-ment
0-2.5	17	6205	85	190	90
2 5-5.0	17	6205	115	168	82
5.0-7.5	14	5110	140	150	75
7.5-10.0	10	3650	170	128	67
10.0 & above	8	2920	105	100	160

TABLE III

ESTIMATES OF EMPLOYMENT POSITION OF THE OPERATOR ACCORDING TO SIZE OF HOLDING IN THE SAMPLE HOLDINGS 1965-66

Items	Y. intercept 'a'	Regression coefficient 'b'	Correlation coefficient 'r'	D. F.	Observed 't' value	Remarks
Farm employment	72.20	5.33	+0.606	64	6.09	**
Non-farm employment	232.62	—7.94	—0.896	64	16.14	**
Unemployment	60.18	2.88	+0.585	64	5.64	**

Table value of 't' at 1%=2.617, ** significant at 1%

Y=f (x) and Y=a+bx, where X =Size of holdings and Y=Employment position.

TABLE IV

NET FARM INCOME GROUPS OF THE SAMPLE HOLDINGS 1965-66

Income groups (in Rupees)	No. of holdings	Percentage	No. of working population	Percentage
300-600	30	45.45	45	44.55
601-900	18	27.27	28	27.72
901-1200	10	15.15	16	15.85
1201 & above	8	13.13	12	11.88
TOTAL	66	100.00	101	100.00

TABLE V

TOTAL AND PER CAPITA NET INCOME FROM FARM AND NON-FARM SOURCES IN THE SAMPLE HOLDINGS ACCORDING TO FARM SIZE, 1965-66

Size of holdings (in acres)	No. of holdings	No. of family members	Net farm income (in Rs.)	Net non-farm income (in Rs.)	Net total Income (in Rs.)
1	2	3	4	5	6
0-2.5	28	130	11,765.00	29,445.00	41,210.00
Per capita					
Income	—	—	90.50	226.50	317.00
Percentage	32.47	—	28.55	71.45	100.00
2.5-5.0	17	113	12,712.50	24,662.25	37,374.75
Per capita					
Income	—	—	112.50	218.25	330.75
Percentage	25.97	—	34.01	65.99	100.00
5.0-7.5	14	84	12,642.00	16,401.00	29,043.00
Per capita					
Income	—	—	150.50	195.25	345.75

1	2	3	4	5	6
Percentage	18.18	—	43.53	56.47	100.00
7.5-10.00	10	58	10,585.00	10,150.00	20,735.00
Per capita					
Income	—	—	182.50	175.00	357.50
Percentage	12.99	—	51.05	48.95	100.00
10.0 &					
above	8	32	9,936.00	4,480.00	14,416.00
Per capita					
income	—	—	310.50	140.00	450.50
Percentage	10.39	—	66.48	33.52	100.00
Total	77	417	57,540.50	85,138.25	142,778.75
Per capita					
income	—	—	138.28	204.17	342.39
Percentage	—	—	40.37	59.63	100.00

PRODUCTIVITY OF FARM CAPITAL

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The efficiency of modern agriculture can be mainly attributed to increased use of farm capital in the form of improved seeds, fertilizers, insecticides and better machinery. For production to be maximised within a frame-work of given resource constraints, such as land and labour, it became necessary to ensure that available capital and credit was being allocated optimally. Some of the farm management studies in different parts of India conducted by the Ministry of Food and Agriculture during 1955-56 to 1958-59 indicated that, on the whole, the influence of both capital assets and working capital were not significant. Since during this period the methods of cultivation were traditional, the non-significant influence of working capital as well as fixed capital is understandable. But most of the farm economics studies during sixties and seventies revealed that the use of added capital through new farm business strategies has greatly increased the levels of farm productivity. Moreover, many recent studies have shown that there were serious imperfections in the allocation pattern as a result of maladjustments and lack of technical know-how. The study of the productivity of farm capital, therefore, should be treated as an important area of applied economics research. This study was planned to throw some light on the productivity of working capital in the existing situation of farm business.

Methodology

This study pertains to alluvial plains of Cuttack district, since this zone has a significant influence on agro-economic conditions of the

district. The villages of this zone were stratified into two categories namely, irrigated and un-irrigated on the basis of irrigation potential. The villages having 80 per cent or more cultivated area under irrigation were taken as irrigated villages and those having less than 80 per cent of the cultivated area under irrigation were considered as un-irrigated villages. The number of primary stage units, viz., the villages selected were four, two from each category.

For the purpose of selection of the ultimate unit (the holdings), the operational size of holdings of each individual household in each selected village was ascertained and recorded. All the recorded data of the operational holdings were classified in three size groups, namely, below 1 hectare, 1 to 2 hectares and above 2 hectares. Classification must provide for some degree of comparability from time to time. Keeping this in view, classification of All India Rural Credit Survey and All India Rural Debt and Investment Survey of the Reserve Bank of India was considered as the basis. It was not advisable to have an additional size group with 4 hectares and above as 93 per cent of the farms fell under 4 hectares and 6 per cent were beyond 4 hectares.

In the final stage, 15 farms from each size group and from each of the selected villages were randomly selected. Thus, the total number of sampled farms were 180. In this situation, it was not ideal to determine the number of sampled farms in each size group according to the probability proportional to the total number of farms falling in the corresponding farm size, since a very small number of farms were coming in the higher size group, which would not have allowed desired minimum degrees of freedom to carry out any statistical analysis and to draw inferences from such analysis. Hence, a fixed number of thirty in each size group was considered as an alternative for the selection of holdings.

Production function technique was used as the analytical approach for studying the factor-product relationship and for finding out marginal value productivity of capital. In this study, production function analysis was applied to farm business as a whole and Cobb-Douglas functions were tried. The reasons for using Cobb-Douglas type of regression model was that many researchers have found out that this model gives a better fit in the productivity studies of Indian agriculture. Though it was thought of taking different input variables such as human labour, bullock labour, seeds, manures and fertilizers, pesticides and implements separately in the regression model as independent variables, the same could not be carried out. Because the examinations of the simple correlation

matrix for above variables revealed that there existed high inter-correlation between these variables. The inter-correlations were as high as 0.98. One of the basic assumptions for studying the explanatory content of degree of association of different input variables with the output is that these input variables should be independent and not highly inter-correlated. When there is problem of multicollinearity such variables act as one joint input and their contribution to output is also joint. Under such circumstances, estimation of independent effect of individual inputs on the output is not advisable. The problem of multicollinearity is serious in the sense that estimated parameters have an unsatisfactorily low degree of precision. If multicollinearity is high, the standard errors are large and the separate effect of individual variables cannot be measured accurately. There is no entirely satisfactory way of dealing with this problem.

Fox and Conney[1] have investigated this problem in considerable detail. They indicated that it was possible to deal with this problem by treating highly inter-correlated variables as a bundle of inputs. Some workers prefer to eliminate the highly inter-correlated variables and retain only one such varible. In this study, working capital which represents as a bundle of the above inputs was taken as one variable input in order to avoid the problem of multicollinearity. The general form which the function took was

$$Y = aX_1^{b1} X_2^{b2}.$$

The parameters a, the constant term of equation and b_1, b_2 the production elasticities of the respective inputs (X_1 and X_2) were estimated and the significance of regression coefficients (b_1, b_2) was determined by 't'-test[2].

It was assumed that in each size group, the individual units of observation were relatively homogeneous with respect to production function. Hence, the equations were developed for each size group separately.

1. Fox, K. A. and Conney, J. F. "Effect of Intercorrelation upon multicorrelation and Regression measures", U. S. Agril. Mktg. service, 1954.

2, In order to test the significance of regression co-efficients, 't'-values were examined: 't'=b/S. E. b where b is the regression coefficient and S. E. represents its standard error,

The marginal value product[1] (MVP) of working capital was worked out at its geometric mean. This was done for each set of equations. The marginal product of gross cropped area was not estimated since some of the regression coefficients with respect to gross cropped area were found to be statistically not significant. Moreover, the scope for increasing area under cultivation was negligible due to the prevailing real imaginary fear of land reforms. At the same time, not much scope existed for reducing the existing holding sizes, since the farms were, by and large, very small. Therefore, it was not considered necessary to emphasise much on the marginal value product of land.

In order to determine the optimum levels of working capital, the marginal value product of working capital was compared with its price. If the marginal value product of working capital is greater than its price then it is suggested that the use of working capital be expanded, while if marginal value product of working capital is less than its price, it is suggested that use of working capital be curtailed. The optimal level of working capital was determined in each case by equating MVP with MFC.[2]

Result and discussion

Efforts in this study were made to assess the productivity of capital, with a view to find out : (1) whether or not it was profitable to use the existing level of capital on the farms, and (2) the extent of capital shortage or surplus on the sampled farms.

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1. $MVPx_2 = dy/dx_2 = ab_2\ x_1^{b1}\ x_2^{b2-1}$

2. Mathematically :

$$P_y \frac{dy}{dx_2} = Px_2$$

where P_y is the price of product, dy/dx_2 is the marginal physical product of X_2 and Px_2 is the price of X_2.

or $P_y E_{y,x} \cdot Y/X_2 = Px_2$ (since $E_{y,x2} = dy/dx_2 \cdot X_2/Y$)

or $P_y \cdot b_2 \cdot Y/X_2 = Px_2$ (since $b_2 = E_{y,x2}$ in Cobb-Douglas equations. $E_{y,x2}$ is the elasticity of production with respect to X_2 and b_2 is the regression coefficient of X_2.

Thus, X_2 (optimum) $= (P_y \cdot b_2 \cdot Y)/Px_2$.

In this study, the MVP of working capital was estimated for different farm sizes of the irrigated and unirrigated farms, respectively by using Cobb-Douglas equations. The functions took the form of :

$$Y = aX_1^{b1} X_2^{b2}$$

where Y=gross returns in rupees,

X_1=gross cropped area in hectares, and

X_2=total working capital, including imputed value of family labour, owned bullock labour, home produced seeds and manures (in rupees).

The developed equations are presented and discussed below :

Irrigated farms

Size group I (0.1 to 1.0 hectare)

$$Y = 30.062\ X_1^{\underset{(.187)}{.671**}}\ X_2^{\underset{(.074)}{.723**}}$$

R^2=.73, n=30, F (2,27)=36.45**

Size group II (1.1 to 2.0 hectare)

$$Y = 15.153\ X_1^{\underset{(.343)}{.522}}\ X_2^{\underset{(.091)}{.687**}}$$

R^2=.56, n=30, F (2,27)=17.15**

Size Group III (above 2 hectares)

$$Y = 18.586\ X_1^{\underset{(.169)}{.462**}}\ X_2^{\underset{(.315)}{.644*}}$$

R^2=.61, n=30, F (2,27)=21.06**

Unirrigated farms

Size group I (0.1 to 1 hectare)

$$Y = 85.704\ X_1^{\underset{(.235)}{.424}}\ X_2^{\underset{(.178)}{.618**}}$$

R^2=.89, n=30, F (2,27)=109.22**

Size group II (1 to 2 hectares)

$$Y = 25.237\ X_1^{\underset{(.162)}{.374**}}\ X_2^{\underset{(0.86)}{.593**}}$$

R^2=.48, n=30, F (2,27)=12.42**

Size group III (above 2 hectares)

$$Y = 13.711\ X_1^{\underset{(.203)}{.343}}\ X_2^{\underset{(.311)}{.673**}}$$

R^2=.77, n=30, F (2,27)=45.09**

* Significant at 5 % level **Significant at 1 % level

It was interesting to note that the regression coefficients of working capital were statistically significant in all the six equations developed from the data. This indicated that in all the cases, the working capital positively influenced the farm returns. The marginal value products of working capital at their geometric mean were derived from the above-mentioned equations for different farm situations. The Marginal Value Products of working capital are given in Table-1.

TABLE 1

ESTIMATED MARGINAL VALUE PRODUCTS OF THE WORKING CAPITAL UNDER DIFFERENT FARM SITUATIONS

Size group	Irrigated	Unirrigated
I	1.56	1.29
II	1.64	1.16
III	1.35	1.23

From the estimated figures for the Marginal Value Products of working capital it may be concluded that in all the situations, the existing level of working capital used was less than the optimal level. This is, of course, true only when the institutional credit could be available at 10 per cent rate of interest. Thus, the cost of capital may be considered as 1·10 for every rupee of capital, whereas the MVPs of working capital varied from 1.16 to 1.64. However, the Marginal Value Products of working capital were higher in the irrigated farms than those in the unirrigated farms. The probable reasons could be, the high yielding varieties and the consequent interaction between irrigation and fertiliser, as also the package of practices in the irrigated area as compared to unirrigated area.

An attempt was made to find out the optimum level of working capital by equating the Marginal Value Product of working capital with its respective marginal cost. The optimum level, so worked out are given in Table 2.

TABLE 2

STATEMENT SHOWING OPTIMUM LEVEL OF WORKING CAPITAL AND ADDITIONAL CAPITAL NEEDED FOR THE SAMPLED FARMS IN CUTTACK DISTRICT (In Rs.)

Size group	Existing level of working capital	Optimum level of working capital	Additional capital needed for optimum level
		IRRIGATED	
I	592 (100.00)	841 (142.06)	249
II	1694 (100.00)	2521 (148.82)	827
III	3267 (100.00)	4040 (123.67)	773
		UNIRRIGATED	
I	348 (100.00)	407 (116.95)	59
II	751 (100.00)	794 (105.72)	43
III	1668 (100.00)	1867 (119.93)	99

(Figures in the parenthesis indicate percentage.)

The following facts emerge from the foregoing analysis :

By and large, the additional capital absorbing capacity of farms increased with the rise in farm size, in both the situations, (irrigated and unirrigated). However, the irrigated farms had greater capital absorbing capacity as compared to their counterparts in the unirrigated farms. Shortage of capital use in consideration to optimal level was more pronounced in the irrigated farms than that for unirrigated farms. Further, it may be concluded that farmers could profitably use additional amount of capital needed up to the optimum level by borrowing from the institutional credit agencies.

PRODUCTIVITY OF AGRICULTURE IN ORISSA

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The important role that agriculture plays in the development of Orissa's economy requires no re-emphasis. Everybody is aware of the fact that agriculture forms the backbone of the entire economic structure of Orissa, providing livelihood to about 76% of the State's working population and contributing about 58% of the total State Income. At the national level too, agriculture assumes a great importance since it contributes about 47% of the National Income. In comparison to that and to those of other States of India, the vital role that agriculture plays in Orissa's economy is thus very much glaring. This also gets reflected from the fact that 92% of the people of Orissa still live in villages being associated directly or indirectly with agriculture. Thus, the success of our efforts for economic development of the State in general and raising of the standard of living of the overwhelming rural population in particular, will largely depend on the order of development achieved in the Agricultural sector of the economy. Orientation of the plan programmes towards a strong agricultural base has thus been an essential perequisite for the higher economic growth.

To achieve this end, concerted efforts were made since the inception of the Five Year Plan Programmes in the country. If we are to review the state effort in this direction, we observe that the emphasis during the 1st Five Year Plan was on agriculture with a provision of about Rs. 5.15 crores (28% of the total) out of total expenditure of Rs. 18.42 crores. During the second plan period, though the emphasis was shifted to irrigation and power, the expenditure under agricultural sector increased to Rs. 7.93 crores out of the total plan expenditure of Rs. 86.59 crores which formed 9.2% of the total expenditure. In the third plan the investment under this programme was further stepped up

to Rs. 21.76 crores out of total expenditure of Rs. 223.27 crores, forming 9.7% of the total expenditure. And, during the 4th plan period, the provision for expenditure of Rs. 42.30 crores in a total outlay of Rs. 222.60 under State Sector was made. This constituted 19% of the total plan expenditure which surpassed the allocations of the previous two plans. The trend of investment in agriculture shows thus the importance attached to this vital sector in our plans.

Now that all these investments have been made in course of a period of about 20 years, the time has come in the wake of the 5th Five Year Plan, to analyse whether the expected rate of growth in the agricultural sector as well as the two main objectives *i. e.* (*i*) increasing the size of the State output and (*ii*) distributing it in an equitable manner to those who participate in producing it, have been achieved. The revised series of State Income Estimates prepared by the Bureau of Statistics and Economics, Orissa, show that the income from the Agriculture sector alone has increased at constant prices (1960-61) from Rs. 213.04 crores in 1960-61 to Rs. 298.68 crores in 1970-71 with dents in the increasing trend during the years 1965-66, 1966-67 and 1967-68 when Orissa faced with severe drought conditions. The overall increase over 11 years period starting from 1960-61 has been 29% with linear annual rate of growth of 3.4% and compound annual rate of 3.2%. This rate of growth has not been, however, up to the expectations of the planners as compared to the plan investments. Another striking feature of the agricultural production during these years was that it was erratic over years and still played in the hands of the monsoon. Failure of crops due to severe drought conditions during the 3rd plan period and devastating flood and cyclone in 1971-72 are the examples.

There has been a notable feature about the progress of agricultural production during the 4 plan periods. Unfortunately, the last year of each plan has been a bad agricultural year. Therefore, assessment of development in agriculture in each plan period taken separately has not been very much encouraging. It is therefore necessary to refer to area, production and productivity of all major crops of the State during all the years taken together and analyse the growth rates. The tables at the Appendix, give the comparative growth rates (linear) of area, production and productivity of different crops for all States and India as a whole during the period from 1952-53 to 1964-65. The growth rate of agricultural production in Orissa during the peried has been only 2.72% as against all-India average of 3.42%. Though Orissa ranks 5th from below in the list followed by the States like Kerala, West Bengal, Uttar

Pradesh and Assam, Orissa's performance can be considered as the poorest since the low rate of growth in agriculture in Kerala, West Bengal and Uttar Pradesh has been compensated by income from other sector like industries which are more developed in these States and Assam has income from tea-plantations. Similarly, the growth rate in agricultural productivity has been only 1.78% in Orissa as against 1.91% in India as a whole, 4.52% in Gujrat, 3.46% in Madras, 3.03% in Mysore and 2.86% in Punjab. Even in regard to area also, Orissa has lagged behind with a growth rate of 0.84% as compared to 1.28% in India as a whole, 3.23 % in Rajasthan, 2.06% in Punjab, 1.31% in Kerala, and 1.35% in M. P.

Coming to individual crops, the growth rate of production of non-food crops has been higher during the period from 1951-52 to 1964-65 than that of food-grains. The rate of growth in production of non-food crops has been 3.40% as against 2.60% in case of food grains. This has been an encouraging state of affairs since this may encourage change-over from the production of food grains to more profitable production of non-food crops resulting in increase in net income in the agricultural sector. It has been the experience that in developed economies, the emphasis on the production of food grains is minimised. Rice is the most important crop of the State, since its area accounts for 65% of the total cropped area. Even the growth rate of that crop has not been up to expectations. During the period from 1952-53 to 1964-65, the growth rate of production of rice has been 2.88% as against 12.31% in Punjab, 6.04% in Madras, 5.98% in Gujrat, 5.96% in Mysore, 5.56% in Rajsthan, 5.15% in Andhra Pradesh and 3.64% in all-India level.

All the above statistics show that the rate of growth in production of crops has not been as encouraging as in other States though it was imperative on the part of Orissa to have an accelerated rate of growth in order to come in par with the level of others.

The reasons for the slower rate of growth are multiple and well known to everybody. The main reason can be attributed to the absence of adequate irrigation facilities in the State. By the end of the 3rd plan period (1965-66) only 11.57% of the total cropped area could be irrigated through all the sources. These irrigated areas are mainly confined to only 3 districts of the State whereas the remaining districts raise almost one major crop within a year depending purely on the rainfall. Thus the agriculture in Orissa still gambles with monsoon even after 4 plan periods. Our big irrigation projects are also not

free from the vicissitudes of the nature and weather conditions. During the current season, due to paucity of rain, irrigation sources including Hirakud Dam could not provide sufficient water to fields growing summer rice, the production of which has assumed popularity among the cultivators due to its high yielding capacities. Water level in the dam fell so low that even the production of electricity had to be curtailed. Along with drought conditions, devastation of crops due to floods and cyclones has become a regular feature in Orissa which affect severely the areas where only one major crop is grown. To fight against these onslaughts of nature and to ensure higher production of crops, it is suggested that (*i*) irrigation facilities may be extended to larger area in all the districts wherever facilities are available, no matter how large is the investment, so that failure of crop in one part of the State will be compensated by the higher production in another, (*ii*) changing the cropping pattern so as to cover the entire year in production of one crop or other, so that the failure in production of one crop in one season will be compensated by the production of another during another season of the same year. This may require research on the cultivation of special type of crops suitable for different type of soils requiring or not irrigation facilities, (*iii*) cultivation of plantation crops or the like which do not require much of water in areas where either there is no irrigation facility or it is invaded frequently by drought conditions.

Secondly, the slower rate of growth can be attributed to the general economic backwardness of the State in general and low economic capacities of the farmers in particular. The farmers have very little to invest in agriculture so as to bring about effective improvement in agricultural production. Even, due to lack of investment capacity of farmers, the minimum input necessary to practise improved techniques of production is not available with the farmers. According to N.C.A.E.R. calculations, the value of inputs per acre in Orissa is only Rs. 27.41 as against Rs. 76. 12 in Kerala, Rs. 56. 05 in Madras, Rs. 35.63 in West Bengal & Rs. 32. 79 in Uttar Pradesh. To this reason, can be added the long recognised evil *i.e.* uneconomically small and scattered holdings and low per capita agricultural income. Besides this, ignorance of farmers about the adoption of improved agricultural techniques and at times refusal to leave the traditional method of cultivation also account for lower productivity. To improve upon this state of affairs, attempts can be made to act in the following directions. (*i*) Land reforms measures may solve the problem of uneconomic holding size. (*ii*) Extensive education of farmers in the use of improved agricultural practices, (*iii*) Reorganising

and improving upon the system of extension methods in the Block area aiming at higher agricultural production. (*iv*) Provision of easy credit facilities and (*v*) investment in input in I.A.D.P. standards.

Thirdly, there has been an inequitable and uneconomic distribution of crops in the State Agriculture with a very high proportion of area under rice and other cereals than under other crops. This resulted in lower output per unit investment with the result that the over-all growth rate in terms of value added in the field of agricultural development has been slower in Orissa than in other States. The distribution of area under different crops will show that there has been very small area under cash crops or commercial crops and practically no plantation crops. Usually, the income per acre of non-food crops such as sugar cane, fruits, vegetables, jute, cotton and plantation crops is higher than that of food crops. In Orissa, a large area under food grains (unirrigated) is mainly responsible for a lower net value of output of Rs. 180. 00 per acre as compared to States like Kerala, Assam, West Bengal and Madras, where the net values of output per acre are Rs. 445.44, Rs. 347.78, Rs. 313.21 and Rs. 282.87 respectively. It is thus now high time that a thought is given for a change-over from the extensive cultivation of rice to other cash crops to increase the total income from this sector. Introduction of high yielding varieties of crop in the state has immensely increased the volume of production of rice in recent year. In 1970-71, the total production of autumn and winter-rice in the state was 39.13 lakh metric tonnes and that of summer-rice was 1.87 lakh metric tonnes. The total production leaves a small margin of surplus after meeting the domestic consumption needs. The present volume of production can be obtained in lesser area by the adoption of cultivation of high yielding varieties of paddy during kharif season as well and the remaining area can be devoted to the cultivation of other profitable crops like cash crops, oil seeds, pulses etc. And again, disparities in the value of agricultural produce in different districts due to different yield rate of rice on account of disparities in irrigation, soil and other conditions can be minimised by adopting the cultivation of different crops other than rice in places where they can grow well. This will mean cultivation of special type of crops in different districts according to their suitability.

Lastly, it can be observed that another important factor of low rate of productivity in agriculture is the state of economic organisation of agriculture. A better economic organisation will mean the better and full utilisation of the existing assets rather than creating additional assets through investments and savings. According to Prof. Dantwala, the

irrigation potential and the propagation of better seed farming in India have not been realised even to the extent of 25 per cent. It will be an admitted fact that if the proper utilisation of the existing assets is realised by plugging the holes and having a better economic organisation, then much will be achieved in the direction of agricultural development in the State. For example, it will be necessary to ensure that the seeds which are distributed to the cultivators go to the field in toto and not for human consumption; and the loan which is granted for the development of the land, is not spent in marriages.

If the above reasons are taken into consideration and measures taken during the 5th Five Year Plan to rectify them, with proper utilisation of investment at 5%, if not more, increase in the growth rate can be achieved and with this rate of growth, the agricultural sector will be able to increase its contribution by about 60% in 1975-76 over 1970-71 at constant prices to the total State Income.

APPENDIX

TABLE I

STATE LINEAR GROWTH RATE OF AGRICULTURAL PRODUCTION DURING 1952-53 TO 1964-65

(Average : 1952-53 to 1954-55=100)

State	Linear growth rate of agricultural production (per cent)
Higher (than all-India) Group	
1. Punjab	5.56
2. Gujrat	5.12
3. Madras	4.91
4. Mysore	4.06
5. Himachal Pradesh	3.93
All-India	3.42
Lower (than all-India) Group	
6. Bihar	3.21
7. Maharastra	3.19
8. Rajasthan	3.08
9. Andhra Pradesh	3.06
10. Madhya Pradesh	2.79
11. Orissa	2.72
12. Kerala	2.52
13. West Bengal	2.07
14. Uttar Pradesh	1.82
15. Assam	1.25

(Source : Growth rates in Agriculture. Issued by Economic and Statistical Adviser, Ministry of Food and Agriculture, Govt. of India)

TABLE II

STATE LINEAR GROWTH RATES OF AREA UNDER CROPS AND AGRICULTURAL PRODUCTIVITY DURING 1952-53 to 1964-65

(Average : 1952-53 to 1954-55=100)

State	Linear growth rate	
	Area under crops (per cent)	Agricultural productivity (per cent)
1. Punjab	2.06	2.86
2. Gujrat	0.46	4.52
3. Madras	1.13	3.46
4. Mysore	0.83	3.03
5. Himachal Pradesh	0.73	3.00
All-India	1.28	1.91
6. Bihar	0.71	2.39
7. Maharastra	0.44	2.62
8. Rajasthan	3.23	(—) 0.08
9. Andhra Pradesh	0.27	2.72
10. Madhya Pradesh	1.35	1.30
11. Orissa	0.84	1.78
12. Kerala	1.38	1.00
13. West Bengal	0.60	1.41
14. Uttar Pradesh	0.74	1.01
15. Assam	1.32	(—) 0.07

(Source : Growth Rates in Agriculture. Issued by Economic and Statistical Adviser, Ministry of Food and Agriculture, Govt. of India)

EMPLOYMENT PATTERN OF FAMILY LABOUR IN RURAL AREAS OF PIPLI BLOCK IN PURI DISTRICT

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Introduction

One of the most pertinent questions faced by the developed and developing nations in our contemporary economics is the problem of unemployment and under-employment. This problem is more acute in an agrarian economy as ours, so much so that there has been scathing criticism both inside and outside the Parliament regarding the failures of the five year plans to make a dent on the employment problem. The Government of India has set up a special committee on employment to suggest measures to solve this problem. The crash programme on employment seeks to collect information on the extent of employment and underemployment in rural areas.

The monthwise distribution of labour, distribution of labour in various activities and the extent of under-employment and unemployment in agriculture have been reported by Goswami and Bora (6), Farm Management Studies conducted in U. P (2), Bihar (5), Punjab (1), A. P. (4) and West Bengal (3).

This paper seeks to find out the distribution of family labour in various months and various activities, the extent of underemployment of family labour in different sizes of holdings under fully irrigated, partially irrigated and non-irrigated condition in Pipli Block of Puri district.

Methodology

This study was conducted in Pipli Block under the jurisdiction of Orissa University of Agriculture & Technology during 1971-72. Information regarding the name of each village, area under irrigation, non-irrigated area and period during which irrigation water is provided were collected from the block office. The villages having less than 100 acres of total cultivated area were eliminated from the list due to inherent uncertainty of getting adequate number of samples of all groups of holdings from such a small village.

These villages were stratified into three strata. The first stratum called fully irrigated area included all those villages having more than 3/4th of total cultivated area under irrigation and getting irrigation for about 10 months of the year. The second stratum called partially irrigated area consisted of all those villages having 3/4th of the total cultivated area under irrigation but getting water for 8 months only. The third stratum, designated as non-irrigated area comprised of villages having not more than 10 per cent of total cultivated area under irrigation. From each stratum two villages were selected and from each village 10 holdings were selected at random in two stages. Thus the method of sampling adopted for this study was stratified two stage random sampling. The information was collected through survey method.

Background of the area and cropping pattern

The block head quarters is located at Pipli on the Puri-Bhubaneswar State High Way No. 8 about 20 kilometres away from Bhubaneswar. The block has a good network of village roads. They are well-linked with the urban markets. Both canal and lift irrigation facilities have been provided to a number of villages and these villages get irrigation water for about 8-10 months. Since this is one of the blocks which serves as laboratory of the Orissa University of Agriculture & Technology, the farmers get latest information on farming. As such they are progressive.

Findings

Table 1 shows the percentage distribution of family labour in different months under fully irrigated condition.

It can be observed from the table that under the present cropping pattern the peak work load coincides with the months of February, April, August, and December. About 50 percent of the total labour load of the year is absorbed in these four months, each of these months absorbing 14, 10, 11 and 14 per cent of the family labour respectively. Most of the important agricultural operations are carried out during the months mentioned above.

It may be also observed from the table that the peak loads are not same for all the size groups. For instance, the 1st size groups (holding below 2.5 acres) faces peak loads in the months of January, February, April, July, August and October, absorbing in total more than 2/3rd of the family labour utilised during the year. The second size group (2.5 to 5.0 areas) faces peak labour load during the five months of January, February, April, August and December and utilises more than 58 per cent of total family labour of the year. The third size group (5 to 7.5 areas) faces peak labour loads in the months of February, April, August and December and uses more than 56 per cent of family labour during these four months. Peak labour load for the largest size group (7.5 areas and above) coincides with the five months of January, May, July, August and October, absorbing more than 2/3rd of the family labour. One common feature of this stratum is that for each of the four size groups the peak load coincides with the months of April and August. The uneven distribution and wide month to month fluctuation of family labour are more marked in the upper two size groups and more conspicuous in the largest size group. This uneven distribution of family labour between months in various sizes of holdings may be due to adoption of different cropping pattern by different size groups and their dependence on outside labour.

It may be seen from the table that the largest size group mostly depends upon outside lobour for carrying out all the agricultural operations. The total utilization of family labour per holding increased with the size up to the 7.5 acres group. The per acre utilization of family labour decreased with increase in size of holdings.

The monthwise distribution of family labour in the partially irrigated area is presented in Table II. It may be observed from the table that utilization of family labour per acre was maximum in the smallest size group. It decreased as the size of holding increased.

This finding is in conformity with the earlier findings by several authors that the small size farms are more labour intensive.

Table II shows that in the partially irrigated area more than 1/5th of the total labour of the year is utilised during February alone. More than 50 per cent of the entire labour force is utilised within a span of four months commencing with November and ending in February. These four months coincide with the busiest part of the agricultural season as most of the operation like harvesting, threshing of the kharif paddy and sowing of summer paddy are done during these months. August is still another month which absorbs more than 10 per cent of the labour force engaged in farming. During this month beusaning, uprooting, transplanting and weeding of paddy crop are carried out. Table 3 shows the percentage distribution of family labour in non-irrigated zone.

In this zone peak labour load is marked in the months of February, May, August, September, October and December. These months are agriculturally busy months absorbing about 60 per cent of family labour. The agricultural operations carried out during these months are given in the appendix. The table also reveals that there is slackening of agricultural activities during the months of January, March and April, each of these months absorbing less than 3 per cent of the total family labour utilised during the year. The months of June, July and November show mediocre activity, each month absorbing between 5 to 10 per cent of the family labour.

It may also be noted from the table that uniformity in the distribution of family labour is evinced in all size groups. Another notable feature of this zone is that there is maximum utilisation of family labour per acre in the smallest size of holding. The extent of family labour utilised per acre by the other two size groups is less than half that of the smallest size group. It again confirms the view that the smaller size groups are more labour intensive.

The percentage utilization of family labour in various activities in different sizes of holdings in the three types of sample villages is presented in Table 4. It may be observed from the table that there is a great deal of variation in utilisation of family labour for various purposes in all the three zones. The percentage absorption of family labour in crop production is maximum in the irrigated zone, followed by partially irrigated zone and lastly, non-irrigated zone. The percentage utilization of family labour in fully irrigated and partially irrigated area in order are about thrice and twice that of the non-irrigated area.

In the fully irrigated and partially irrigated area, the percentage of labour absorbed in crop production increased with the size of holdings. In non-irrigated area no such trend was evinced.

The percentage of labour utilised for land development, construction, marketing, exchange and gratis was negligible in all the three zones.

Hiring out was the second item which consumed the maximum amount of family labour next to crop production. The common feature on hiring out in all the three zones was that the smallest size of holding hired out the maximum amount of labour so much so that it absorbed about 50 per cent of the available labour time.

It may also be observed that the percentage of labour hired out by the smallest size group exceeded that of its utilisation in crop production. In nonirrigated area hiring out was the major activity in the smallest and largest size of holding and absorbed more than 50 per cent of the available labour time.

The percentage of labour absorbed in social and family works, shop-keeping, mill-works, sickness, carpentry, Government services constituted on an average 8, 18 and 16 per cent of the total for irrigated, partially irrigated and non-irrigated area respectively.

Unemployment was rampant in the irrigated area, followed by the partially irrigated and lastly non-irrigated area. Here again unemployment increased with the size of holdings. This was perhaps due to the fact that the people in the higher size of holdings were more well-to-do and as such they preferred leisure to work and engaged outside labour for farm work. It may also be due to the fact that they abhored manual farm work due to false prestige.

The extent of employment and underemployment in agriculture and allied occupations in various sizes of holdings in all the three types of sample villages is presented in Table 5.

It may be noticed from the table that about 79 per cent of the family labour was underemployed in the non-irrigated area. The magnitude of underemployment decreased to 65 per cent in partially irrigated area and futher to 55 per cent in irrigated area. Thus the study reveals that the extent of under employment in agriculture decreased with availability of irrigation facility. In the irrigated zone the percentage of underemployed labour decreased with the increase in size of holdings. The only exception was the largest size group. It appears that the people in this size group were less inclined to do manual work in agriculture and they preferred leisure to work. They might have also utilised hired

labour to do the field-works. In the partially irrigated area also the same type of trend was noticed although there was not much difference between the smallest and middle size of holdings.

The extent of underemployment in agriculture and allied occupations reached alarming proportion in all sizes of holdings in the nonirrigated area. This is in conformity with the general observation that the farmers in non-irrigated area do not get employment throughout the year, since they grow only one crop.

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APPENDIX

TABLE I

PERCENTAGE DISTRIBUTION OF FAMILY LABOUR IN DIFFERENT MONTHS IN THE FULLY IRRIGATED ZONE, 1970-71

Months	Size groups				
	0-2.5	2.5-5	5-7.5	7.5 and above	Total
January	11.90	10.25	6.89	17.27	9.89
February	10.49	14.12	17.29	8.25	14.04
March	5.70	8.08	8.96	5.93	7.70
April	9.91	10.41	10.04	9.28	10.06
May	6.78	8.39	8.80	10.05	8.31
June	7.02	3.61	2.70	6.70	4.29
July	10.03	8.74	5.40	10.31	7.87
August	12.49	9.64	10.81	10.31	10.82
September	1.96	2.22	3.31	0.25	2.42
October	13.26	7.58	3.29	19.59	8.20
November	2.14	2.71	4.10	—	2.90
December	8.32	14.25	18.37	2.06	13.50
Total utilization%	100 (1097.1)	100 (1441.5)	100 (1852)	100 (388)	100 (4778.9)
Total utilization per holding	156.70	206.00	463.00	194.00	239.00
Total utilization per acre	83.80	65.61	74.08	13.86	54.25

TABLE 2

PERCENTAGE DISTRIBUTION OF FAMILY LABOUR IN DIFFERENT MONTHS IN THE PARTIALLY IRRIGATED ZONE, 1970-71

Months	Size groups			
	0-2.5	2.5-5	5-7.5	Total
January	5.85	9.28	7.22	7.42
February	20.45	21.95	23.10	21.49
March	4.95	4.69	4.43	4.76
April	6.42	6.49	10.01	7.07
May	9.67	10.20	5.39	9.14
June	1.81	1.89	5.20	2.42
July	3.10	3.86	—	2.86
August	11.33	10.37	17.32	11.99
September	6.40	2.92	0.10	3.96
October	5.31	3.60	0.10	3.74
November	13.69	9.49	17.90	12.79
December	11.02	15.26	9.24	12.36
Total utilization%	100 (1324)	100 (1166.5)	100 (519.5)	100 (3010)
Total utilization per holding	120.36	166.64	259.75	150.50
Total utilization per acre	84.17	51.59	37.11	53.04

TABLE 3

PERCENTAGE DISTRIBUTION OF FAMILY LABOUR IN DIFFERENT MONTHS IN THE NON-IRRIGATED ZONE-1970-71

Months	Size groups			Total
	0-2.5	2.5-5	5-7.5	
January	3.68	0.94	3.10	3.09
February	15.84	16.69	13.43	15.69
March	1.29	—	1.20	1.04
April	3.62	2.11	1.72	3.09
May	10.50	14.57	13.60	11.67
June	5.98	5.64	4.13	5.68
July	8.63	8.46	6.02	8.26
August	8.99	10.58	17.21	10.34
September	13.38	11.63	8.60	12.44
October	12.35	7.05	4.82	10.38
November	7.40	5.64	6.20	6.92
December	8.34	16.69	19.97	11.40
Total utilization%	100	100	100	100
	(1547)	(425.5)	(290.5)	(2263)
Total utilization per holding	119.00	85.10	145.25	113.15
Total utilization per acre	62.30	22.82	29.05	42.25

TABLE 4

PERCENTAGE UTILIZATION OF FAMILY LABOUR IN VARIOUS ACTIVITIES IN DIFFERENT SIZES OF HOLDINGS UNDER THE THREE TYPES OF SAMPLE VILLAGES 1970-71

Item of work	Zones and size groups											
	Fully irrigated zone					Partially irrigated zone				Non-irrigated zone			
	0-2.5	2.5-5	5-7.5	7.5 & above	Average	0-2.5	2.5-5	5-7.5	Average	0-2.5	2.5-5	5-7.5	Average
Crop production	30.48	43.68	61.74	32.33	43.05	24.52	29.91	43.29	28.67	19.84	8.34	16.14	15.39
Land development	0.69	1.09	0.40	1.25	0.79	0.70	1.10	1.00	0.89	0.51	2.41	1-44	1.29
Construction work	0.39	0.33	—	—	0.23	0.15	0.64	0.67	0.39	0.23	0.84	0.89	0.52
Marketing	0.33	0.70	0.40	1.00	0.53	0.31	0.28	0.83	0.36	0.22	0.27	0.50	.0.27
Exchange/gratis	—	—	—	—	—	2.73	0.05	—	1.42	1.60	1.51	—	1.38
Hiring out	49.75	2.21	9.67	—	19.40	47.04	26.77	1.42	34.30	68.59	35,22	59.33	55.88
Social and family affairs	3.56	4.70	3.03	3.42	3.74	2.70	8.69	3.50	5.02	3.99	3.08	4.33	3.72
Shop keeping	—	—	—	15.17	1.64	3.33	—	—	1.71	—	—	—	—
Mill-work	—	—	—	—	—	6.67	9.23	—	6.86	—	—	—	—
Govt. service	—	—	—	—	—	—	—	25.00	2.86	—	29.41	—	10.20
Carpentry	—	7.18	—	—	2.14	—	—	—	—	2.74	—	—	1.46
Sick	0.75	1.61	0.53	1.00	0.97	1.67	2.21	2.17	1,92	0.83	0,18	0.67	0.58
Unemployed	14.05	38.50	24.23	45.83	27.51	10.18	21.12	22.12	15.60	1.45	18.74	16.70	9.31
Total	100	100	100	100	100	100	100	100	100	100	100	100	100
Total days available for work per farm	514	471	750	600	555	464	514	450	525	600	720	900	735
Total days available for work per acre	275	150	120	43	126	324	159	64	185	314	193	180	275

TABLE 5

EFFECTIVE EMPLOYMENT AND UNDEREMPLOYMENT OF FAMILY LABOUR PER FARM IN AGRICULTURAL AND ALLIED OCCUPATIONS IN VARIOUS SIZES OF HOLDINGS IN THREE TYPES OF SAMPLE VILLAGES, 1970-71.

Farm size group	No. of earners engaged in Agril. and allied operations	Total 6 hours days devoted to agril. and allied operations	Average no. of man days per worker in agril. and allied operations	Effective man year utilization per farm per year *	Excess agril. workers (col.2—5)	Percentage of under employment (col. (6÷2)
1	2	3	4	5	6	7
			FULLY IRRIGATED ZONE			
0-2.5	1.71	164.01	95.67	0.55	1.17	68.42
2.5-5	1.57	215.93	137.41	0.72	0.85	54.14
5-7.5	2.50	469.06	187.63	1.56	0.94	37.60
7.5 and above	2.00	207.50	103.75	0.69	1.31	65.50
Average	1.85	247.54	133.81	0.83	1.02	55.14

1	2	3	4	5	6	7
			PARTIALLY IRRIGATED ZONE			
0-2.5	1.55	139.50	90.26	0.46	1.08	69.68
2.5-5	1.71	178.21	103.96	0.59	1.26	73.68
5-7.5	1.50	274.75	183.17	0.92	0.59	39.33
Average	1.60	166.58	104.11	0.56	1.04	65.00
			NON-IRRIGATED ZONE			
0-2.5	2.00	134.38	67.19	0.45	1.55	77.50
2.5-5	2.40	136.50	56.88	0.45	1.95	81.25
5-7.5	3.00	170.75	56.92	0.57	2.43	81.00
Average	2.20	138.55	62.98	0.46	1.74	79.09
All Farms average	1.88	184.22	97.99	0.61	1.27	67.55

* This has been calculated by dividing the total man-days utilized per farm in 6 hour days (col. 3) by 300 man-days per year available for work by each able-bodied person.

PRODUCTIVITY OF LOCAL BREEDS OF COWS THROUGH DIFFERENTIAL FEEDING LEVELS

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&
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Introduction

In a menoculture rice economy, the importance of dairy as a supplementary enterprise is supreme. It is more so for the State of Orissa. For, about 80% of the area is dependent on rain for the successful production of a single crop of rice. The exclusive dependence on it makes the economy of the State highly unstable. Dairy being a certain enterprise will introduce stability in the economy. It is also an excellent supplementary enterprise in so far as it helps to even out the distribution of labour between months. Its relationship with crop husbandry is well known to be complementary in that it influences crop productivity considerably by the supply of organic matter in the form of farm-yard manure. It is, of course, true that dairy animals in most holdings in Orissa are maintained not so much for milk production as for obtaining draft animals and farm-yard manure. If, however, stability in the farm economy is the main consideration, increased productivity of dairy animals is to be aimed at. The magnitude of the problem is evident from the fact that while the average milk yield per cow per annum in the survey area is estimated at 217.77 litres, the corresponding figures for better breeds like Hariyana, Red Sindhi and Sahiwal is 813.60, 1360.80 and 1630.30 litres, respectively.[1]

1. Source—Gosambardhana, Vol. XIII, No. 8 Nov. 1965, p. 21

Objective

Cattle resource in Orissa is vast. But the stock comes from a very poor breed as is reflected by poor milk yield rates. The development of these degenerated stocks of animals through programmes of breeding is a very long drawn process. In the short run, therefore attempt should be made to improve the production efficiency of the local cows by better and higher level of feeding. It is observed that the productivity of local cows increases when brought to urban areas and fed at a higher level. The hypothesis to be tested here is that whether the productive efficiency of the local cows can be increased by administering higher feeding levels.

Methodology :

Sampling technique

For the purpose of the study we have selected four villages around Bhubaneswar panchayat area. The stalls in the selected villages are classified into four groups according to the number of cows maintained by each, *viz.* below 2, 2-4, 4-6 and above 6. From each of the groups six stalls were selected at random for the purpose of the study. Thus, the total rural stalls studied comes to 24 in number. Out of them, those who have more than six cows have been classified as rural specialised stalls. Further, six stalls were selected at random from Bhubaneswar town area. Thus, the total number or samples comprising of 30 stalls is broadly classified as rural ordinary, rural specialised and urban stalls for the purpose of the present study. The total number of cows in the samples comes to 140.

Limitation

The study relates to the year 1966-67. Therefore, the factor cost and product prices used here relates to that year only. Further, some may feel that the cows brought to urban areas are a little better producers among the rural stock on an average. This aspect has also been taken into account and while conducting the enquiry, attempt has been made to select urban stalls which have cows homogeneous to average rural one's. The small sample size is yet another limitation of the study. As a consequence thereof some sampling errors might have crept in. There might be also some amount of nonsampling errors due to the adoption of survey method of investigation. Finally the conclusions, drawn in this study is based only on one year's observation and hence result may be applied with caution.

Productivity

The present study involves productivity of cows only and such as the interpretation of productivity whether in terms of physical product or value product does not make much difference. In this paper, therefore productivity has been dealt with in terms of both.

Milk yield rates of cows and their cost structure

It is observed earlier that the productivity of better breeds is considerably higher than the local one's. Within the local ones again there is variability depending upon the practice of breeding, feeding and management. Lactation number is yet another factor bringing about variation in productivity. The three classes of cow stalls which we have taken up for study is, of course, exposed to differing management practices and differing levels of feeding, It is felt, however, that the contribution of feeding levels to productivity is by far greater than the other factors in our present situation. The effect of variation in lactation number is cancelled out by the operation of the law of compensating errors as a large number of cows from all the stall classes have been included in the study. It may be interesting at the outset to examine the nature of dispersion of productivity rates in the various stall types.

TABLE 1

DISPERSION OF YIELD RATES OF MILK WITH THEIR COST IN THE VARYING CLASSES OF STALLS

Categories of stalls	Total physical product per cow per year (in litres)	Total cost per cow per year (in Rs.)	Cost per litre of milk (in Rs.)
Rural ordinary stalls	217.77	161.61	0.74
Rural specialised stalls	232.82	125.11	0.53
Urban stalls	336.70	175.07	0.51

A comparison of productivity and cost between the rural ordinary and urban stalls will indicate that productivity of cows has been increased by about 55 per cent by increasing the cost by approximately Rs. 15.00

per cow per annum only. In fact, the total cost is composed of fixed and variable costs and it is the latter which influences productivity to a greater extent. Therefore, Table 2 specifies the nature of variation in the variable cost among the three classes of stalls.

TABLE 2

DISPERSION OF VARIABLE COST BETWEEN THE THREE CATEGORIES OF STALLS

Stall categories	Total physical product per cow per annum (in litres)	Variable cost per annum per cow (in Rs.)	Variable cost per litre of milk (in Rs.)
Rural ordinary stalls	217.77	114.17	0.52
Rural specialised stalls	232.82	102.87	0.44
Urban stalls	336.70	151.28	0.44

It is evident from Table 2 that the higher variable cost per cow has brought about increased milk production in urban stalls relative to the rural ordinary stalls. An examination of the variable cost structure between the various stall categories will indicate the extent of variability of feed inputs. Moreover, what is of importance in the context of the present study is to examine the extent of increase in productivity due to higher levels of feed input. Therefore, Table 3 specifies the break up of variable cost to bring out precisely the differences in the levels of feed input among the three types of stalls.

Table 3 clearly confirms the belief that there is higher levels of feed input in urban stalls. While there is about 150% increase in the inputs of concentrates, roughage input records an increase of 29% in the urban stalls over the rural ordinary stalls. The cost of feed in the rural specialised stalls, however, is little less than the rural ordinary stalls. But even then they have been able to achieve greater production efficiency. This might be due to greater allocation of their total feed expenditure to concentrates which have higher quantity of total digestible nutrient and digestible protein. The higher labour cost in the rural ordinary stall is due to grazing. The quality of grazing available in the rural areas is not likely to add much to the productivity. Whatever productivity would

have been added is compensated by the loss of energy in wandering about the grazing land, with low carrying capacity.

TABLE 3

STRUCTURE OF VARIABLE COST AMONG THE THREE STALL CLASSES (EXPRESSED IN RUPEES PER COW PER ANNUM)

Items of cost	Rural ordinary	Rural specialised	Urban stalls
(i) Feed (concentrates)	14.06	17.88	38.21
(ii) Feed (roughage)	68.90	58.25	88.49
(iii) Human labour	15.45	4.29	3.41
(iv) Medicine & perishable dead stock	15.66	22.45	21.47
	114.07	102.87	151.58

Input output relationship

With the above analysis one may be led to believe that productivity of cows is perhaps positively correlated with the levels of total feed inputs of roughage and concentrates. Though the total cost on roughages and concentrate provides an index of their influence on the productivity, it is in fact the total digestible nutrient and digestible protein present in both the feed types that affect milk production. Therefore, in order to study the correlation between feed inputs and milk production, and to do away with the quality difference in feed T.D.N. and D.P. from both the types of feed fed to the cattle in different stalls have been estimated. The following table indicates the average nutrient fed and the average milk yield recorded per cow in different classes of stall.

The productivity of both the types of rural stalls is almost same. But this has been obtained at a lower total cost of feed in the rural specialised stalls. Their feeding skill lies in that they have higher T.D.N. values by feeding a little more of concentrates and reducing the cost on roughages. Thus the owner of the rural specialised stalls have been able to reduce the cost of milk per litre as is evident from Table 2. The coefficient of correlation between T.D.N value and the productivity of cows is estimated at 0.6458. With 28 degrees of freedom this coefficient value is significant at 5 percent level of probability. Similarly, there

appears to be a positive relationship between productivity and digestible protein. There is a reason, therefore, to believe that productivity of local cows increase with increase in feed levels. Thus, the hypothesis that the productivity of local breeds of cows can be increased by higher feeding rate canr ot be rejected.

TABLE 4

VARIATION IN THE QUANTITY OF T. D. N. AND D. P. AND THE CORRESPONDING PRODUCTIVITY PER COW PER DAY IN THE DIFFERENT CLASSES OF STALLS

Categories of stalls	T. D. N. (in grams)	D. P. (in grams)	Milk yield (in litres)
Rural ordinary stalls	58.2	13.8	0.60
Rural specialised stalls	70.2	12.0	0.65
Urban stalls	97.0	20.7	0.93

Economics of feeding

One may be interested to know the economic advantage arising out of additional feeding. There are different measures of profit such as net income, farm business income, return over variable cost, etc. The herdsman will be interested in the latter measure of profit as also the additional cost incurred to secure the added return. Table 5 gives the distribution of return over variable cost.

TABLE 5

DISTRIBUTION OF RETURN OVER VARIABLE COST PER COW AMONG THE VARIOUS CATEGORIES OF STALLS

(in rupees per annum)

	Categories of stalls	Total value product (gross income)	Variable cost	Return over variable cost
1.	Rural ordinary stalls	216.55	114.17	102.38
2.	Rural specialised stalls	227.33	102.87	124.46
3.	Urban stalls	332.25	151.28	180.97

It is evident from Table 5 that the additional cost incurred by the owner of the urban stalls over their rural counterpart per cow per annum is Rs.37/-. As against this additional cost, the additional return obtained is estimated to be of the order of Rs. 78.59. Though this amount is small, an analyst will be quick to visualise that the profit potential is larger irrespective of whether increasing, constant or diminishing returns to scale is operating. For, there is enough scope to increase productivity by increasing the dose of feed till the marginal cost of the feed is equal to its marginal value product.

The Cobb-Douglas production function fitted to the data reads as follows :

$$Y = 0.1159\, x_1^{0.172}\, x_2^{0.246}$$

Where, X_1 = TDN from concentrates per day per milch cow,

X_2 = TDN from roughages per day per milch cow.

The sum of the two regression coefficients of concentrates and roughages being less than unity, we have reason to believe that there is diminishing return to scale operating at the existing level of feed input. In general, cows fed below the maintenance ration, the input-output relationship is that of increasing returns to scale. Since the statistical evidences are indicative of diminishing returns to scale, the conclusion emerges, therefore, that the productivity of local cows is limited.

PART II

INVESTMENT IN EDUCATION IN ORISSA

RAPPORTER'S REPORT

INVESTMENT IN EDUCATION IN ORISSA

Rapporter : **Sri P. N. Das**

The basic issues involved in allocation of investment for educational development centred round some of the following questions :

1. Does investment in education lead to growth of capital formation, or it is simply a measure for promotion of social services ?

2. What should be the basic approach with regard to the content of education at different levels ?

3. How to integrate educational planning with manpower planning ?

4. How to determine investment-return ratio in the field of education ?

5. Has investment in education in Orissa received due share and how to augment it ?

1.2 Highlighting these issues, three papers were contributed, by Sri Ram Chandra Patnaik, Sri Baidyanath Nanda and Sri Pravakar Pradhan and participating in the discussion that followed Dr. Chakradhar Mishra and Dr. Devendra Chandra Misra inter-alia analysed the special problems of balancing in educational planning.

1.3 Sri H. C. Patnaik approached the problem of investment in education from the angles of (i) productivity, (ii) promotion of social changes and economic reforms, citing the cases of U. S. A., where two-thirds of the output is due to the magnitude of national investment in

education and research, and of U. S. S. R., where elementary literacy given in a year of schooling raised a man's productivity by 30%,compared to increase in productivity by training of entirely illiterate workers at the plant level by 12 to 16 per cent, he contended that there is justification for bigger investment in education in India for augmenting labour productivity. Sri B. N. Nanda thought that inclusion of education under social services in our planning framework has deprived it from receiving high priority in the allocation of inter-sectoral outlay. Both of them have treated expenditure on education as investment on human capital, though Sri B. N. Nanda contends that even the consumption component of education is more enduring than most of the durable consumer goods. However, none of them has made any attempt for making a measurement of addition to productivity per unit of investment in education under Indian or Orissa conditions, though the relative success of green revolution among the prosperous elite rural community is a pointer in that direction. Sri P. K. Pradhan's paper on 'Inter-State Disparity in Investment in Education', shows that percapita expenditure in education in Orissa at Rs. 0.90 in 1951-52, or Rs. 5.90 in 1965-66 or Rs. 13.10 in 1971-72 is always one of the lowest in India. But an analysis as to what extent this low investment in education is a contributing factor in keeping Orissa's percapita State Domestic product at the tail-end of the inter-state position would have been more useful for policy makers. One of the problems of measurement of investment relates to the distinction between investment on human capital and investment on education, the latter being only a part of the former. Following the methodology adopted by the Reserve Bank of India which includes medical and public health along with education under investment in human capital, Sri P. K. Pradhan finds that per-capita investment in human capital in Orissa has increased from Rs. 1.40 in 1951-52 to Rs. 18.80 in 1971-72.

1.4 Achievement of success in implementation of social change and economic reform is a problem which is more educational than administrative. Sri R. C. Patnaik's view that "our present attitude to land reforms, or population control or development of agriculture, or co-operation is largely based on the colonial pattern of education" is quite pertinent; but it would have been better to bring out the relative cost and efficiency of education versus administration as factors promoting socio-economic reforms; unfortunately no such type of study has ever been conducted in this field in Orissa.

1.5 The authors have utilised the budgetary figures and equated it with the volume of investment in education. This covers only one part, i.e. the governmental expenditure on education. But in India, as well as in Orissa, large segment of education is still financed by private agencies. Authors are however, conscious of their limitation due to paucity of data in this regard. Dr. Devendra Chandra Misra was of the view that value of land and building and other physical assets which are largely contributed by private agencies should be included to the public expenditure on salaries of teachers etc. and in that case the percapita investment on eduction would be higher. He suggested adoption of a standard cost, consistent with the norm for each class for determining the extent to which investment is deficient.

1.6. Dr. Chakradhar Mishra maintains that in the pattern of plan investment, low priority given to education is due to under-estimation of its contribution to the national income, which comes to roughly 1%, as according to standard methodology. Only wages and salaries component of educational services are taken for purposes of computation of national income.

2.1 That the policy of provision of universal primary education, vocationalisation of secondary education and spread of technical education has not met with desired degree of success is recognised. The failure in implementing free primary education to all children up to the age of fourteen is not entirely due to lack of public investment. Difficulty in Orissa, specially in tribal areas is, according to Dr. Devendra Chandra Mishra, that while expenditure increases, initial enrolment increases, the drop-outs also increase, as a result at the pass level in primary standard, the student population is constant. If the drop-outs are largely from among the earning dependants, the remedy suggested by him is developing general education with learning of some vocation of trade, consistent with local potentialities of earning, while Sri Nanda suggests that provision of scholarships and grants will induce them not to drop-out. "The rate of return to investment in education systematically declines as we go from lower to higher stage of education and therefore, expansion of primary education appears most desirable" is the view of Sri R. C. Patnaik. But it is difficult to reconcile this view, perhaps not based on conditions of Orissa, with the fact that drop-outs and wastage of resources is very high in case of primary education. Sri B. N. Nanda has calculated that 30% of expenditure on primary education is a wastage in Orissa.

2.2 Sri Nanda thinks that there still continues too much emphasis on general education in Orissa at the cost of technical education. He estimates that expenditure on general education in Orissa has increased from 64% in 1970-71 to 66% in 1972-73, whereas expenditure on medical education has gone down from 17% to 15% during the corresponding period.

2.3 Sri Patnaik advocates selective investment in higher education and emphasises need for higher enrolment in agricultural courses for Orissa.

2.5 The concept of wastage is confined to drop-out and failures, but a still more important area of wastage located among the unemployeds, specially of the technical personnel, on whom sizable investment has been incurred, needs to be taken account of.

3.1 Manpower Approach to Educational planning is essential. The problems involved are : (*i*) making a precise forecast of future requirements, (*ii*) balancing the educational output with the future demands. This needs a detailed perspective planning. Sri Nanda thinks that short period imbalance is inherent, as forecast of future manpower requirement holds good for short period, whereas investment planning in the education warrants a longer period. This may be true only in cases where supply pipe-line is too long, as in case of technical man-power, but not so in other cases. Dr. Devendra Chandra Mishra advocates that from the Secondary education stage, planning of education, of manpower and of the economy should be inter-related. To make it effective, he suggests area-planning approach.

3.2 Another type of imbalance about which Dr. Chakradhar Mishra indicated referred to the imbalance arising out of under-employment of over-educated persons in lower jobs. He felt that this often leads to negative output.

4.1 How to calculate the return on investment is a real problem for the specialist. There are many elements in education which are intangible and not amenable to measurement. Sri Nanda refers to the difficulty in demarcating the capital and consumption components of education. One approach is to adopt the Alternative Return method. But Dr. Devendra Chandra Mishra feels that this method is not suitable

in case of education, due to the fact that marginal rate of return of investment on education versus other sectors is not comparable. Though Sri R. C. Patnaik has referred to the estimates detained by M. Blaug and others, the methodological problems need further studies in greater detail.

5.1 An analysis of inter-state budgetary data indicates that investment in education in Orissa, whether measured in terms of per capita investment or per scholar investment, or share of education in development expenditure, our position continues to be always near about the bottom. Sri P. K. Pradhan estimates that Kerala which had highest per-capita public expenditure in education at Rs. 15.5 in 1965-66, has doubled it in 6 years' time and has now Rs. 30.70 in 1971-72, but the gap between all-India average and that of Orissa has widened from less than Rs. 2/- to more than Rs.3/- during the corresponding period. Sri Patnaik's calculation of per scholar expenditure figure, also shows that except Bihar, no other State makes lesser investment than Orissa. This is because the share of education in total development expenditure is too low in Orissa. Sri Pradhan finds that at 35.4% in 1971-72 it is in fact lowest in India.

5.2 All the authors plead for higher investment in education. The economic backwardness of Orissa is both the cause and effect of her educational backwardness. To tackle this special problem, allocation of resources on a special priority basis is needed. Sri Pradhan feels that the disparity between the prosperous and poorer States in India has widened over the plan periods. As education is one of the basic needs, he pleads that it attracts the provisions of Art. 275 (I) of the Constitution, under which larger grants-in-aid from the Union is called for as a balancing factor between needs and resources.

5.3 There is also another source namely central assistance under the plan schemes. In the approach to the Fifth Plan, social justice is the basic test of our new planning outlook and 'Minimum Needs programme', which covers education, is the instrument for effecting it. Therefore, outlook for poorer States for higher central assistance is brighter. This aspect needs greater attention in our investment and resources planning in the next plan period.

INVESTMENT IN EDUCATION IN ORISSA

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Education is a potent factor of economic development. It not only imparts knowledge but also develops proper skills and right attitudes. It also raises the level of initiative and inventiveness of the population. It improves consumption patterns and promotes economic and social mobility. It gives a chance to individuals to become leaders, entrepreneurs, administrators and technicians and improve their quality. It has been said, "that the direct economic impact of education is upon the quantity and quality of occupational skills, labour usually accounting for some three quarters of national output, and education being the major source of the productivity of labour."[1]

It has to be remembered that national expenditure on education is both an economic as well as a social investment. General Education regarded as consumption, is a necessary prelude to technical education, which is a productive investment. Again it is general education which builds up the economic infra-structure for economic development. It is only by integrating educational planning with overall planning that it is possible to avoid the problem of "educational unemployed" on the one hand and the shortage of trained personnel on the other.

"While most of the actual planning in underdeveloped countries continues to be based on the notion that physical investment is the engine of development, there are to-day an increasing number of economists, who denounce that view and regard development in underdeveloped countries as primarily as educational process."[2] It is seen from history of economic development in U. S. A., that two thirds of the output of

1. UNESCO—Economic and social aspect of educational planning—Page 18.
2. Gunnar Myrdal—The challenge of World Poverty—Page 174

U. S. A is due to the magnitude of national investment in education and research. Both in her economic development and in her reconstruction after Second World War, Japan's achievement is attributed to the human factor as represented by her educated and trained manpower. Public expenditure on education in Japan amounts to 5% of the national income. U. S. S. R., in the earlier years of planning, laid more emphasis on investment of machines, but the difficulty with untrained workers in operating the machines led to reoriented planned policy, which resulted in more investment in education. As a result, the return on investment in educational development exceeded indices in the whole country growing from 52% to 144% a year. Further, the studies in U. S. S. R indicated that the elementary literacy given in a year of schooling raised a man's productivity by 30% whereas the training of entirely illiterate workers at the factories and plants increased their productivity only by 11 to 16 percent.[3] It has been well said by Prof. Galbraith that "a dollar or a rupee investment on intellectual improvement of human being will often bring greater increase in national income than a dollar or rupee devoted to railways, dams, machines, tools or tangible goods. To rescue farmers and workers from illiteracy may certainly be good in itself. But it is also a first indispensable step to any form of agricultural progress."[4] Similarly Theodore W. Schultz points out the empirical evidence in U. S. A that real income per person has increased more rapidly than reproducible (non-human) capital. Where does that additional output come from ? It is evidently due to substantial unrecorded investment in human beings, the most obvious form of which is education.[5] Gunnar Myrdal in his book 'Asian Drama' has said "education implies the inculcation of rational attitudes towards life and work that raise labour utilisation and productivity directly, or contribute to this end by institutional reforms." "If we invest too little in human capital, relative to what we invest in non-human capital, new plants and equipments will be produced without producing the skills and knowledge necessary to make them."[6]

Our present attitude to land reforms or population control or development of agriculture or co-operation is largely based on the colonial pattern of education which laid emphasis on passing examinations

3. S. Strumilin—The Economics of Education edited by E.A.G. Robinson—Page 152.
4. J. K. Galbraith—Economic development in perspective—Page 64.
5. T. W. Schultz—Investment in human capital-American Economic Review, March 61; Page 15.
6. Gunnar Myrdal—Asian Drama-Chapter 31, Page 632.

and acquiring status through a white-collared job, and which totally neglected practical training for life and work. After independence, Pandit Nehru and other leaders wanted that the entire system of education must be revolutionised. But the principal features of the old system as it has been inherited from colonial times, has remained largely unchanged even to-day. According to Sri J. P. Naik, member secretary of the Education Commsssion, "What has happened in India in the last sixteen years in the educational programme, is merely an expansion of the earlier system with a few marginal changes in content and technique. The character of education on all levels has not changed at all."

The Report of Kothari Commission on Education says that in the industrialised societies, education has to be related to productivity so that the educated individual makes a significant contribution to production. In such a situation, the development of education leads to an increase in national wealth, which, in its turn, provides the means for a still further development of education. According to the Commission, education and productivity, thus constitute a rising spiral whose different parts sustain and support one another. The Report of the Education Commission further urges to introduce work experience as an integral element of general education, to vocationalize secondary education..... to lay special emphasis on the combination of teaching and research in agriculture and allied sciences. According to the report of the Education Commission 1964-66, "Throughout the first three year plans, the general policy has been to do something in every sector or for every programme with the result that the meagre resources available were spread thinly over a very large area. This policy involves considerable wastage. It has, therefore, now become important to concentrate on a few crucial programmes such as improvement of the quality of teachers, development of agricultural education, provision of good and effective primary education for all children, liquidation of illiteracy, vocationalization of secondary education, establishment of major universities, expansion and improvement of post-graduate education, increase in the number of scholarships and development of about ten percent of institutions at each stage to optimum levels of quality.[7]

Now if investment in education is the best form of investment, then it raises a number of issues. First, is expenditure in any type of education liable to bring returns ? Second, what should be the degree of

7. Report of Education Commission-1964-66. Page 814.

emphasis on elementary, secondary and higher education so as to bring about most fruitful results ? Third, what should be the content of education on different stages, so that higher returns may be possible ? Fourth, how much investment on education is required at different stages of economic growth ?

A developing country like India which needs more technicians and scientists, if continues to lay stress on too much literacy education, then the returns are liable to be very low. There will be unemployment and underemployment. M. Blaug and others have calculated that the rate of return of primary education for an illiterate person is found to be about 15 percent, that of going through middle school after completing primary education is about 14 percent and the return on completing secondary school following middle school 10.5 percent. This decline continues at the next stage and the average rate of return of a degree education is about 8 to 9 percent.[8] If we use rate of return of 10% as a minimum acceptable rate, then primary education definitely will be profitable and university education definitely will be unprofitable. The important point to note is that the rate of return to investment in education sytematically declines as we go from lower to higher stage of education and therefore expansion of primary education appears socially most desirable.

The content of education is a potential factor in the growth productivity. An education which does not help the learner to earn more than what he earns without education is non-productive. Higher returns can only be possible, if higher development of individuals is sought as the objective of education together with vocational efficiency. This does not mean that the ideals and age-old values of education should be lost sight of as ideals of education. 'Education increases our productivity. It is also a nourishing alternative to ignorance which like food has its own enjoyment and rewards. Like food it is not only production but a prime object of consumption".[9]

The following table gives percapita expenditure in education in U. S. dollars and public expenditure on education as a percentage of National Income.[10]

8. M. Blaug—(Edited)-Economics of education (1) Page 218.
9. J. K. Galbraith—"Social balance in current issues in higher education—Page 3
10. UNESCO—Economic and social aspects of educational planning, Page 64.

TABLE 1

NATIONAL INCOME AND PUBLIC EXPENDITURE ON EDUCATION
1957-60

Country	Per capita national income (in U. S. dollars)	Public expenditure on education per capita (in U.S. dollars)	Public expenditure on education as percentage of national income
DEVELOPED COUNTRIES			
1. Japan	250	14.6	5.7
2. U. S. A.	2,132	97.0	4.6
3. France	960	32.5	3.0
SEMI-DEVELOPED COUNTRIES			
4. Turkey	460	10.0	2.2
5. Chile	310	9.6	2.4
UNDERDEVELOPED COUNTRIES			
6. India	66	1.3	3.7
7. Pakistan	51	0.6	3.2
8. Burma	42	1.6	2.6

However, according to the Education Commission's Report India is only spending 2.9 percent of its national income on education and its percapita expenditure is only Rs. 6.83. The Commission has projected that if National Income grew at 5 per cent per year, population at 2.5 percent per year, and 4 percent of national income were allocated to education, the expenditure on education in 1985-86 would be only Rs. 27.5 percapita[11], which is much less than the figures of even the semi-developed countries.

The Commission has emphasised on qualitative aspects of education and has suggested for the preparation of a comprehensive long term plan of prospective development of education spread over 20 years against whose background annual plans of educational development can be formulated in the light of resources available. It has called for the need for concentration of effort and adoption of a selective approach. Education has to be linked to productivity and emphasis should be placed on the development of vocational education at the secondary stage and

11. Report of the Education Commission—1964-66, Page 873.

professional education at University, in the light of manpower requirements as estimated from time to time.

Orissa occupies the lowest rank among all the States in India in respect of percapita expenditure on education and per scholar on education as is evident from the following table.[12]

TABLE 2

PER CAPITA AND PER SCHOLAR GOVERNMENT EXPENDITURE ON EDUCATION DURING 1959-60

State	Per capita expenditure on education (Rs)	Rank	Per scholar expenditure on education (Rs)
1	2	3	4
Maharashtra	10.32	1 st	79.27
Kerala	10.10	2 nd	53.88
West Bengal	9.16	3 rd	83.08
Madras	8.43	4 th	68.21
Gujrat	8.20	5 th	62.28
Punjab	7.93	6 th	79.44
Mysore	6.88	7 th	58.72
Assam	6.34	8 th	52.33
Andhra Pradesh	6.19	9 th	63.58
Madhya Pradesh	5.27	10 th	70.92
Rajsthan	4.92	11 th	70.96
Uttar Pradesh	4.86	12 th	67.14
Bihar	4.08	13 th	46.25
Orissa	3.71	14 th	48.71

It is evident from the above table that Orissa and Bihar are the only states where the governments expenditure per student is below Rs. 50.00 in a year which is much below the all-India average of Rs. 67.31 per year. Similarly the per capita expenditure of Orissa is about half of the all-India figure viz. Rs. 3.71 in Orissa as against Rs. 6.83 in all-India.

12. Bureau of Statistics and Economics "Applied Economics Studies"-Vol I, Page 11.

Again the number of matriculates per thousand of population in Orissa is 0.51, which is again the lowest in India. During the three plan periods, considerable efforts were made to increase the percentage of literacy in Orissa. But still we are behind the all-India average. Only 8.6% of the female population in Orissa are literate as against 12.9 per cent in all-India. There is considerable wastage and stagnation due to drop-out of students in the primary and secondary education. A large percentage of students give up their studies even before their primary education, due to economic difficulties under which they assist the family in agriculture and household cottage industries.

According to a report on the progress of education in 1959-60, out of every 100 pupils admitted in class I in 1956-57, only 41 reached class IV in 1959-60 showing the wastage to be 59 per cent during 1958-59.[12] Thus the problem of wastage and stagnation is a serious one which should be avoided in order to get full returns from investment in education in Orissa.

At the end of the Third Plan period in Orissa, there were 16.44 lakhs children reading in primary schools, 1.92 lakhs in middle schools and 0.72 lakhs in Secondary schools. These enrolments formed 69 per cent, 15 percent and 4 per cent of the children in the age group of 6-11, 11-14 and 14-17 respectively. This is in sad contrast with the corresponding enrolment ratios of 73 percent, at the first level, 5 · percent at the 2nd level and 11 percent at 3rd level obtained in advanced countries.[13] As only 15.20 per cent of the age group of 11-14, have so far completed their education, it will be a stupendous task to fulfil the Directive Principle under Article 45 of the constitution which seeks to provide free and compulsory education for all children up to the age of 14.

Further, Orissa has got 44 per cent of the population consisting of scheduled caste and scheduled tribes, whose educational development is the poorest in India. Special efforts and special expenditure are, therefore, necessary to bring their educational status at par with other people. Special programmes for liquidation of illiteracy among the adults of backward classes and tribes is necessary. Deliberate and sustained efforts to assist the less advanced states should be made by centre, so that the gap between less advanced and advanced states is reduced and the less advanced state obtains certain minimum standards in education.

13. Bureau of statistics and Economics—Fact book on manpower—Page 10.

The total educational expenditure in India shows a cumulative increase of 11.7 per cent per year and the total educational expenditure as a percentage of National Income has increased from 1.2 percent in 1951 to 2.9 per cent in 1965. The National Policy on education aims at gradual increase in investments in education so as to reach a level of expenditure of 6 per cent of National Income as early as possible. The policy recognised to promote the educational interest of minorities and equalise the educational opportunities. It further reiterates that regional imbalances in the provision educational facilities should be provided in rural and other backward areas.[14] It is essentially, in this context of the policy resolution, that Orissa should receive the first priority for substantial grants-in-aid for development of education in the state.

The planned allocation of funds for education in Orissa in the last four five year plans have been as follows :

1st Plan—Rs. 172.33 lakhs
2nd Plan—Rs. 565.10 lakhs
3rd Plan—Rs. 1427.45 lakhs
(1966-67 to 1971-73)—Rs. 1086.71 lakhs

and the total educational budget of the state for the last five years have been as follows :

1968-69—Rs. 16.40 crores
1969-70—Rs. 19.88 crores
1970-71—Rs. 21.62 crores
1971-72—Rs. 26.28 crores
1972-73—Rs. 28.80 crores

If we take the population of Orissa to be 2.2 crores and Orissa state income to be about Rs. 600/- crores, then the per capita expenditure on education in Orissa comes to about Rs. 12.8 at present. This is an impressive figure, but it is artificially high because of inflationary prices. This works to about 4,5% of the state income. It is a high figure because the state income is low. Efforts should be made to increase the per capita expenditure in education in Orissa to increase to more than Rs. 20/- and for this purpose, at least 15 percent of the state income should be invested

14. Frederick Harbison and Charles A. Myers. Education, Manpower and Economic Growth—Page 458.

in education. The distribution of educational expenditure in the three sectors of education in Orissa during last three years have been as follows.

TABLE 3

EXPENDITURE IN THE THREE SECTORS OF EDUCATION IN ORISSA
(IN LAKHS OF RUPEES)

Year	Higher education	Secondary education	Primary education
1970-71	224.70	604.36	840.89 (Non-plan)
	29.01	57.45	44.06 (Plan)
1971-72	258.06	710.67	923.33 (Non-plan)
	72.69	85.48	128.58 (Plan)
1972-73	315.53	787.60	983.52 (Non-plan)
	50.09	134.10	182.07 (Plan)

Source : Budgets of Orissa Government from 1970-71 to '72-73.

We find from the above figures, that the expenditure on primary education has been given due priority, even though the planned allocation on that account is considerably lower. The expenditure on Secondary Education is $2\frac{1}{2}$ to 3 times more than higher education and expenditure on primary education is 3 to 4 times more than the budget on higher education. It is necessary to bring about some sort of balance in the three levels of expenditure keeping in view the economic needs and the manpower needs in Orissa. As it has been calculated, the returns in college education in India vary between 4 to 10 per cent and the rates of return are high for matriculates varying between 20 per cent to 30 per cent.[15]

The wise policy for Orissa, therefore, should be to make selective investment in higher education, so that the marginal rates of returns will increase and to avoid wastage in education, so that a large percentage on education will be channelized to be converted into income yielding investment. Making available the bulk of investment in education into

15. Ref. (*i*) A. C. Harberger – Investment in Man versus Investment in Machines—the case in India.
(*ii*) V. N. Kothari—Returns to Education in India in "Returns Education in India"—Page 279.

such sectors which have inherently possessed high potential for yielding returns should be the basis of educational planning and development in Orissa. Orissa being mostly an agricultural state, our enrolment for agricultural and allied courses should be increased. A policy of work-oriented education should be the foundation right from the secondary stage, which should be continued in the college classes. In U. S. S. R. enrolment in agricultural courses is 11.5 per cent and in Japan it is 4.5 per cent compared to 1.2 per cent in India.[16] The entire organisation of our rural society and economy is such that on a variety of matters including the use of modern inputs and new varieties of seeds, communication between different members of the same village is extensive and influence on one another is great. Since administrative factors are becoming increasingly important in the operation of Indian agriculture, adult education, on agricultural extension services will help a great deal to revitalize agriculture. Primary education has been at present seriously biased in the direction of catering to the local urban middle classes at present. A number of surveys clearly show that the spread of literacy and education is much more in evidence among the socially advanced section of the society and there is stark illiteracy in the society at the base. It is therefore necessary that our policy should cater to the requirements of the rural community and emphasis should be on relating educational organisation to the economic life of people in the rural areas. Educational development should be integrated into the total plan so as to ensure that the supply of qualified manpower as required by our five year plans is matched by the demand for it. The essence of the problem lies in the use of efficient and modern techniques for forecasting manpower requirements in various sectors in Orissa. The growing unemployment of engineers is only a reflection of a tendency in public policy to over-expand higher education and specialized training on the basis of poor estimations of demand.

Higher education should not grow under politics and social pressures as it is being done in Orissa at present. The emphasis should be on (*a*) selective and qualitative education on higher levels with scientific and technological bias and based on "manpower needs" and 'social cum cultural' needs, (*b*) universal primary education and (*c*) vocationalized secondary education. In view of the rapidly growing knowledge and

16. NCERT—Measurement of cost productivity in education—Page 7.4.

the competing claims on the limited resources in developing countries, 'the aim should be to create the centres of excellence in selected disciplines which gradually should embrace more and more fields. Adequate stress should be laid on research orientation as the goals of development, so that the fruit of research may be applied in accelerating the pace of development.

An educational plan must be dynamic, growing and pragmatic in its approach, adapting and readapting itself to the changing needs and conditions in seeking balanced investment (*a*) between education and other sectors of development, (*b*) between the various types and levels of education within the education sector, and (*c*) between quantity and quality of education.

Above all, the educational investment plan must be executed properly without any pressures. All past experience shows that at the point of planning policy, greatest stress is laid on universal mass education, education of women, rural areas, scheduled castes and tribes. At the point of fixing quantitative targets, proportionate expansion of all sectors is provided for. But in actual execution, highest achievements are in the field of urban educations and so on. The policy-wise priority sectors, including adult literacy programmes, fall much behind the targets. This should be avoided in a scheme of investment in education in Orissa.

INVESTMENT IN EDUCATION IN ORISSA
(PROBLEMS and APPROACH)

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Orissa like any other State in India has a rich cultural heritage—where education was being held in high esteem. But until the launching of the planned effort for overall economic development, the economic value of education was not recognised. The economic and vocational objectives of education were not given that importance as its human and social values. Economists have regarded education as investment in development of human resources. The following observations of J. K. Galbraith are important in this context :

'When we consider education as an investment, we must consider it as purposefully as other forms of capital outlay. This the older and more developed countries do not necessarily do or need to do. Wealth has made it possible for them to be much easy-going. The new country cannot be so permissive towards these in whom it invests.'[1]

Despite the importance attached to education by several economists as an investment in developing human capital, most of the economic development planners have been swayed by the traditional attitude towards education as a social service and consumption. In Orissa education has been incorporated under the head 'Social services' along with Health and Urban and Rural Planning, Housing, Welfare of backward classes and Labour welfare schemes. The planners have given a high priority to investment in physical capital and education as an investment in human resources has been assigned a low priority. While the planners recognise that some investments in education are economic since they directly promote economic growth, they contend that other expenditures for education and human resource development are primarily 'social investments'. The economic analyses of investment in man which have been made recently, though representing a significant

1. G. K. Galbraith—Economic development in perspective.

contribution to economic theory, are of little use as yet to planners, except to highlight the general importance of education and suggest that some of the outlays for education could be considered as investment rather than simply current consumption on 'social expenditures'.[2]

There are many elements in education which are intangible and not amenable to measurement. It becomes difficult to measure the capital and consumption components of education. Education, considered even as a consumers good, is different to other consumer goods in the sense that it has an enduring effect than most of the durable consumer goods. Of course, these effects of education are not taken into account while measuring the national income or per-capita income. But when we view education as investment in human capital in the form of abilities acquired through education, we cannot measure its economic benefits in the same manner as we measure the economic benefits of a steel factory, a dam, etc. The economic analysis of education will not perhaps recognise its social values. The habits, motives and attitudes of the people of a country, which are shaped through education, play a vital role in the economic development of the country in so far as education brings a change in them as may be esssential for the economic growth of the country.

All nations are development-minded nowadays and development is essentially the result of human effort.

Human resource development becomes necessary for economic development of a country and therefore the development planners invest some outlay in education. The task of the planner is to determine the appropriate level of investment in education and the manner of its distribution between various levels of education. This task of the planner becomes difficult as there are always competing claims of the various sectors of development, including education, to the limited available resources. The planner therefore must strike a balance in allocation of resources between these competing sectors. Further, the educational plan should fit into the general plan in such a way that supply of qualified manpower is matched by the demand for it. Any over or underinvestment in any of the interdependent sectors will create an imbalance and will hamper the rate of growth. To sum up, the task of the educational planner will consist of the following.

2. F. Harbison & Charles A Myres—Education, Man-power and Economic growth, p. 11-12.

(*i*) To determine the appropriate level of investment in education.

(*ii*) To distribute resources allocated to education among various levels and types of education in such a way as to achieve a balance between supply and demand for educated manpower.

(*iii*) To suggest the arrangement of the mechanism of conversion of educational input into output for maximisation of its productivity, both in quantity and quality.

With the above objectives in view several methods of educational planning have been evolved. One of them is called 'Man-power Approach' which aims at planning the education in such a way that the educational output in various levels is matched by demand for educated and trained manpower of various types required for different sectors of the economy. This can be done provided data relating to number of persons of various levels of education required in each occupation of the economy can be calculated up to a given year and the present number of persons and their educational level in each occupation is also known. Further, the change in this number due to change in the job, retirement, death, etc. should also be known. Assuming that entry into each occupation is related to a given level of education of a given type and further assuming that a given input-output ratio would hold good, it should be possible to produce the desired number of persons with requisite level of education of various types.

It would have definitely been a good thing if this man-power approach to educational planning was adopted in Orissa. But it appears that this approach has not received sufficient attention by the educational planners in Orissa. Certain imbalances in different types and levels of education make this point clear. Unemployment among the engineers, agriculture and veterinary personnel has grown. This increasing unemployment among the technical and professional manpower in the State indicates that we have not been able to link output of educational institutions to requirements in different sectors of the economy of the State. This temporary imbalance was, of course, bound to occur since any forecast of future manpower requirements would hold good only for short periods whereas, due to the 'lead time' in education, planning investment in education warrants a perspective planning extending to longer periods. Further with the change in

technological progress, occupational mobility in different levels and types of education, it is difficult to get a precise estimate of future manpower requirements.

Recognition of education as an investment in human resources and the desire for progress and advancement which swept India after the launching of the Five Year Plans have led all the States in India to invest more and more on education. In Orissa the investment on education has increased from Rs. 0.9 percapita in 1951-52 to Rs. 13.12 percapita in 1971-72. The trend of investment on education in Orissa which presents a depressing picture and the problem and approach to investment in education are discussed in the following paragraphs.

There has been significant rise in the percapita expenditure on education in Orissa. But this is too low when compared to other States. The percapita expenditure on education in Orissa is the fourth lowest in India and has been always below the national average. This is also low when the percentages of expenditure on education to State incomes of different states are taken into account. In Orissa expenditure on education constituted only 2.3% of its State income against 2.6 in India as a whole. Excepting a few States like Andhra, Bihar and U. P., the expenditure on education in all other States accounts for a higher percentage of their respective State income than the expenditure percentage in Orissa. In terms of real educational development, as indicated by the percentage of literacy and percentage of enrolment at different levels to corresponding age-groups, Orissa occupies perhaps the lowest position. The percentage of literacy in Orissa was the seventh lowest among the States. Enrolment of children in the age-group of 6-11 accounts for only 67.6% of its population 21.6% in the age-group of 11-14, 13.6% in the age-group of 14-17 and 1.5% in the age-group of 17-23. The position of Orissa so far as the enrolment in the 1st level is concerned is just marginally above four other States, in the second and third level, Orissa occupies the lowest position and in the fourth level Orissa is lowest except for Nagaland. The enrolment percentages at various levels of education in Orissa have been lower than the national average also. There has been some growth in education so far as the total investment on education and growth in the number of educated manpower are concerned. But in Orissa, it appears, we are deficient both in quantity and quality. Our investment in research is extremely low. The planners cannot possibly be provided with any arithmetical formula to allocate a certain proportion of the plan outlay

for investment in education. Experience of different countries under different cultural, social, economic and political conditions only indicate that investment in education is highly effective as instrument of economic and social growth. But one cannot say that a given amount of investment in a given level and type of education will lead to certain amount of increase in the State income. The deficiencies pointed out above and the manpower approach will guide the planner to determine the allocation to education out of a given plan outlay. The state of educational development in Orissa as discussed above only suggests that since Orissa has been lagging behind the other States in the field of educational development, more of investment in this sector becomes necessary.

Having determined the quantum of investment for the education sector, the problem faced by the Educational Planner is how best to distribute the available resources among the various sub-sectors in various types and level of education. In Orissa there existed an imbalance in the investment of resources in various types of education. To correct this imbalance weightage had to be given in allocating resources to the more critical areas of education like medical, engineering and technical education where shortages were existing. Distribution of expenditure on education excluding the grants, indicates that the expenditure on general education has been absorbing nearly 2/3rds of the expenditure on education. Expenditure on general education accounted for 64.22% in 1970-71, 64.56% in 1971-72 and is expected to rise up to nearly 66% in 1972-73. The percentage of expenditure on medical education has been gradually reduced from 16.97% in 1970-71 to 14.89% in 1972-73 (Budget estimate). Similarly, adequate attention has not been given to industrial, agricultural and other technical education. Expenditure in such areas of education has been very insignificant indicating rather an underinvestment in such types of education. This has resulted in deficiency of certain types of trained technical and scientific personnel. It has been discussed earlier that there were certain excesses of certain categories of educated and trained manpower. In order to correct the imbalance admissions to engineering and certain other categories of technical education were reduced and this cut-back in admission has been retained in certain types of education. Of course, one has to agree that there has been some excesses in certain categories of manpower. But unemployment or excess supply of manpower in some of the sub-sectors of education which has manifested in recent years is the result of unharmonious growth of the economy, and to some extent, this imbalance

can be reduced through certain administrative measures and incentives. For example, the supply of medical personnel in Orissa is considered to be in excess of the demand for them. But if one looks at the uneven distribution of doctors between urban and rural areas and the doctor-population ratio in Orissa, one would only advocate to increase the supply of doctors. What is needed is gearing up the administration to correct this imbalance between urban and rural areas and to make rural postings more attractive.[3] Although there has been some excesses in certain types, these excesses could be reduced and a balance could be achieved if the demand for such manpower could correctly be estimated in advance. For Orissa there is rather requirement for additional educated and trained manpower, if her potentials of economic growth are taken into consideration. The problem is that since everybody looks on to the Government to generate the employment opportunities for them, it has been difficult to absorb all of them.

The quantum of investment was viewed in the last few paragraphs so far it related to the quantum of educational output. But the problem of planning the investment in education arises as the investment may not bring out the output in required (or planned) quantity and quality. Therefore, the investment in education should be such so as to maximise the productivity in education, both in quantity and quality. This might require the streamlining of the mechanism for conversion of educational input into desired output, both in quantity and quality. The quality in education is, of course, a varying concept and is relative to the stage of development in a State. Further the quality of the educational output is also influenced by other social factors like cultural organisations, radio, libraries, etc. While considering the qualitative aspect of educational output in Orissa, we would limit on study of the problem to the analysis of the teacher-student ratio, percentage of trained teachers, wastage due to failure, etc. In terms of teacher-pupil ratio the position of Orissa at primary, middle English and high school levels is somewhat better compared to the national average. In Orissa the teacher-pupil ratio at primary, middle English and high school level is respectively 1:33, 1:23 and 1:13 as against 1:48, 1:26, and 1:14 respectively at the all-India level. But in terms of the percentage of trained teachers, Orissa again presents a dismal picture. The percentages of her trained teachers are 72%, 33.4% and 55.4% at primary, M. E. and secondary levels respectively and incidentally, Orissa occupies the fourth lowest position in percentage of trained teachers. These deficiencies along with other

3. The Fourth Plan—Mid-term Appraisal, Vol. II—p. 199.

deficiencies like low per-pupil expenditure on education, nonavailability of certain facilities in schools, school-timings, etc. which are internal to the educational system in the State have contributed to the heavy wastage of our resources in education.

Analysis of data relating to the enrolment in different (classes) stages of primary education reveals a considerable wastage of our investment in education. Out of the total enrolment in primary stage, nearly 39% belong to Class-I, 25% belong to Class-II, 16% to Class-III, 11% to Class-IV and 9% Class-V. It is revealed that out of the total number of pupils admitted in Class-I only 64% are available in Class II, out of the students in Class-II 67% are available in Class-III and 70% of the pupils in Class-III are available in Class-IV. This percentage increases when 78% of the pupils in Class-IV are available in Class-V. This involves a heavy wastage of nearly 30% of the expenditure on primary education excluding the wastage in Class-V. Assuming this average picture would hold good in respect of any particular year, in financial terms there has been a wastage of nearly 10 to 11% of the entire education budget[4] of the State in the year 1970-71 due to failures and drop-outs.

The causal factors responsible for this wastage are divided into two groups: factors external to the educational system like low income of the parents, level of socio-economic development etc. and factors internal to the educational system like that of educational expenditure, facilities provided in schools, timing of the school year, size of the school, pupil-teacher ratio, teachers' salary, etc. In Orissa in order to reduce this wastage the investment in education should be directed to improve the internal factors along with some provision for improving external conditions. For instance, provision of scholarships and grants to tribal students will induce them not to drop-out.

Whatever may be the quantum of investment in education and the manner of its distribution in different sub-sectors of education, there is found to be an increasing demand for education in a developing state like Orissa. The prudent course for investment planning would have to ensure maximum expansion of certain basic education and to give incentives for higher education and research so that the state would not lag behind in the level of quantity and quality attained by other states and countries. For realisation of these objectives apart from improving the factors internal to the educational system, the educational plan should also provide for better teacher education programmes, in-service training

4. In the year 1970-71, the budget for Primary Schools accounted for nearly 36% of the entire education budget.

for teachers, better curriculum and textbooks. All factors external to the educational system but complementary to educational development should also be improved by investing required funds in the appropriate sectors. On the whole for obtaining better educational output, both in quantity and quality, besides increasing the investment in education that should be an improvement in educational input.

The Fourth Plan in India aims at making progress towards carrying out the constitutional directive of free and compulsory education for the age-group of 6-14 years. At the secondary and higher stages of education, the plan lays more emphasis on consolidation and diversification so as to meet the diverse needs of trained man-power of the requisite standard. In keeping with these objectives the educational plans of the state was formulated. But although the constitutional directive to the States was to provide free and compulsory education to all children below the age of 14 within a period of 10 years, yet Orissa, even after 22 years since adoption of the constitution, is no where nearer the realisation of this goal. In fact the percentages of enrolment in the age-group between 6-11 and 11-14 have been the lowest for Orissa. Free and compulsory education for children below the age of 14 is advocated because of the pervasive value of education. Orissa has not been able to progress much in the field of primary education due to inadequate financial allocation. To fulfil this constitutional objective the centre should come to the rescue of Orissa in allocating more resources for realisation of the objective.

Orissa has definitely been one of the most backward states so far as the educational developments are concerned. With a view to reduce the regional disparity in this sector, more of investment on education should be made in Orissa. A manpower approach (despite its limitations) combined with social and cultural objectives should be adopted to help the educational planner in planning the investment in education. This approach will reduce the imbalance to the minimum. Because of the social values of education a surplus educated manpower should not be taken as a wastage of investment on education. The fact that education plan acts as an instrument in inspiring progress, raising the general level of aspiration, creating a good citizenry and in furthering the urges of drive and enterprise would ensure that there would not be any wastage of investment in education, although there might be sometimes a surplus man-power of a particular level and type of education.

INTER-STATE DISPARITY IN INVESTMENT IN EDUCATION

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It is proposed here to present the disparity between states in matters of investment in education by the State Governments since the beginning of Planning in the country. It covers the period from 1951-52 to 1971-72 which has witnessed three complete Five Year Plans, three annual plans and a part of the Fourth Five Year Plan. These long years of planning has not been able to remove the existing disparity and has allowed economically backward States like Orissa to fall behind other prosperous states of the Indian Union as before in all fields of development including education. This continued neglect of human capital in this part of India would stand in the way of future growth.

The problem of low rate of investment was very acute in 1951-52 when our first plan was launched. An analysis presented in the Reserve Bank Bulletin (June-1966) described that the percapita expenditure on human capital was only Rs. 1.40 paise in Orissa and Bihar during that year which was the lowest in the country. Expenditure on education, Medical and Public Health was classified as expenditure on human capital. The table presented below reveals the extent of disparity between states in respect of per-capita expenditure on human capital.

These data on inter-state financial investment on human capital reveal how Orissa has remained at the bottom. When First Five Year Plan was launched, the percapita investment was highest in Mysore followed by Maharastra. Over a period of 15 years that followed, *i.e.* in 1965-66, the level of per-capita expenditure on this item increased three times in Bombay which was the lowest. Orissa registered the highest increase of seven times in the series. This changed the position of 1951-52

and as a result, states such as Bombay and West Bengal which ranked second and fourth respectively then, came down the list to seventh and tenth in 1965-66. In spite of sevenfold increase, Orissa still remained at the bottom of the ladder, of course this time above Uttar Pradesh and Bihar. The status quo remained unchanged in 1971-72 and Orissa was trailing behind other states of the Indian Union with the exception of U. P. and Bihar.

TABLE 1

TRENDS IN PER-CAPITA EXPENDITURE ON HUMAN CAPITAL
(IN RUPEES)

States	1951-52	1965-66	1971-72
1	2	3	4
Andhra	2.8	11.4	20.2
Assam	2.9	12.6	22.7
Bihar	1.4	5.9	13.4
Bombay/Maharastra	3.8	12.1	28.1
Kerala	3.7	20.2	39.6
Madhya Pradesh	1.9	11.3	19.2
Tamilnadu	2.8	14.2	28.0
Mysore	4.3	13.0	25.7
Orissa	1.4	9.4	18.8
Punjab	2.2	12.7	33.4
Rajsthan	2.3	12.2	26.7
Uttar Pradesh	1.7	7.8	14.4
West Bengal	2.9	11.0	25.5
All States	2.6	11.0	22.8

The analysis of development expenditure in state budgets reveals the importance attached to education. In the beginning of the First Five Year Plan 20.6 per cent of the development expenditure was devoted to education. In ten out of thirteen states, the proportion of expenditure on education to total development expenditure varied between 28 percent and 37 percent with the exception of West Bengal, Bihar and Orissa. These three states remained at the bottom of progress. A table containing

the proportion of expenditure on education to total development expenditure in the beginning of the First Plan, end of Third Plan and the middle of Fourth Plan is presented in support of the claim that there exists rather wide difference in expenditure on education.

TABLE 2

SHARE OF EDUCATION IN DEVELOPMENT EXPENDITURE
(IN PERCENTAGES)

States	1951-52	1965-66	1971-72
1	2	3	4
Andhra Pradesh	32.3	30.8	40.8
Assam	30.4	28.4	38.0
Bihar	20.3	30.3	40.5
Bombay/Maharastra	36.8	32.6	44.8
Kerala	34.7	50.3	54.6
Madhya Pradesh	31.3	42.6	36.2
Tamilnadu	29.8	37.2	42.7
Mysore	28.2	35.9	39.0
Orissa	20.6	21.1	35.4
Punjab	29.9	30.6	42.5
Rajsthan	35.9	36.2	39.7
Uttar Pradesh	28.5	34.1	43.5
West Bengal	20.2	31.2	46.2
Total	29.5	33.9	41.6

The position maintained in 1951-52 had changed by the end of the Third plan in few states due to relatively high priority accorded to education in many states. This is reflected in the rise in the proportion of development expenditure devoted to education from 35 percent to 50 percent in Kerala, 20 percent to 30 percent in Bihar, 31 percent to 43 percent in Madhya Pradesh and 20 percent to 31 percent in West Bengal

The Reserve Bank Bulletin commented, "the only exception to this trend was Orissa where proportion which was already low at 21 percent witnessed no changed over a period of 15 years ending 1965-66." It presented a different picture in 1971-72 which changed the position completely. States like Bihar and Uttar Pradesh marched ahead of Orissa to 40.5 percent and 43.5 percent respectively. Almost all the states of the Indian Union spent larger proportion of their resources in education from development heads. The rise from 21.1 percent to 35.4 percent in 1971-72 in case of Orissa was significant. In spite of this, Orissa remained at the bottom of progress in 1971-72 in comparison to other states. The inter-State differences existing in 1951-52, continued in 1971-72 even after the completion of 20 years of planning. The continuation of wide disparity in educational investment causes concern.

Another index of measuring the inter-State investment in education is the percapita expenditure on education. In 1951-52 the per-capita expenditure on education was the highest in the State of Mysore and lowest in Orissa and Bihar. The per-capita expenditure of 90 paise in Orissa in 1951-52 is a sufficient indication of low investment on human capital. Increased emphasis given on education during 20 years of Planning resulted in an increased per-capita expenditure on education for all the States. A table containing per-capita expenditure on education in different States is given below.

The table indicates improvement in the levels of per-capita expenditure in most of the states. Kerala recorded the highest per-capita expenditure of Rs. 15.5 at the end of 1965-66 and lowest was the state of Bihar. Per-capita expenditure of Rs. 5.9 was recorded in Orissa which was just little above the state of Uttar Pradesh. The year 1971-72 presented a different picture of gloom when Orissa, Uttar Pradesh and Bihar again remained at the bottom in the per-capita expenditure on education. States like Kerala almost doubled the per-capita expenditure on education and kept it at Rs. 30.70 paise within a period of 6 years from 1965-66 to 1971-72. The per-capita expenditure achieved by Kerala stood first among all states. Although Bihar, Orissa and Uttarpradesh doubled their per-capita expenditure on education in 1971-72, their progress failed to cover up the distance travelled so far by many other states. The long years of planning has not removed this wide difference in the field of education.

TABLE 3

PER CAPITA EXPENDITURE ON EDUCATION
(IN RUPEES)

States	1951-52	1965-66	1971-72
1	2	3	4
Andhra	2.0	8.1	14.1
Assam	2.0	8.9	17.3
Bihar	0.9	3.9	9.2
Madhya Pradesh	1.3	8.7	13.0
Maharastra	2.8	8.4	19.8
Kerala	2.5	15.5	30.7
Tamilnadu	1.9	10.5	19.9
Mysore	3.1	9.8	19.0
Punjab	1.5	9.0	24.4
Hariyana	—	—	20.3
Rajsthan	1.4	8.0	16.8
Uttar Pradesh	1.2	5.5	10.3
Gujarat	—	—	17.3
West Bengal	1.3	7.3	18.4
Orissa	0.9	5.9	13.1
All States	1.7	7.8	16.14

This disparity in expenditure has put few prosperous states in a better position than the states like Orissa, Bihar and Uttarpradesh. States capable of spending more of their resources on human capital have offered better educational facilities to their population. This has helped them in many ways, including getting more of employment in all-India level. States incapable of diverting much of their resources for investment in human capital are not in a position to improve the existing facilities offered in the field of education. This has resulted in wide disparity between states and created advantageous conditions for prosperous states. In a federation, it is necessary to provide at least equal facilities to every part of the population to prosper according to their genius. But the fact reveals that there exists a wide difference in the expenditure on human capital between states and even 20 years of planning has failed to bridge the gulf. It would continue for long years to come unless massive investment is made in the field of education in weaker states like Orissa.

This raises the question of diverting additional resources for investment in education in weaker states. Finances of these weaker states are in a very bad shape and there hardly exists any great scope diverting substantial resources to the field of education. Many states like Orissa are so diverse in their fiscal capacities and have such pressing and peculiar needs that left to themselves, it would be extremely difficult, if not impossible, for some to match resources with requirements. The Constitution, therefore, provides for grants-in-aid under Article 275 (I) from the Union as balancing factor to remove wide difference between needs and financial resources required to fulfil these. Education is one of the basic needs of the population and the Union should see that these basic needs of the population are fulfilled on equitable basis. This need has got sufficient justification and needs to be emphasized before Sixth Finance Commission :to get substantial central grants-in-aid under Article 275 (1) to divert more of resources for investment in education not only to fulfil the commitments made in the Directive Principles of State Policy of the Constitution but also from the point of view of a better future.

FORM OF DECLARATION

FORM NO. I

(See Rule 3)

I, Sri Bidyadhar Misra, declare that I am the printer and publisher of the Journal entitled 'Orissa Economic Journal' to be printed at Archana Printing Press, Cuttack–1 and published at Bhubaneswar and that particulars in respect of the said Journal given hereunder are true to the best of my knowledge and belief.

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2. Language (s) in which it is (to be) published.	...	English
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Address:—	...	Professor of Rural Economics, Utkal University.

6. Place of publication (Please give the complete postal address)	...	Department of Rural Economics, Sociology and Applied Economics, Utkal University.
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Signature

Date—1. 2. 73