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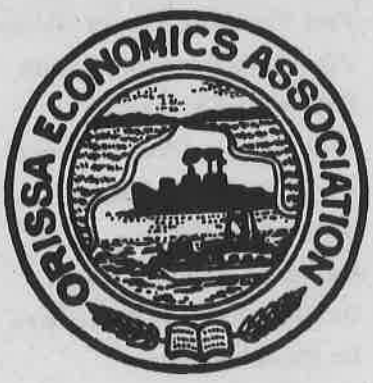

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TRENDS OF ECONOMIC GROWTH IN ORISSA

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Economics of Corruption

Corruption has become a part of life. Nobody takes any serious note of it since it has become a common feature like poverty, hunger and squalor. The Transparency International, Berlin based non-profit organisation in their 2003 Report points out that India ranks 83 in the corruption level among 133 countries. In a survey of literature of 'Economic Analysis of Corruption' by Toke S. Aidt in 'The Economic Journal', November, 2003 mentions what Jains says that corruption is an act in which the power of public office is used for personal gain in a manner that contravenes the rules of the game. There are three conditions which give rise to the persistence of corruption.

(1) **Discretionary Power**: the relevant public official must possess the authority to design or administer relations and policies in a discretionary manner. During the entire planning era discretionary power was the norm which many officials used for their own advantage. It is even said that corruption can be efficient enhancing. If an entrepreneur is interested to start an industry, instead of waiting for a long time for the disposal of his application, pays some bribe to speed up the bureaucratic procedure (greases the wheels) which enLiables him to start the work without much delay. It is even said that corruption introduces competition for (scarce) government resources with the result that services are provided more efficiently than they otherwise would have been. The licenses are allocated on the principle that those who are willing (and able) to pay a high bribe are served first. This implies that whenever the power of sanction of license is delegated to a bureaucratic or political authority, the chances of corruption are greater.

(2) **Economic Rents**: the discretionary power must allow extraction of (existing) rents or creation of rents that can be extracted. The license system creates rents because the would be entrepreneurs are willing to pay a bribe to get hold of a license. The extraction of rent proliferates when the rules and regulations are so ambiguous that one cannot easily comprehend them. In such a case, it becomes easier on the part of officials to interpret the rules and regulations to secure some rent.

Another factor which perpetuates corruption is lack of transparency in government decisions. Even though there is no secrecy in most of the government files, the secret element is used to secure some rent. Further, when a large number of individuals in one organisation or society are involved in corruption, the cost of eliminating corruption becomes too high. All these people share the booties and have a common interest in concealing information. It is sometimes said that an efficiency wage or remuneration reduces corruption.

It may, it may not. In such cases, efficiency wage may reduce the number of corrupt acts, but those who continue may demand higher bribes as per their status and position in the society.

(3) **Weak Institutions**: if the institutions are weak, the incentives embodied in political, administrative and legal institutions must be such that officials are left with an incentive to exploit their discretionary power to extract or create rent. Inefficient regulation and corruption are two sides of the same coin. One of the institutions which is considered to be an antidote is democratic form of government. In democracy it is said that the control system via conscious public opinion, alertness of the opposition parties and the independent judiciary may restrict the collusion between bribe givers and bribe takers for the prevalence of corruption. However, if democracy does not have firm roots, the institutions of control may be weak, the grabbing hand may find much scope to increase rent in the economic system.

Take the case of India which has the largest functioning democracy. The ingenuity of scams in India even during the new millennium like Stamp, CAT, PSC, Taj Corridor, Stock Market, Cash on Camera, etc. have increased so much corruption that thousands of crores of rupees have been used for personal aggrandizement. Many such people and agencies have not only squandered away public money for their personal benefit, they have also concealed quite a lot of such black money in foreign banks. A Swiss Bank had estimated that Indian nationals stashed abroad about $200 billion during the last four decades. All such black money has created so much distortion in the economy that more than 26 per cent of people are still living below the poverty line. The UNFAO has estimated that in India over 200 million people go to sleep every night without a square meal.

The legal system is so weak that dishonest persons manage to escape from punishment (even if some influential people are found guilty and put in prison cells, they are provided with the comforts of a five star hotel) whereas honest persons sometimes become victims to even crucial murder. The two cases that come out recently, one in Bihar & another in Maharashtra show how

mafias control the economic system. In Bihar, when there was misappropriation of funds of Prime-Minister's road connectivity, Satyendu Kumar Dubey an engineer informed the Government and even wrote a letter to the Prime Minister, but before any action could be taken to prevent such misuse of funds, he was brutally murdered. In Maharashtra, the officials of Public Service Commission including the Chairman were found recruiting government servants in the year 2002 on receipt of bribes. Please remember even a Chairman of PSC was a party to the scandal and when a young Tehsildar (age 28) exposed the scandal he was also brutally murdered. Where do you stand, when Chairmen of PSCs, Vice-Chancellors of Universities and Judges occupying the prestigious posts of Governors indulge in such scandals? We have only mentioned two cases of the new millennium, but there are thousands of such cases in different parts of the country.

We cannot of course sacrifice democracy to prevent corruption. If the political institutions are controlled by a dictator corruption also increases unabated. In case of Philippines under the Marcos regime, corruption became epidemic and state resources were appropriated for private ends. Such examples are numerous. The question which bothers us, is there any scope to control the grabbing hand? We can suggest two or three remedies which may be of some use to control this malady. One is the vigilance of people. It is said that eternal vigilance is the price of liberty. All those who have read Charles Dicken's novels, they may be aware of the fact that there was a time when wide scale corruption was prevalent in England. One example will be sufficient to illustrate the point. Oliver Twist when he was in a charity house, money sanctioned for his maintenance was grabbed by the Managers and his assistants of Charity House. But now there is tremendous improvement in social ethics. Even a great economist like Hugh Dalton had to resign when there was partial leakage of his budget. Unfortunately, there is tacit acceptance of corruption in India. Persons branded for massive corruption are lionised and invited to inaugurate academic conferences, schools, hospitals and bridges. Unless there is social ostracism of such persons, there is no scope to control corruption. Second, many things depend on leadership of politicians. If honesty and integrity of the leaders are above board, they can create a congenial atmosphere for enforcing rule of law. A big push is necessary. Hong Kong is a bright example of this big push. Corruption was enormous in Hong Kong Police in the beginning of 1970s. An Independent Commission was set up with widespread power to investigate and prosecute corrupt officials. And corruption was effectively eliminated within a decade. In the first decade of Indian independence, the level of corruption was minimum. The political leadership and the bureaucracy played an important role in changing the economic and political scene of India even at a critical time.

Another area in which more work has to be done is decentralisation of power. If the political & economic powers are concentrated in a few hands, they can misuse the power to extract public funds for their own benefit. Decentralisation of economic & political power increases the empowerment of people which enable them to control the monopoly power of a few who are at the helm of affairs. Political institutions, economic policies and vigilance of the people may to a great extent, control corruption, though may not eradicate it altogether.

Prof. Baidyanath Misra

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Secretary's Report

Mr. President Professor Padhisarma; Esteemed Chief Guest of this Session and Hon'ble Minister, School and Mass Education of Orissa Sj.Surendra Nath Nayak Revered Guest of Honour of the occasion Professor D.C.Mishra; Respected former Presidents of Orissa Economics Association; Chairman, Reception Committee & M.L.A., Jagatsinghpur-Sj.Das; Chairman, Reception Committee & Principal of the College-Mr.Das; Local Secretary-Mr.Mohapatra: Organising Secretary-Mr.Rout; Office Bearers of Organising Committee of the Conference; Distinguished Guests; Invitees; Members of the Press and Media; Fellow delegates; Ladies & Gentlemen.

As the Secretary, Orissa Economics Association, I feel uniquely privileged to accord a warm welcome to you all to the 35th Annual Conference of the Association. We are singularly fortunate to have in our midst to-day Hon'ble Minister, School & Mass Education of the State-Sj.Nayak to inaugurate this Conference. We are really grateful, to you Sir, to have you here with us. We are more fortunate to have with us our most respected teacher Dr. D.C.Misra as the Guest of Honour for this conference. We are extremely grateful to you Sir, for kind gesture.

I take this opportunity to present before you a profile of activities of our Association. Founded on 26th January, 1968 with the noble objectives of promoting the study and teaching in the economics Science in general and stimulating research on the contemporary economic issues of the Indian economy and the state of Orissa in particular, the Association has the unique distinction of being one of the oldest and largest regional academic Associations in the country. It has now 3(three) Institutional Life Members, 265 individual Life Members and 15 Annual Members and these also includes Policy makers. The Association endeavours to accomplish the set objectives by organizing Conferences, symposia and seminars. It has the distinction of holding a two-day Annual Conference and publishing its mouthpiece- Orissa Economics Journal-regularly since inception. The journal has been an important source of research information and reference for the academicians, researchers and policy makers and finds in important libraries of the country.

The Association maintains the healthy convention of discussing two sets of issues in the Annual Conferences-one relating to the Indian economy at large and the other in the regional context of the State of Orissa. This year the two topics selected for discussion in the Conference are:

1. Economics of Sustainable Development
2. Trends of Economic Growth in Orissa during the Plan period.

It is the only academic forum in the State in which distinguished economists, scholars, administrators, planners and statesmen discuss and deliberate upon various contemporary economic issues of regional and national dimensions.

Since 1987 an endowment lecture has been instituted in a special session of the annual Conference in the memory of Bhubaneswar Mangaraj an illustrious teacher of Banki. We are thankful to Sj. Trilochan Kanungo for his kind consent to deliver this year's Mangaraj Memorial Lecture on the theme "Post-super cyclone Reconstruction and Rehabilitation in Orissa with Special Reference to Jagatsinghpur District" despite his busy schedules. The Mangaraj Memorial Lecture has been a continuous item in the programme of the Annual conference.

It gives me immense pleasure to express my sincere thanks to the local organisers of 34th Annual Conference at Bhadrak college for having donated Rs.7,000/- to meet part of the cost of the 34th Volume of Orissa Economics Journal. I am proud enough to record my heartfelt gratitude to the Chairman, Reception Committee, Principal of S.V.M.College, Jagatsinghpur and other Office Bearers of the Local Organising committee of the conference for their tireless efforts in organising this conference in a colourful manner. My sincere thanks are due to Professor Baidyanath Misra for the keen interest he has been taking in promoting all activities of the Association and taking immense pains in editing the articles for the Orissa economic Journal. My special thanks are due to Prof. Bhabani Prasad Dash for his sincere guidance in nurturing the Association and in making this conference possible at this place. I am extremely grateful to all the former Presidents and Secretaries of the Association for the keen interest they are taking in managing the association and to the members of the present executive body and especially to the Conference. President Prof. Padhisarma for their cooperation and help. I am thankful to M/s.Das and Associates, Chartered Accountants, Cuttack for having audited the accounts of association for 2001-2002 free of cost. I really owe a great deal to the dignitaries academicians invitees, guests, delegates, paper writers for their cooperation and to you all ladies and gentlemen for co-operative with the in discharging my duties.

Thanking you all once again.

Rabi N. Patra

Secretary,

Orissa Economics Association.

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Presidential Address

Role of Tribals in Economic Development of Orissa

Professor R.P. Sarma

Director,
Institute of Economic Studies, Brahmapur

Economic development is a complex process. There are several factors responsible for economic development; the economists have identified some important ones such as capital formation, investment, availability of resources, skilled labour, appropriate technology etc. but in spite of availability of all these if a region remains underdeveloped, like Orissa, what is the reason? Gunnar Myrdal after travelling through out the lengths and breaths of South East Asian countries in search of reasons, witnessing the Drama of poverty and Inequality, concluded that development of a community depends not necessarily on the economic factors, even though they are inevitable, but greater part on the non-economic factors and believed that most effective social factor is the people's "urge for development". (Myrdal, 1956)

This is true for the scheduled tribes in India. Their social philosophy and way of life at large differs from the Hindu civilized society with whom they have been staying from time immemorial. Of course the Hindus in thousands of years back lived in a similar way with the nature, like the present day tribals, and worshiped the nature alike the latter, but gradually adopted different ways of life as time progressed. The tribals on the other hand did not go through in the changing process of the society system and their philosophy of life, satisfied with the minimum requirements for the maintenance of life, remained almost stagnant.

After India became independent in the middle of the 20th century the efforts started to develop the Indian economy, including the tribals, but the developed communities absorbed most of the development benefits and the tribes socio-economic situation did not change significantly during the last half a century of planned development, even though they have been provided with special privileges both politically and on the basis of economic status. This is a fact, which needs no evidence.

Tribal Population

The tribals constitute about 8.08 (1991) per cent of the total population in India. Of this about half of them stay in the three states of Madhya Pradesh,

Maharastra and Orissa. In Madhya Pradesh maximum population of more than 140 lakhs of tribals are residing even excluding the state of Chhatisgarh, newly carved out of the former Madhya Pradesh. In second position comes the state of Maharastra where about 73 Lakhs of tribals. Orissa's position is third with 70 Lakhs. Even though Orissa comes third in tribal population but in terms of per centage of tribals to the total population of the state it is second to Madhya Pradesh. Madhya Pradesh has 39 per cent of tribals followed by about 25 per cent in Orissa. In Maharastra the tribals constitute about 9.5 per cent. (1991 Census)

Growth Rate of Population :

High growth rate of population is one of the factors that retards the economic growth in terms of per capita income. It is found that the growth of tribal population in Orissa is slower in comparison to non-tribal population, hence in this sense the tribals are not putting any obstacles to the economic growth; on the other hand it is the high rate of growth of non-tribal population that retards the economic growth of Orissa.

Growth of tribal and non-tribal population in Orissa from 1961 to 2001 is presented in Table-1 for a comparative analysis.

The growth rate of tribal population in sixties remained 2.01 per cent annually in comparison to non-tribal population growth rate of 2.66 per cent. Both the rates came down in the 1990es, in 2001 census the tribals, annual growth rate came down to 0.98 per cent as against the higher non-tribal growth rate of 1.83 per cent. This is the positive contribution of the tribals to the economic growth of the state. This slow growth rate of tribal population has several reasons; it is neither due to higher level of education nor due to higher level of economic status, the main reason is the high infant mortality among the tribals. This slow growth of population in no way indicates the socio-economic development of the tribals. Whatever may be reasons it is the non-tribal population with their high general fertility rate and crude birth rate retards the economic growth of Orissa.

Table-1: Growth of Tribal and Non-tribal Population in Orissa

Year	Tribals In Lakhs	Annual Growth Per cent	Non-tribals In Lakhs	Annual Growth Per cent
1961	42.24	—	113.24	—
1971	50.72	2.01	168.72	2.66
1981	59.15	1.66	204.55	2.12
1991	70.32	1.88	244.99	1.97
2001*	77.20	0.98	289.87	1.83

Source: Census of India, 1991.

*Bifurcation between tribal and non-tribal population is projected on the basis total population growth according to Census of India, 2001.

The Spread of Tribes in Orissa

Majority of tribal population in the state are concentrated in the eight districts of Orissa where this tribal population constitutes more than fifty per cent of the district. These districts are five districts of the southern Orissa viz., Malkangiri, Koraput, Nabrangpur, Keonjhar and Mayurbhanj. These can be termed as tribal districts. About 63 per cent of the tribal are concentrated in these eight districts of the state.

In another eight of the coastal districts, the tribal population is very marginal, less than 5 per cent of the district's population. These districts are Bhadrak, Kendrapara, Jagatsinghpur, Puri, Cuttack, Khurda, Ganjam and Nayagarh. These districts can be termed as non-tribal districts.

Tribal population in 30 districts of the state divided into four zones according to the per cent of districts' population is presented in Table-2.

Presence of these tribal districts with their low economic level of development depresses the economy of Orissa considerably. In rest of the 14 districts, in seven of them the tribal population constitutes 5 to 20 per cent of the district's population with 7.96 Lakhs while in the other seven districts the tribal population remains 21 to 50 per cent with an absolute populating of 14.89 Lakhs.

Growth of Literacy

Literacy is regarded as one of the determinants of economic growth. Economists believe that at least 40 per cent of literacy is a pre-requisite for acceleration of economic development. The Nobel Laureate Amartya Sen emphasises for the development of primary education as a prerequisite for development.

Table-2: Tribal Population in the Districts of Orissa (1991)

Per cent of Tribes	No.of Districts	Population In Lakhs	Per district In'000
<5	8	3.06 *4.25*	38.25
5-20	7	7.96 *11.32*	113.71
21-50	7	14.89 *21.17*	202.71
>50	8	44.41 *63.15*	555.12
Total	30	70.32 *100.00*	

Note : Figures in italics indicate per cent of tribal population.

Rate of literacy of the tribes for the census 2001 is not yet available. According to 1991 census the literacy among the tribals was estimated as

22.31 per cent, of which male literacy is 34.44 per cent and female literacy is 10.21 per cent. In four of the tribal districts the general literacy was 8.79 per cent.

But if one compares the general rate of literacy for 2001 between the districts of tribal and non tribal ones it reveals great difference. According to census of 2001 the rate of literacy among the four of the least tribal districts is 76.88 per cent while in the four of the districts with maximum tribal population comes to 31.88 per cent. The literacy of the latter districts is far below the rate of literacy of Orissa of 63.61 as per 2001 census.

A comparative picture of the differences in the per centages in literacy of male and females in tribal and non-tribal districts can be seen in Table-3. The wide gap in the rate of literacy in the two groups of districts is mainly due to the low rate of literacy among the tribals. The male literacy ranged between 41 to 48 per cent, and female literacy between 21 to 25 per cent in the tribal districts while in the non-tribal districts male literacy remained 88-89 per cent and female literacy is more than double that of the tribal districts, to the range of 67-70 per cent.

Table-3: General Per centage of literacy among the tribal and non-tribal districts
Figures in per cents.

Tribal Districts			Non-Tribal Districts		
District	**Male**	**Female**	**District**	**Male**	**Female**
Koraput	47.58	24.81	Jagatsinghpur	88.96	69.94
Nabrangpur	47.37	21.02	Puri	88.73	67.80
Rayagada	47.35	24.31	Khurda	88.38	71.06
Malkangiri	41.21	21.26	Kendrapara	87.62	67.29
Mean	45.87	22.85		86.42	69.01

Sources: Census 2001

A sample study taken in the district of Gajapati in the year 1999 to know about their literacy reveals the true picture of the literacy among the schedule tribes. In this district there are about 49 per cent tribal population mainly the Soura tribes. The Gajapati district has a maximum 30 per cent of the population who are Christians the highest in any district of Orissa. The Christian population is mainly confined to tribals. It is general assumed that the Christian tribals are better off in the economic development and also in the literacy. But this hypothesis is completely proved wrong in the study.

The Souras are found in almost all the districts of Orissa but they are mainly concentrated in the southern districts. It is a major tribe and is in the third position in terms of population after Kondhs and Santals. The Souras have written scripts of their own and considered comparatively developed ones among the tribals. But the study reveals (Rout, 2000) the rate of literacy is very low as shown in Table-4. The total literacy of the tribals is 12.35 per

cent, of which adult literacy is 6.84 per cent and children's literacy is 18.10 per cent. It can be verified from the Table that the female literacy is as low as 0.8 per cent.

Table-4: Literacy among Tribals in Gajapati District.

Adults	Per cent	Children	Per cent
Male	13.76	Male	18.32
Female	0.80	Female	17.86
Total	6.84		18.00

Source : Rout, 2000, Table 7.11

If 25 per cent of the total population of the tribals has 12.35 per cent literacy the rest of the non-tribal population has a rate of literacy of about 76.84 per cent. The general rate of literacy of the state is depressing because of low rate of literacy, if the tribals have attained the literacy rate at the same level with that of non tribals it would have been increased to 93.18 per cent.

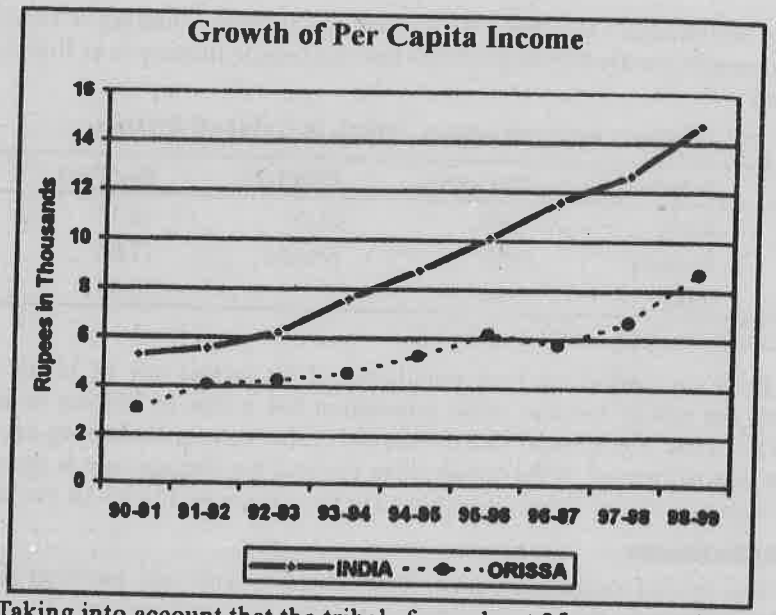
Per capita Income

The second important aspect where there is wide gap between tribals and the non tribals, due to several reasons, is the per capita income. Not going far back, India's per capita income in the nineties 1990-99 increased by 174 per cent from Rs.5,365 to Rs.14,712 in current prices. During the same period Orissa's per capita income increased of course at a higher rate by 183 per cent but could not reach the Indian per capita figure. In 1999 Orissa's per capita income at the current prices is Rs.8719 which is lowest among the major states of Indian union with the exception of Assam which has a per capita less Rs.19, the highest per capita income being Rs.20,834 for Punjab. (TATA, 2001-02)

The growth of per capita income of India and Orissa is presented in Fig. 1. The gap of income between the two is gradually widening instead of closing. In the year 1990-91 the gap was Rs.2288 which increased to Rs.5993 in the year 1999, in a period of eight years.

Very slow growth of income among the tribals depresses the growth of per capita income of the state. Per capita income of tribal population separately is not available. On the basis of the sample per capita income of the tribals available from research studies Orissa's per capita income can be calculated afresh, to know the impact of tribals on the Orissa's per capita income.

About 54 per cent of the tribals are land less and those who own land are not taking up agriculture with any scientific management hence the yield rate of agricultural product is very poor. In general about 32 per cent family earnings of the tribals come from agriculture, about 63 per cent from daily wages and the rest from the sale of forest products and other sources. There is also differences in the per capita income of landed and lend less families among the tribals. For the landed families the per capita income is Rs.2,800 and for the land less families the income is Rs.1,670; (1999) and combined per capita income of the tribals comes to Rs.2,238, in the same year Orissa's per capita income was Rs.8719.



Taking into account that the tribals form about 25 per cent of the state's total population and the per capita income of the tribal population is Rs.2238, the rest of the 75 per cent of the non-tribal population of the state has an estimated per capita income of Rs.11,454. If this happens to be the per capita income of the state of Orissa. Orissa would ascend over eight states' per capita income among the states in 1999.

I have presented here two of the indicators, literacy and per capita income, to establish the point how the accelerated development of the tribals can boost economic development of the state. There are also several other economic indicators which can analyzed similarly.

The planners have been giving special emphasis for the development of tribals from 5th Five Year Plan period onwards and formulation of tribal sub-plans to improve the socio-economic conditions of the tribal population. Apart from this the following specialized schemes are being implemented for their development:

- Micro Projects: Presently there are 17 micro projects covering 20 Community Development Blocks in 12 districts for the development of 12 primitive tribal groups to bring them into main stream livelihood.
- Modified Area Development Approach: This approach aims at development of the tribals who are outside the Intensive Tribal Development Agency areas. There are 46 pockets covering 47 blocks of 17 districts which are developed under this scheme.
- Cluster Approach: Since the Seventh Five Year Plan period the cluster approach has been adopted by the planner for the intensive development of the tribals. Accordingly in an area contiguously having five thousand population and of them at least about 50 per cent are

tribals the cluster approach is adopted for intensive development of tribals.

- Kasipur Project: The government adopted area specific for the development of the tribals in the year 1988-89 according the first project was established in Kasipur Block of Rayagada district under Orissa Tribal Development Project. It is a joint venture of International Fund for Agricultural Development, Central Government and the State Government.
- Dispersed Tribal Development Programme: Some welfare programmes are implemented by the Scheduled Caste Scheduled Tribe Development Finance Co-operative Corporation who are not covered by the above mentioned programme and projects.
- Co-operative Marketing Corporation: The tribal Development Co-operative Corporation of Orissa Ltd., was started mianly for the marketing of forest products and surplus agricultural products. It has 130 procurement-cum-collection centres and 360 seasonal procurement centres in the tribal areas of the state. Under it there are 2002 Multi Purpose Co-operative Societies.
- Finance Co-operative: The Orissa Scheduled Caste and Scheduled Tribe Development Finance Co-operative Corporation was established in 1979-80 for providing economic assistance to the tribal and scheduled caste families below poverty line.

Expenditure on the above projects for the year 1997-98 for which actual expenditure figures are available indicates approximate expenditure annually on the socio-economic development of tribals, which is presented in Table-5. About 96 per cent of the expenditure is spent on the Tribal Sub-Plan, out of the total expenditure of Rs.779.89 crores. Out of the total expenditure of the government of Orissa for the year 1997-98 of Rs.5,536.5 crores the total expenditure on special tribal programmes constitutes about 14.06 per cent.

Table-5: Special Expenditure on the Tribal Projects, 1997-98.

Programme	Expenditure Rs.Crores	Per cent
Tribal Sub-Plan	748.64	95.97
Micro Projects	1.65	0.22
Modified Area Development	2.36	0.30
Cluster Programme	18.13	2.33
Kasipur Project	7.42	0.96
Dispersed Development Programme	1.69	0.22
Total	779.89	100

Source : Economic Survey, 1998-99, Government of Orissa, Bhubaneswar, 1999.

This annual expenditure on the development of the tribals in the state is not sufficient for the acceleration of their socio-economic development. Harvey Leibenstein developed the thesis that underdevelopment is characterised by the vicious Circle of Poverty. (Leibenstein, 1957) The way out of this circle is to invest a "critical minimum" that would raise the per-capita income to a level at which sustained development could be maintained. He believed that it is necessary to have a 'stimulus' to growth that is greater than certain critical minimum investment to accelerate the economic growth. Regions and communities are underdeveloped because the magnitude of stimulants is small. Similar is the case of tribal community and the region they live in the state.

The critical minimum approach has to be adopted for the development of the tribal areas if one is interested for the acceleration Orissa's economic growth. The proposals given below may be considered seriously by the Planners and special plans have to be formulated with in the Five Year Planning fold accordingly.

Conclusion :

I purpose two Special Tribal Economic Development Zones:

- **Southern Orissa Zone** : This includes five tribal districts of Malkangiri, Koraput, Nabrangpur, Rayagada and Kandhamal. Four of the former districts are included in the so called KBK (Kalahandi-Bolangir-Koraput) special development zone under a centrally sponsored scheme, which is yet to start in right earnest. Recently Chief Minister of Orissa declared to include Kandhamal in this zone.
- **Northern Orissa Zone** : This includes three districts of Mayurbhanj, Kendujhar and Sundargarh.

These two Development Zones may be put in charge of two Development Commissioners, to formulate specific plans for the respective Development Areas, in consultation with Planning Commission, Central Government and State Government for financing and guidance. Planning Commission may be asked to formulate modalities and execution of projects for which international assistance may be sought for implementation of specific schemes.

The government of Orissa has not lagged behind to take initiative for the specific development of the tribal community in the state. In 1992 six tribal districts, out of eight tribal districts I have mentioned above, have been declared as "Scheduled Area" for specific tribal development along with six Tahsils in five districts and four Blocks in three districts, which covers 13 districts with an area of 69.61 thousand sq. km. constituting about 44.7 per cent of the total geographical area of the state. (Economic Survey, 1998-99 p.20/1)

But then it is only in the records. Nothing is done for the "Scheduled Area". I am only reminding and re-emphasising to take up it seriously for the intensive development of the tribal community with a "Critical Minimum

Approach" and with a high target growth rate, starting with the Tenth Five Year Plan, for the acceleration of the economic development of the state. Will the Government hear the appeal of an economist and take it for consideration?

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The Post Super Cyclone Scenario of the Affected Regions of Orissa

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At the outset let me put it on record my deep sense of gratitude to the functionaries of Orissa Economics Association in general and Prof. Bhabani Prasad Das in particular for conferring on me this rare privilege of addressing this prestigious Mangaraj Lecture before the galaxy of outstanding economists of the state and country. The subject assigned to me. **The Post Super Cyclone scenario of the affected regions of Orissa**- more particularly of Jagatsinghpur district. Less we recall the memory of the killer super cyclone of October, 1999, better it is. The horrendous traumas is still alive in the minds of the millions who had experienced the dreadful day of the 29th October, 1999. The extent of loss and damage of lives and properties caused by that super cyclone were unprecedented and immense beyond redemption. Language would be inadequate 1.9 crore people of fourteen out of thirty districts of the State of Orissa. The memory of more than three hundred and sixty kilometers of whirling wind for nearly 36 hours, tidal waves of 5 to 7 meters height with high velocity rushing into 30 km inland, incessant downpour for about 72 hours and consequential unprecedented flood rendering millions of families homeless; entire Khariff crops in the field being washed away and millions of uprooted trees; death of thousands of people and lakhs of carcasses of cattle and other domestic animals polluting the entire environment with unbearable stinking odour is still heart rending and mind boggling.

An objective assessment after three years of super cyclone, restoration and reconstruction works undertaken by government and NGOs are no doubt substantial but in certain critical areas they have remained far from satisfactory to which I shall come in due course of my address.

* On 10.41921, Gandhiji after touring Orissa wrote in 'Navajivan' (Gujarati) "in Orissa the suffering is due to the wrath of the Nature. Either the crops do not grow through lack of rains or there are floods following excessive rains and the crops and houses are washed off. Hence there is always a near famine in this state (Orissa)". Either cyclones were not that severe at that time or Gandhiji was not aware of them- Orissa's agrarian economy has been ravaged by successive floods, droughts and cyclones.

Immediately after the devastating cyclone of 29th and 30th of October 1999 relief materials poured into the state capital from all corners of the country and even abroad. They were no doubt adequate and sufficient to meet the emergent needs of the affected people. But the management at home was not upto the mark. The chaos in relief distribution was created because of gross mismanagement accompanied by corruption by the executing personnel. Gratitude is due to Mr.Chandra babu Naidu, Chief Minister of Andhra Pradesh and to his relief operators whose contribution can never be forgotten.

Govt. of India under food for work programme had sanctioned Rs.104.92 crore towards cost of 22,077.80 Mt of food grains for providing need based wage employment in the cyclone affected areas. The panchayatiraj department was the nodal agency.

Funds allotted	104.92 cr
Amount utilized	104.16 cr
Food grains allotted	2,22,078 MT
Food grains utilized	2,22,070 MT
No. of works programmed	14730
No. of works taken-up	13581
No. of works completed	13085
Man days generated	157.53 lakh

An executive summary depicting the loss of lives and damage of properties are placed alongside

SUPER CYCLONE, 1999-STATEMENT OF ORISSA

EXECUTIVE SUMMARY

(These are estimates obtained from various Government and Non Government sources)

The Super Cyclone And The Impact:

- Two successive cyclones, severe cyclonic storm of 17th and 18th October, 1999 and super cyclone storm of 29th and 30th October, 1999 accompanied by rough winds with velocity of 270-300 km per hour and unprecedented tidal waves of 5-7 meters high, followed by torrential rains and devastating floods in the major river basins ravaged 14 districts of Orissa, including 128 Community Development Blocks and 46 Urban Local Bodies.
- Severely affected districts, 14 in number, include Balasore, Bhadrak, Cuttack, Dhenkanal, Jagatsinghpur, Jajpur, Kendrapara, Keonjhar, Khurda, Mayurbhanj, Nayagarh, Puri, Ganjam and Gajapati. Six coastal districts, viz. Jagatsinghpur, Kendrapara, Cuttack, Khurda, Puri and Ganjam bore the maximum brunt.
- The natures fury caused unprecedented waste of human lives, livestock, public and private properties including vital infrastructure, houses institutions and agriculture in the most prosperous part of Orissa.

Areas affected:	14 districts		
	128 Community Development (CD) Blocks		
	46 Urban Local Bodies (ULB)		
	2399 Gram Panchayats (GP)		
	17993 Villages.		
Population affected:	Total:	1900 million	
	Rural:	16.50 million	
	Urban:	2.50 million	
Human causalties (in number):	10,092		
Livestock mortality:	Cattle:		3.00 lakh
	Sheep, goats and pigs:		2.60 lakh
	poultry		10.00 lakh
House damaged:	Total:		18.97 lakh
	Fully washed off houses:		0.24 lakhs
	Fully collapsed houses:		7.50 lakhs
	Partly collapsed houses:		11.23 lakhs
Damage to educational institutions:			
	Primary and Upper Primary School Buildings:		16,270
	High School and Training Institutions:		3,931
	Higher Educational Institutions:		215
Other public buildings (in number):	Total:		31,321
	public Works Deptt:		18,059
	Water Resources Deptt:		357
	Panchayat Raj Deptt:		5961
	Rural Devt. Deptt:		6944
Damage to standing khariff crops/Horticultural corps:	21 lakh hectares (estimated at Rs.1800 crores)		
Damage to forests/trees:	Forests		95,750 hectares
	Trees uprooted:		90 million
Damage to coastal Shelter belt plantation:	18,000 hectares		
Damage to cashew plantation:	Total:	29,913 hectares	
	OSCDC:	15,112 hectares	
	Private:	14,801 hectares	
Damage to coconut plantation:	Trees uprooted:	45 lakhs	
Damage to water sources (in number):	Total:	14163	
	L.I.Points:	6208	
	Tanks/MIPs:	7423	
	Water Harvesting Structure:	532	

Damage to fishermen:	Boats:	29,818
	Fishing Nets:	59, 174
Loss of critical infrastructure:	Damage to :	
	-Surface communication including Rural/Urban roads, culverts, bridges, States/National highways and railway network- 52,000 km of roads severely damaged - 12,809 bridges/cross drainage bridges affected.	
	-Telecommunications	
	-Power stations and transmission lines- 43 towers along 220 KV and 130 KV transmission lines collapsed/severely damaged.	
	-14, 000 Water sources affected.	
	-Rural and urban drinking water system.	
	-Ports.	
	-Health institutions and Women/Child development centres.	
	-Other public utilities/private infrastructure.	

Housing

As per the Government Reports houses of nineteen lakh families in fourteen out of thirty districts were devastatingly damaged by this killer cyclone. No government can provide resources to rebuild all the damaged houses of those nineteen lakh unfortunate families. But what they were deserving and Government should have come forward to provide is at least one core room of 12' × 12' with R.C.C. roof to each of these nineteen lakh devastated families. Out of nineteen lakh of damaged houses, nearly 7.75 lakh houses were either washed away or fully collapsed. Number of houses targeted to be completed by Government and other agencies, current status and works assigned to the department are as follows. Figures below depict there status by 31st December 2002.

Name of the scheme	Target (numbers)	Progress	Nodal Department
Indira Awas Yojana (Specially allotted for Cyclone affected districts)	2,00,000 houses	190837 completed 9163 in progress	Panchayati Raj; Expenditure so far made Rs.84029.17 lakh made out of Rs.104478.04 lakh
IAY houses (Addl. allotment for cyclone affected districts)	4,00,000 houses	1,89,258 completed 2,03,545 in progress	

Credit linked Housing Scheme (Housing & Urban Development Corporation loan) (HUDCO)	1,02184 houses	102184 financed 56376 completed 42018 in progress	Housing & Urban Development Department of Orissa is the nodal department; Amount disbursed Rs.281.74 cr out of Rs.357.64 cr.
NGOs and donors	5,011 houses.	4641 completed 370 under Progress	
Total	7,07,195 houses		

Besides the provision of above 6 lakh Indira Awas Yojana for the people below poverty line a sum of 1 lakh IAY was available from Govt. of India after 2001 flood affecting the same cyclone affected areas plus other areas. For IAY houses 75% comes from Government of India and 25% from Govt. of Orissa. The cost of each unit is approximately Rs. 32,000.00 The way BPL persons were identified in the state in 1997, many doubts can be attributed on the bonafides of the process of selection. Many families with object poverty had been excluded from the BPL list. The house damage list after the super cyclone was alleged to have been identified or prepared on consideration. Lakhs of real poor people have yet to find a RCC roof over their head to protect themselves from such killer cyclone. State Government should move to Govt. of India to provide 6 lakh more houses under IAY for the poor people in the cyclone affected area. Given the precarious financial condition of the state, the state should have moved the Government of India to bear 100% of the IAY cost in the cyclone affected area. Allegations are pouring in from all corners that the poor beneficiaries of he IAY in the cyclone affected areas were forced to grease the hands of the corrupt officials and local middlemen.

MULTIPURPOSE CYCLONE SHELTERS

98 numbers of MCs are being constructed within 10 kms of the High tide level of Bay of Bengal covering six coastal districts of the state. Out of the above, 60 MCSs are being constructed with Chief Ministers Relief Fund (CMRF) and 38 with World Bank assistance. Construction of 38 shelters taken up with CMRF has been completed. Local communities will be responsible for their day-to-day maintenance and management. Constitution of the Cyclone Shelter Management and Maintenance Committee (CSMMC) has been completed in 28 multipurpose cyclone shelters.

School And College Buildings

Out of nearly 16,000 damaged primary school buildings, only 5786 school buildings have been taken up so far (31.12.2002). Details are as under

Source	Nos Committed	Work started in	Completed
Prime Ministers" Relief Fund	961	860	657
Maharastra Govt	41	41	41
Karnataka Govt.	49	49	28
Gujrat Govt.	37	36	35
Madhya Pradesh Govt.	133	131	111
Operation Black Board	4420	4420	4251
NGOs and other donors	130	128	107
NFCR (Collector, Bhadrak)	15	15	0
Total	5786	5689	5230

Out of 3931 damaged high schools and training institutions only 1117 high schools have been programmed under cyclone reconstruction. Details are furnished below

Source and Agency	Programmed	Work started in	Completed
Prime Minister's Relief Fund (300)			
Collector, Ganjam	47	46	37
Collector, Balasore	48	48	47
Collector, Bhadrak (NPCC)	28	28	13
Collector, Puri	78	77	37
NPCC (Jagatsinghpur)	30	28	10
Collector, Kendrapara	10	10	0
RSP	59	10	0
Total	300	247	144
Maharastra Govt.	59	59	59
Karnataka Govt.	50	49	33
Gujrat Govt.	13	13	13
Madhya Pradesh Govt.	54	54	38
Chief Ministers' Relief Fund (1st phase)	128	128	128
Chief Ministers' Relief Fund (2nd phase)	128	118	88
MPLAD fund of Rajya Sabha MPs-76 (HUDCO)	75	71	58

MPLAD fund of Lok Sabha MPs-75	77	62	45
NFCR (RD Department)	140	139	121
Donors and other NGOs	93	93	72
Grand Total	1117	1033	799

It was expected that assistance for construction of school buildings would flow from DFID (Department for Internal Development). As the funds have not yet been received the construction of school buildings both primary and high school is yet to commence. State govt. has moved the Union Finance ministry to help early commencement of the project.

Funds were available from NFCR for repair/restoration of Utkal University buildings (Rs.1.70 crores) and repair/ restoration of Berhampur University buildings (Rs.150 crore). An additional amount of Rs.15,00,000.00 was also available from CRF (Calamity Relief Fund) for repair of Berhampur University buildings. A sum of Rs.1 cr was made available from NFCR for laboratory equipments and furniture for Government colleges. UGC has also made allocations of Rs.4.53 crore for 3 universities, 2 Govt. Colleges and 15 Non govt. colleges. Funds however have only been committed but have not yet been received from UGC as yet (31.12.2002).

Exemption of examination fees, furniture for high schools supply of text books on storage facilities to high schools, purchase of learning and teaching materials for primary schools, for laboratory equipments and library books, text books for primary and UP schools, storage facility for 6,387 schools, school kits totaling Rs.67.76 crores have been made available from different sources.

In Jagatsinghpur district assistance for 16 nos. of school cum cyclone centers have been received from HAL, IBPCO, IRCS.

Improvement Of Health Institutions

215 health institutions are being improved in 125 cyclone affected blocks with Chief Ministers Relief fund at the rate of Rs.10,00,000 per block. Works at all the sights are in different stages of progress. Work has been completed at 133 institutions and 54 nearing completion.

Reconstruction Works Under World Bank Assistance

The immediate phase of World Bank assisted projects is as follows:

Sl. No.	Project Proposal	Works Programmed /Value (in Rs.crore)	Works in Progress/ value (in Rs.crore)
1.	Roads of RD department	74/57.37	48/49.84 13 completed
2.	Roads of works department	57/64.38	40/31.70 11 completed
3.	Roads of Urban Local Bodies (H & UD)	53/14.77	44/13.97 16 completed

4.	Irrigation Infrastructure : WR Department Embankments	342/73.95	313/65.80 76 completed
5.	Piped Water Supply by RWSS projects	65/2.99	30/1.75 10 completed
6.	Urban Water Supply Scheme projects	25/11.21	17/3.97 6 completed
7.	Cyclone shelters-40 nos	31/15.18	16/8.98
8.	Agro-service Centres-500nos	1/10.00 (500 nos)	0/6.26 (329 nos set up)
	Total	648/2 Rs.220.0 crore	508/175.96

Work on 508 packages at an estimated cost of Rs.175.96 crore is in progress. Work has been completed in 132 packages. An amount of Rs.89.24 cr has been paid for the works by 15.12.02

Road condition in Orissa from state highways to village roads more particularly in cyclone-affected areas is precariously bad. Whatever repair or reconstruction of the roads has been undertaken in the cyclone –affected area, the quality of work is very bad. Honesty and accountability in construction work are at their low. State Govt. should make endeavour to avail low cost loans from RIDF (Rural Infrastructure Development Fund) of NABARD. No soft attitude towards corrupt executing engineers and neglecting contractors should be tolerated. Good roads are no doubt essential for horizontal linkage and progress of economy. This is the area which has not received adequate attention of the government.

Electricity

More than 3 years have elapsed after the super cyclone, but electricity has not been restored in quite a sizeable number of villages, where electric connection was there before super cyclone. In Jagatsinghpur district alone electricity has not been restored to nearly 20% of villages. This is mainly due to the so-called reform of electricity in the state. The private distribution companies are not paying any attention to fulfil their social obligations. Lift irrigation point and rehabilitation projects with electricity connection are currently under implementation with DFID assistance. As per the latest assessment out of 6208 LI points about 2500 points can be rehabilitated with the DFID funds. So far 1303 pani panchayats have been registered under Societies Registration Act 1860. Funds have been placed with 184 pani panchayats for rehabilitation of LI points. Materials have been supplied for 76 projects. So far (up to 31.12.2002) rehabilitation of only 59 LI points has been completed. This is the area of gross negligence, in an agricultural dominating economy.

Livelihood Restoration

With DFID assistance out of 519 primary milk producer's cooperative society buildings 513 buildings have been constructed. Similarly 3482 milch

animals have been supplied to the farmers with funds to the tune of Rs.10 crore provided to OMFED. The amount has been fully utilized.

National Diary Development Board has also assisted about Rs.18 lakh for 500 milch animals. Money has also been received from NFCR and CRF for supply of milch cows to the affected farmers.

Boats

Financial assistance to the tune of Rs.5.11 crore has been disbursed among 15,306 families at the rate of Rs.3,000.00 per boat for 9417 non mechanized boats (marine sector) and at the rate of Rs.1500.00 per net for 15,211 nets (marine sector).

For in land sector financial assistance to the tune of Rs.6.16 crore has been disbursed to 30163 families at the rate of Rs.3000.00 per boat for 10,154 boats and at the rate of Rs.1500.00 per net for 20,776 nets.

The severity of cyclone is due to the mindless and deliberate depletion of saline forests like mangroves and others. A thick belt of saline forests was serving as both wind and wave breakers. The greed of few persons to grab land for brackish water prawn culture has been causing immense harm to millions of coastal people. A coastal belt of least 1 km width of saline forests is essential to protect the coastal millions from the horrors of cyclone. Disaster can only be mitigated by raising thick belt of saline forest. Cyclones are created in the Bay of Bengal near Andaman Nicobar islands but have never affected these islands because of the existence of thick saline forests.

The super cyclone of 1999, had caused immense damage to the agrarian economy of the most prosperous area of the state. Millions of coconut trees and other long standing timber and fruit bearing trees were uprooted. To bring back the economy on an even keel shall no doubt take a few more years, but the disaster should have been taken as a great challenge to rebuild the society with more vigour and dynamism both by the Government and the people. Some positive achievements/results have no doubt been achieved but a lot more is to be done. A nation's courage is known at the time of crisis. We are awakened but have not fully prepared ourselves to meet the challenge and bring in prosperity to our fore. At the end I must thank you for giving me the opportunity to place before you the facts of the disaster and figures of reconstruction and restoration to the best of my ability. I couldn't give the separate figures for Jagatsinghpur district as I am unable to collect all the informations necessary to be placed before you. This however includes Jagatsinghpur.

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Economics
of
Sustainable Development

Challenges Towards Sustainable Development

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Introduction :

Sustainablity is currently one of the most important issues pertaining to environment and development. Development in terms of economic growth has been thought to have resulted in degradation of environment due to the output of pollution and waste and depletion of natural resources. Wise management of natural resources and protection of global environment are essential to achieve sustainable development and hence to alleviate poverty, improve the human condition and preserve the biological system on which all life depends. Sustainable development is not a de novo thinking. Of late it is an expanded view of conventional development in more concrete terms. Sustainable development comprises of sustainability and development. While sustainability connotes continuation, development simply means change. Sustainability is an integral attribute of multiple visions of development ranging from local to global scale. This necessitates a radical change in the concern for development for all including ourselves and future generation. The concept of sustainable development though still passing through the phase of refinement, has succeeded in stimulating the efforts to find out common solutions through collective efforts for a common secured and better future.

Concept of Sustainable Development :

Development economists have adopted the term sustainability in an attempt to clarify the desired balance between economic growth on the one hand and environmental preservation on the other. There are many definitions but stated simply, sustainable development means development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (World Commission of Environment and Development 1987) (WCED). The concept originally proposed by the WCED's in 1987 gained prominence after the united Nations Conference on Environment and Development in 1992. It culminated in the establishment of the United Nations Commission on Sustainable Development (CSD).

IUCN (1991) defined sustainable development as improving the quality of human life while living within the carrying capacity of supporting

ecosystems. Carrying capacity is the largest number of any given species that a habitant can support indefinitely. When that maximum sustainable population level is surpassed, the resource base begins to decline. Pronk and Haq (1992) have come up with economic growth that provides fairness and opportunity for all the world's people, not just the privileged few without further destroying the worlds finite natural resources and carrying capacity.

Bartelnus (1994) considered the WCED's definition as rather vague as it gives no indication of the time horizon (future generation), the scope and substance of human needs and the role of environment. He introduced a new definition focusing on the maintenance of produced and natural capital for ensuring continuing generation of output and value added and bearing in mind possibilities of extending the use of natural capital through resource saving and environmentally sound technological progress, resources discovery or substitution of produced, natural or human capital inputs. Thus sustainable economic growth and development is defined in operational (quantifiable terms as upward trend of environmentally- adjusts domestic product), assuming that the allowances made for environmental depletion and degradation can and will be invested into capital maintenance and taking into account that the past trend of depletion and degradation can be offset or mitigated by technological progress, discovery of natural resources and changes in production and consumption patterns.

Since the establishment of the CSD, very little progress has been made in operationalising the concept of sustainable development. This is because according to some writers, there can be no operational definition for sustainable development within the modern world view (Noryaard; 1994) When a concept can not be operationally defined, its realization becomes difficult. Nevertheless, the definition given above explicitly or implicitly indicated the importance of natural systems in terms of natural resources and carrying capacity in supporting the sustainability of development.

India including other developing countries are facing a number of problems in the field of environment due to widespread poverty and under development. Rapidly growing population and certain developmental activities are causing environmental decay and prompt remediable measures are now required to prevent further environmental degradation and to restore ecological balance. Environmental management is now considered to be a major guiding factor for the country's economic development. On account of these reasons, official involvement in environmental management with increased scientific, technical, administrative and legislative back up at the Centre and State levels has been strengthened in recent years.

Apart from the ecological caused by poverty and under development, there are also certain environmental problems resulting from development itself. These are mismanagement of natural resources, large deforestation, unplanned discharge of wastes in rivers, mishandling of toxic chemicals, unplanned construction and expansion of settlement activities etc.

Global environmental issues such as ozone depletion, climate change due to accumulation of green house gases, bio-diversity loss etc. are largely due to the rapid industrialization of developed countries. India contributes insignificantly to greenhouse gases in absolute terms but considering India's share in world carbon emissions is quite large.

Conflicting Interest in the Environment-Growth Relationship:

The contradictions and conflicts arise mainly due to the fact that the debate on environment and sustainable development hitherto has been based on either dominant social paradigm or deep ecology paradigm. Often development and ecological concerns are viewed as conflicting goals. The attempts to integrate these two views are not very successful as they failed to incorporate the socio-ecological aspects into the concept of sustainability.

One of the consequences of the growing concern was the 1972 UN World Conference on the Environment in Stockholm. But at this conference the developing countries stated that in their ranking of objectives, development need to be given greater priority than the environment. Slowing economic growth in the interests of protecting the environment might appear to be a worthy cause to the richer countries but was not high on the agenda of the developing countries. The global environmental problems are direct or indirect consequences of local and individual actions. Unfortunately, there is complete lack of effort to educate and organize people around environmental issues regionally and locally.

Even in the advanced countries it was never clear that environmental protection was high on the agenda for the majority of the population as distinct from the more affluent members of society (Beckerman, 1992).

According to Todaro (1994), evidence indicates that the worst perpetrators of environmental destruction are the billion richest and the million poorest people on earth. It follows that increasing the economic status of the poorest group would provide an environment windfall.

The increasing concern for environmental problems at the policy making level in the west are mainly due to the increased awareness among its citizens which is a result of high level of socio-economic development. On the other hand, in the low developing countries (LDCs), the present concern for global environment and ecology is largely a result of the initiation and aggressive promotion by the industrialized western countries and some NGOs rather than from the demands of its own populance. Apart from the international politics involved in promoting global environment, the considerable lag in development of the poor nations puts them in a great dilemma as to whether to continue with their present route to develop and fulfil the promised dreams of their people or hastily change the definition of development as per the present-day nations of the people in rich countries.

However, the over riding conflict between poverty and environment appears to be somewhat overemphasized. For the level of environmental

degradation appears to be universal irrespective of the level of poverty and economic development. The only difference in the nature of environmental degradation in some regions (Industrialised west) conspicuous in terms of industry and life is style and induced degradation in others (developing world) is more in terms of natural resource depletion. These variations can be observed even within a country like India between fragile resource regions and well endowed regions. It is not denying the fact that the environmental degradation is equally bad in the green revolution regions where the levels of poverty and unemployment are substantially lower. Similarly, the environmental problems are more serious in the case of erstwhile USSR and Eastern Europe where the state ensured at least the basic needs. However, the developed countries (with high living standards and low level of poverty and unemployment) are capable of taking preventive measures for safeguarding their environment in terms of mitigating technologies (low in put intensive). On the other hand, developing countries can not afford to go for these technologies as their priorities lie in meeting the basic requirements of their people. But neither of the worlds is willing to change its life styles (the underlying assumption of the deep ecology paradigm) as the basic human psychology is same everywhere.

Availability of Resources- Different Perceptions:

Much of the concern over environmental issues stems from the perception that we may reach a limit to the number of people whose needs can be met by the earth's resources. This may or may not be true, given the potential for new technological discoveries, but one can say that continuing on our present path of accelerating environmental degradation would severely compromise the ability of present and future generation to meet their needs. In this regard perceptions and attitudes of the people towards environment and sustainability play a vital role.

At present, environmental concerns do not find place in policy planning due to the myopic attitude of the policy makers towards solving the problems of poverty and unemployment. It is important to realize that poverty and unemployment are not solely responsible for the current environmental problems and long run solutions can be sought by following environmentally sustainable path. Incorporation of ecological aspects into policy planning would largely depend on the awareness and attitudes of the people towards environment. As far as technologies are concerned, development of economically viable and environmentally friendly technologies would go a long way in achieving the objective of productivity and stability.

The theme "Environment and Development" is being intensively discussed at various forum in the country and abroad. The general understanding is that environment preservation and economic development are diametrically opposite to each other and the best that the society can opt for is to strike a balance between the two. Unbridled consumerism, which is the universal outcome of modern economic growth, does lead to the use of natural resources at a level which is not sustainable. Over and above the direct

demands on the natural resources, the life-style generally accompanying economic growth had led to serious pollution and resource degradation. Time has come when the trade-off between preserving environment and continuing growth is quite obvious. There is a need for demarcation of the areas of conflict and convergence between two desirable goals of environment up-gradation and economic growth.

In more recent years, attention has shifted from 'economic development' to 'sustainability' to ensure economic equity and social justice.

The sustainable development is meaningful only when the interests of marginalized and vulnerable sections of the population are safeguarded and their living standards are improved.

'Sustainability development' has become an important theme of environmental studies. As the concept of sustainability relates to people, their culture, life-style and use of natural resources, one has to deal with location specificity and that too at different levels, such as, local, regional, national and global.

Causes of the Environmental Decay:

(1) **Land and Water Mismanagement :** Land and water are the two natural resources which contribute a lot to human well being provided they are properly used. While water is a renewable resource, land is for all practical purpose a non-renewable resource. When water comes in the contact of land, it should benefit the latter and should not be allowed to damage it. The key to environmental quality, therefore, lies in efficient land and water management. In India attention has been given to use water resources for irrigation purpose only through major, medium and minor irrigation projects but required attention has not been paid to proper management of the country's land and soil resources for which they have been seriously degraded.

(2) **Deforestation :** Forest cover is considered to be a good indicator of the quality of the land. It has been estimated that about 20 million hectares of forest lands are affected by erosion. Moreover, large-scale deforestation in recent years has exposed sensitive catchments areas in the Himalayas and other hilly areas to soil erosion. Rapid flow of water causes floods and soil erosion. In order to prevent these, not only deforestation is to be arrested but tree plantation programme is to be undertaken on a gigantic scale.

(3) **Destruction of other Natural Living Resources :** India's living resources in its animal and plant heritage are immense. Their maintenance is of crucial importance for the future survival and development of the people. However, under the pressures of rapidly growing population and unplanned development of natural environment the habitants of our species are being lost or modified. Forests have no doubt received some attention from the point of view

of the production of commercial timber and play wood. Hence, teak, pine or eucalyptus trees have been planted, but virtually no attention has been given even to maintenance of species producing valuable minor forest produce.

(4) **Marine Ecosystems:** There is hardly any knowledge and understanding of valuable marine ecosystems in this country. Therefore, no protective measures have been undertaken to prevent over exploitation and destruction of these resources. The coral reefs protect the coastal areas from sea erosion. But this importance of coral reefs has not been recognized in this country. Since Coral reefs are rich in limestone, they have been thoughtlessly used for manufacture of cement in the Gulf of Manner (Tamil Nadu) and in the Pirotan Islands (Gujurat). The coral reefs even the Lakshadweep and Andaman Island are not safe. In the marine ecosystems coastal mangroves are also quite important. They protect us from cyclone damage. Further, they contain many unique species adopted to the unusual habit and are key nursery areas for many species of fish. Unfortunately, these mangroves have disappeared from most of this country's coastal areas. However, they still exist in the Sundarbans (West Bengal), Bhitarkanika Sanctuary (Orissa), Coringa Sanctuary (Andhra Pradesh) and in the Andaman and Nicobar Islands. These surviving Mangroves deserve full protection.

Remedial Measures:

Programmes to check growing ecological imbalance were undertaken during the Sixth Plan. These received greater impetus during the Seventy Plan. In recent years certain remedial measures to improve the environment have also been taken up, major programmes, including the thrust areas are given below:

(1) **Pollution Monitoring and Control :** The Central Board for the prevention and control of water pollution has been entrusted with the task of tackling pollution problems in the country. The basic tasks before the Board are: Assessment and control of water, air and coastal pollution, development of professional expertise and trained manpower to undertaken the job of pollution control, development of cost effective technologies for water and air pollution control and strengthening the Institutional R & D support for pollution monitoring and control.

In order to deal with pollution problems at the national level, the Central Board coordinates and supports the pollution monitoring and control activities of the State Boards. For executing pollution monitoring and control programme the country needs well equipped laboratories. The Central Board is required to develop trained manpower to deal with the pollution problems. This is being accomplished by conducting short and long-term courses in the field.

(2) **Environmental Impact Assessment :** It involves evaluation of a project or a programme which is likely to cause damage to the environment. Under the Seventh Plan, it was decided to set up a Technical Cells for environmental assessment. The cell would ensure that the project authorities carry out environmental impact assessment for each project at the stage of preparing feasibility reports. The Department of Environment is required to consider the approval of projects from the environmental angle, ensure compliance with conditions laid down at the time of scrutiny and document environment related experience. For this, appropriate structures are yet to be created.

(3) **Natural Living Resources Conservation :** These programmes have not received the required attention. Their existing weakness can be rectified through strengthening of the work of the Botanical and Zoological Surveys of India and also through the man and Biosphere Research Programme. The Botanical and Zoological Surveys of India were entrusted with the tasks of taxonomic investigations and publication of flora and fauna of India. They were also required to take up joint programmes for survey of living resources and ecological mappings.

(4) **Eco-development :** The eco-development programmes aim at restoration of already degraded ecosystem through implementation of schemes, such as land reclamation, afforestation, cleaning of water bodies etc. This programme also attempts to arrest further damage to eco systems and promote a conservation based strategy. In eco development programme the involvement of various voluntary agencies, schools, colleges and development agencies were involved.

(5) **Environmental Research Promotion :** In order to ensure scientific support for environmental management programmes, efforts aimed at promotion of environmental R & D are continued. The thrust areas for R & D have been identified by Expert Groups on Environmental Research and Man and Biosphere Programme. Accordingly, special attention is being give to:

(i) assessment of risks to sensitive ecosystems and development of norms for environmental management;

(ii) dynamics, ecology and resource management of tropical forests, wetlands, mangroves, grazing lands and arid/semi arid zones;

(iii) development of advanced technology for waste treatment and waste recycling;

(iv) river basin studies;

(v) biomass studies, energy/ecological balance and conservation;

(vi) environmental policy research; and

(vii) practical application of research efforts in environmental management.

(6) **Environmental Awareness :** The Government proposes to rely on both formal and non-formal educational channels for creating environmental awareness. The basic thrust of the programme to create environmental awareness would cover:

(i) incorporation of environmental themes in educational curricula;

(ii) encouraging non-government organizations and mass media to promote non-formal environmental education;

(iii) giving aid to various societies and institutions for environmental educations;

(iv) developing the National Museum of Natural History and setting up of Regional Museums;

(v) Promoting Manpower development and creating literature and audio-visual material for environmental education;

(vi) establishing centers of excellence in environmental education and research; and

(vii) setting up of interpretative centers in national parks, botanical gardens, zoos and biosphere reserves.

Issues in the New Economic Environment:

The sets of issues important to understand India's new economic policy and environment in recent years are:

1. The linkage between growth and environment;
2. Development strategies and the environment; and
3. Policies to prevent environmental disasters.

Under the first set of issues, the related questions are:

(a) Whether and to what extent there is a trade-off between growth and the environment.

(b) If such a conflict exists, what should be the guiding principles to prioritize between the two, while doing so we can not bypass the issue of technology and institutions involved in attaining growth as the growth, technology and institutions interact in a complex way to produce environmental repercussions. The issue is directly related to nature of the growth process itself.

Globalisation and Sustainable Development :

At global level both Govt. and outside have an overriding aim to remove poverty. And this should be done in a sustainable way in terms of the environment as well social justice. Poverty is multidimensional and extend beyond money incomes to education, health care, skill development and political participation at all level from local to global. It is also determined by access to natural resources, clean water and air and advancement of one's own culture and social organization. However, alleviating poverty requires much

more resources than now available to poor and developing countries. The developed countries should meet the requirement of resources (finance) and technology directly in terms of giving aid and indirectly by opening their markets to poorer nations. This form of indirect support is one way of making globalisation work for the poor. Therefore imposing environmental or labour restrictions on the free movement of goods and services in the name of selective aspects of sustainable development such as the environment or child labour, will intensify poverty in developing world.

Some innovative instrument can be used for raising resources to remove poverty & make success of sustainable development and globalisation. For example, specific multilateral levies on global natural resources used by rich countries such as the electromagnetic spectrum or marine fisheries to support sustainable development in poor countries.

The flip side of poverty in the developing world is the huge environmental toll of consumerist life styles in developed world. The per capita consumption of natural resources in developed countries is generally of the order of 20:01. In both absolute and relative terms such consumption of natural resources is inherently unsustainable.

Conclusions:

Though the paradigm of sustainable development is riddled with contradictions and conflicts at the conceptual as well as operational level, the much propagated conflict between economic development and environmental concerns seems to be less important in the light of socio-economic attributes like awareness and attitudes.

There are clear differences in opinion between economists and scientists. These differences in view point arise in part from ambiguities in and disagreements about the real meaning of sustainability in term of differing assumptions, perceptions and knowledge about :

The importance of environmental conditions and process in supporting the biogeochemical cycles;

The sensitivity of these cycles to disruptions by human activities.

The rate of resources use exceeding the rate of biogeochemical cycles in the natural component would mean disaster to growth and development. IUCN (1991) in Strategy for Sustainable Living proposed that sustainable use means use of an organism, ecosystem or other renewable resources at a rate within its capacity for renewal. Operating within the capacity for renewal is one of the key elements of sustainability. Daly (1991) gave a wide scope of the rate of resource use by specifying :

Rates of use of renewable resources must not exceed regeneration rates:

Rates of use of non-renewable resources must not exceed rates of development of renewable substitutions as ingredients of sustainability.

It can be seen that whether sustainable development is achievable or not depends on the time frame attached to its definition. The definition given by Brundtland Report does not specify which future generation should be considered in the consequence of today's human actions. Sustainable development could be achievable in the next 100 years as non-renewable natural resources are still available for the generations to come within the given time frame. Infinite availability as sustainability of non-renewable resources is an illusion.

The present reserves of resources should be managed to buy time for new technologies to be developed for harnessing other renewable energy resources. Depletion of petroleum resources is real and if no new feasible technologies for utilizing other forms of energy resources are in sight, sustainable development would become impossible.

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Project Planing And Project Appraisal vis-a-vis Our Approaches Towards Sustainable Development

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I. Introduction

As the projects constitute the building blocks of our development due to their intimate relationship with our planning process, all the investment decisions in a project should be appraised/assessed in its proper perspectives. Moreover, the decisions regarding investments have long-term impact on the health and well-being of our country in general and an organisation/firm in particular. Hence, in framing such programmes of development, a number of socio-economic aspects are ought to be investigated by the project planners and policy makers. There is, in the first place, a decision about the rate of investment-how high or low it should be. Secondly, there is a decision about the distribution of investment between different sectors- how much should be allocated to industries, to agriculture, to irrigation, to infrastructure development, to social services sector etc. Once these decisions have been taken, then at the third stage a decision about the projects to be chosen with each category of investment, their locations, plant outlays, and designs must be examined with possible alternative locations and designs for a particular project. Moreover, in a capital-scarce and planned economy like India, the need for good investment decision at macro level is beyond any doubt because there are various alternative investment opportunities each competing with one another while the total capital budget of an organisation or entrepreneur is limited Hence, there is a problem of selecting the best alternative investment project. However in recent years owing to greater awareness about environment and also due to pressure from the international forums/organisations like United Nations and World Bank the projects are approved not only on socio-economic considerations, (viz., profitability as the yardstick, which, no doubt, play an important role at macro levels of planning), but in terms of environmental considerations. The environmental aspects of a project have become more prominent after Earth Summit, 1992 where sustainability development had been focused as the key issue. In this paper an attempt has been made to examine the importance of sustainability approach at the micro level, i.e., at the stage of project planning and appraisal. The case studies examined by us have

established that lack of a sustainable approach at the stage of project planning has been responsible for the failure of many industrial, agricultural, tertiary and above all, the infrastructure projects, which in turn have slowed down our growth processes. The environmental concerns and policies involved with the projects as they are practiced today are subjected to many criticisms and have raised many conflicts and controversies.

II. The Issues Involved In Planning of Development Projects

One of the major issues associated with the development projects is how to bring reconciliation between the twin goals of higher economic development and preservation of the physical, social and economic environment. An examination of the schematic representation of our development process shows that environment plays a crucial role both in the demand and supply sides of project level activities. However, in spite of its integration in our planning, there are many unresolved issues and conflicts, which need further attention of the planners and policy makers. To add to it, the pursuit of incompatible environmental goals and services often result in conflicts. The broad issues that need the attention of the planners are:

- Is the site **chosen** the most appropriate one or not? Does it involve conflicts between various groups or regions?
- Whether the **technology** selected is the most appropriate on or not?
- Are the **Project Affected Persons (PAPs)** adequately compensated or not to regain their lost socio-economic status?
- Whether the **Rehabilitation & Resettlement Policies** of the authorities are acceptable to the affected parties or not?
- How are the **Common Property Resources** regenerated for the benefit of its pressure and future users?
- How to share the **joint products and Multiple Services ?**
- Whether all the **environmental dimensions** are considered or not ?
- Are all the **benefits and costs associated** with the project identified ?
- Are the flows of environmental resources **compatible** ?

In order to attend these issues and possible conflicts, economists and policy planners have suggested a number of policy initiatives. Even these policies have been reiterated in various international forums. One such policy initiative is to move towards achieving a **'sustainable development'**, that which is considered as new paradigm of progress of an economy.

Another issue, which has drawn the attention of economists and policy makers, is the concept of economic welfare because projects involve activities those are very much linked with the welfare of the society, i.e. aim of each development project is to maximize the social welfare function.

III Quest for Sustainability:

In the recent years the concept of 'sustainable development' is almost universally used in discussion of environment, technology, resources and economic development. It has become one of the catchwords of our economic policy. One of the vital questions that are raised in the context of sustainable development is that whether humanity can converge to an infinitely sustainable economy in a way that is reasonably orderly, peaceful and safe or whether it is on a one-way track of disaster.

Though the term 'sustainability' first came into use in forestry during the 18th century and required that the amount of timber that might be felled in one year be approximately equal to annual growth, so that the stock could be maintained and infinitum, the economic use of the term sustainability was built into the very concept of income, growth, population and physical resources. J.R. Hicks (1946) defined income as the maximum amount that a person or a nation could consume over some time period and still be as well off at the end of the period as at the beginning. But its use in the context of environmental economics became popular in 1970s. The Club of Rome's report 'Limits to Growth' was probably the corner stone that got the concept being popular in development. It focused the need of a balance between natural resources and its ecology and environment. It further established the complexity of interconnected problems of poverty, environmental degradation, industrialization and urbanization. The concept became more popular with the publication of the report of the **'World Commission on Environment and Development'** popularly known as **'Brutland Commission'** entitled *"Our Common Future"*. The Commission envisaged sustainability as *'meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.* The same notion of 'sustainable development' was further endorsed by the **'U.N.Earth Summit'** in Rio de Janeiro in 1992 and subsequently it was included in the **'U.N. Agenda 21'**.

IV. The Case Studies Undertaken by us:

(a) The Development of IERT Complex in U.P.

In 1983-84, the CST, Government of U.P. had approached IIT Kanpur to undertake the implementation of one ERT complex in the Kanpur (Rural) District for which the CST was willing to grant a sum of Rs.12 lakhs. As per the guidelines of CST experts of the IIT Kanpur finally selected the village, viz., Mariani in Chaubepur block for development of the ERT complex. Further, with a view to prepare the feasibility report of various activities in the project, based on the socio-economic data, a detailed household survey of the village was conducted during April-May 1983. Adhering to the suggestions and guidelines of the CST, the experts of IIT Kanpur had prepared a technical feasibility report comprising the energy complex and the rural technology complex in which it was envisaged to undertake a community bio-gas plant, windmills to pump water for irrigation, solar photovoltaic water pumping systems, solar driers and to supply smokeless ovens for increasing the

efficiency in wood burning and also to reduce the drudgery of women. The rural technology complex had also proposed to demonstrate the use of improved agricultural implements, material handling and transport systems, improved domestic appliances, simple and efficient water lifting devices, agro processing equipments, seeds reservation and some improved grain storage practices.

However, before the execution of the project, the experts decided to examine economic viability of each of the proposed activities were not undertaking the economic feasibility test they found that some of the activities were not economically viable nor sustainable. So, they proposed some alternatives and also suggested to incorporate R & D components, which were not accepted by the CST. There after CST approached JK Energy Centre to take up the project, which they readily agreed to. But after proceeding a little in the project, the researchers of JK group found the same problems, which were envisaged by the experts of IIT. By that time Non-Conventional Energy Development Agency (NEDA) had been established by the UP government which took over the project.

We had undertaken a post-evaluation study later on and our results have established that even at zero discount rate the social benefit-cost ratio (BCR) has been 0.74 and the net present value (NPV) a loss of Rs.4.01 lakhs. The corresponding figures at 10% rate of discount have been 0.55 and a loss of Rs.2.64 lakhs. Even the commercial analysis results have shown the BCR as less than one and the NPV negative. These results imply that the community bio-gas plant is a failure in the village and has proved to be unsustainable.

It has been observed that the complex is yet to generate any additional income and employment opportunities in the village. Among the important factors which have been identified as the causes of failure of the complex are:

(a) The unrealistic assumptions used in preparation of the technical feasibility report as per the guidelines of CST. A detailed analysis of these aspects had been undertaken. It was observed, "the field application of any science and technology project would be bound to fail if the social realities were neglected at the stage of project planning" (Rath, 1988).

(b) There are managerial failures at different stages of the project starting from the approaches of the CST towards implementation of the project to its operation and maintenance. There is hardly any commitment on the part of the implementing agency to see that the schemes deliver the results for the benefit of the common man in the village.

(c) There was no room for participation of the people in the promotion of the complex in the village. As the aspirations and priorities of the people could not match with the activities of the complex, they have developed antipathy towards the project. Gradually the few households who had agreed to supply gobar and to use the gas had withdrawn their participation.

(d) The solar cookers and other non-conventional energy devices had not generated any induced impact in the village due to their cost structures, which is still beyond the reach of any ordinary household due to their low income.

(e) There has been a lack of monitoring of the project by the government of U.P. to improve its performance.

(f) The NEDA has hardly made any attempt to restructure the activities in the complex by consulting the various experts from the technical or R & D institutions.

(b) The Effluent Treatment Plant in Kanpur under GAP

In the 1980s, the Government of India and Government of U.P. undertook the scheme of cleaning river the Ganges under the Ganga Action Plan (GAP) to provide a clean environment to the people of Kanpur City and down stream. The background of GAP implies a bilateral cooperation between the Government of India (GOI) and Govt. of Netherlands (GON), which dates back to the year 1987 with the start of the Dutch funded Indo-Dutch Environmental and Sanitary Engineering Project in Kanpur and Mirzapur. On the initiation of former Prime Minister Late Shri Rajiv Gandhi the Dutch Govt. supported the Ganga Action Plan in Jajmau pocket in 1987. At that time Jajmau was the worst pocket of Kanpur city with minimum urban infrastructure and housing the biggest cluster of tanneries. The objective of this scheme was to support the Govt. of India in its endeavor to clean the river Ganga under the Ganga Action Plan. Ganga Action Plan was initiated in three states of Uttar Pradesh, Bihar and West Bengal.

The Indo-Dutch Environmental and Sanitary Engineering Project (IDP) was initiated in the year 1987 and concluded in the year 1995. IDP was followed by the Institutional and Community Development Project (ICDP), which was started in March 1995 to facilitate Ganga Action Plan Support Programme (GAPSP) that started in 1998. As a spin-off to the Dutch Aided Indo-Dutch Integrated Environmental and Sanitary Engineering Project a project for the Institutional Improvement/Strengthening was initiated in 1996 namely Institution and Community Development Project (ICDP) in 1995. Another spin-off project is Dutch Aided Ganga Action Plan Supported Project (GASP) initiated in 1997. Under this project point of Kanpur on South of GT Road is taken as the project area. This project is looking not only into the overall Environmental improvement of the South Kanpur but also attending to some of the major bottleneck of the central city of the Kanpur City also.

Between 1987-1995, three Effluent Treatment Plants (ETPs) with a capacity of 167 MLD had been executed in the Jajmau Area in Kanpur under the IDP. The main objectives of the project were :

- To reduce the pollution load on River Ganga.
- To improve the urban environmental living condition of the population.
- Specially the urban poor in the project area of Kanpur and Mirzapur.

But our post evaluation study has revealed many gaps and loopholes in the project as a result of which the project has become a cause of environmental concern. The hazardous liquid waste disposal has posed serious problems in the down stream are of the city. The Technological Intervention in various forms have generated many negative impact in the vicinity. The Effluent Treatment Plant (ETP) set up under the Ganga Action Plan with Indo-Dutch collaboration, which discharges the treated water for irrigation has brought more curses than blessings to the villagers. The quality of treated water (which is very blackish in colour) is much below the required standards as we can see from the picture given below. The treated water is still highly contaminated.

The major problems associated with the ETP, which are borne by the nearby villagers those are using this treated water for irrigation purposes are:

- Yield of crop has gone down drastically. Majority of the respondents of our study area have reported that their yield gone down by 50% in case of wheat, paddy and berseem (local name for animal feed plant). In case of flower, it is a total disaster.
- Yield of milk has gone down by more than 30% for animal due to intake of contaminated water by animals.
- The decreasing soil fertility due to hazardous waste material in the irrigation water has become a major concern for the farmers.
- It is observed at many places that crops are burnt whenever there is concentration of harmful material in the water.
- The escalating population of mosquitoes in villages have posed serious health hazards. The size of mosquitoes have been bigger than before as the surrounding area has been conducive for their breeding.
- The problem of skin diseases has been gone up in the area. Moreover, many people have got their body deformed.
- The water discharged from the ETP has contaminated the ground water in the area, which has become hard.
- The aquatic life has got affected due to plant. The fishes die out if the contaminated water goes into the ponds made by the farmers.
- In spite of the social problem in the area, there has been no interaction between the public and authorities concern.

Hence, the municipal administrations need a revamping to cope up with the current needs of the people and also to contain the negative effects of the technology used by the authorities in tackling the infrastructure needs of the urban area.

V. Suggested Sustainable Managerial Tools:

In order to overcome the problems that the project authorities face in implementation and operation and maintenance of the projects, and also to ensure sustainability of the input availability and output supply so as to

maintain profitability we suggest that the planners and policy makers should adopt the following managerial tools:

(a) Life Cycle Assessment (LCA)

(b) Environmental Impact Assessment (EIA)

(c) Environmental Management Systems (EMS)

(d) Decision Management System (DMS)

The other managerial tools, which have bearing for sustainable development of projects, are:

- Cleaner Production Assessment
- Eco-Design
- Supply Chain Management and
- Regulations.

Some of the important tools that we advocate for sustainable development are discussed below:

Life Cycle Assessment (LCA) Method:

Like the human being, whose life cycle starts from the mother's womb, then birth, infancy, childhood, adulthood, old age, and finally death, each project has a life cycle. Since the environmental improvement projects like ERT Complex and ETP project have a long life-span and provide a number of direct and indirect benefits, each stage of its life cycle plays an important role in planning. Each stage needs a thorough scrutiny and examination. We have discussed below those stages and also examined the scope of each stage from point of view of long run planning.

The life cycle of a project can be broadly divided into:

(i) *Ex-ante phase (i.e. pre-investment stage for planning stage)*

(ii) *Post-de-facto Phase (i.e. post-investment implementation stage)*

The ex-ante phase includes:

(a) Conceptualisation stage,

(b) Identification stage,

(c) Feasibility stage comprising of:

  (i) Technical Appraisal,

  (ii) Commercial Appraisal,

  (iii) Economic Appraisal,

(d) Fund Raising Aspects stage

On the other hand, the post de-facto phase covers:

  (1) Selection of project,

  (2) Implementation stage

(3) Monitoring and Concurrent Evaluation

(4) Post Evaluation and

(5) Reformulation or Abandonment.

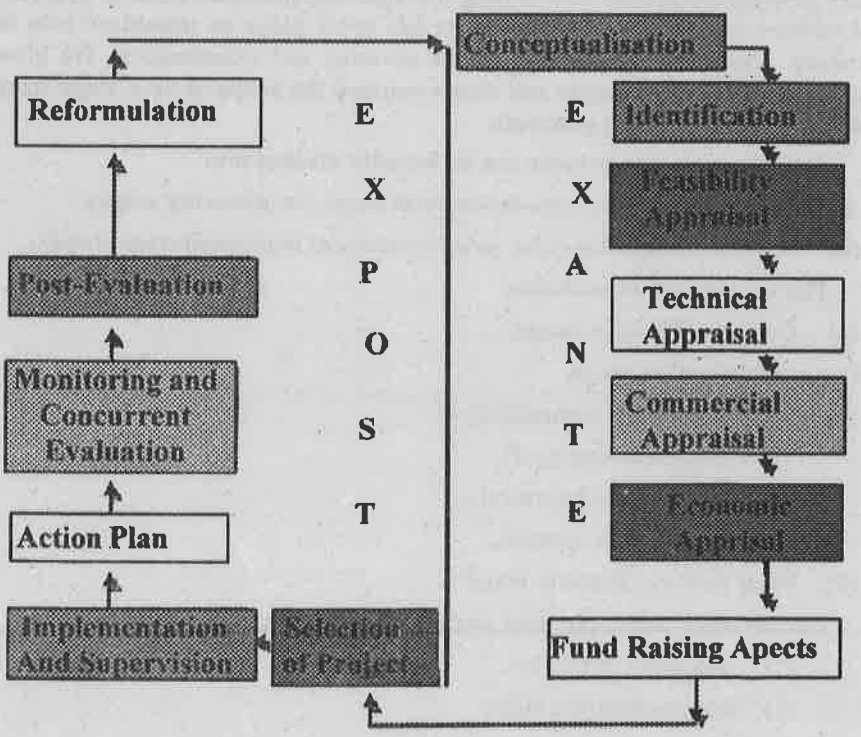
The above mentioned stage analysis that a project is being conceived of with conceptualisation, its birth takes place with selection of project, and its death comes with abandonment that is when the life of the project is over. A comprehensive model showing these aspects is presented below in a diagrammatic form:

Some of the important stages are elaborated below:

Conceptualisation and Identification Stage

Every developing economy is faced with some constraints and possesses certain development opportunities. But in a low-income country like ours, the constraints are numerous. While development opportunities are either less apparent or limited, investment requirements are many. Hence, projects should be properly planned with a view to have judicious exploitation of the limited resources. From the point of view of project identification, this criterion implies the observance of at least five cardinal conditions. Project should be:

Life Cycle Assessment of a Development Project



(a) Subjected to a rigorous examination to ensure their priority for the economy and especially for the sector to which they are related.

(b) Capable of neutralizing or minimising the inhibiting effects of constraints facing the development of the sector or sub-sector.

(c) Making the optimum use of scarce resources in the economy.

(d) Yielding a high rate of economic return to the society, and

(e) Ensuring sustainable development so as to accomplish its objectives.

In order to provide information necessary for comprehensive appraisal of the project the feasibility report be made covering the following aspects:

(i) Analysis of the sector to which the project belongs.,

(ii) Market analysis

(iii) Description of the location.

(iv) Technical aspects.

(v) Organisational and manpower requirements and their availability

(vi) Raw material requirement and availability.,

(vii) Cost analysis.

(viii) Financial analysis.

(ix) Economic analysis, i.e. the estimation of impact of the project including environmental impact on the national economy.

Since the main purpose of the feasibility report is to assist in the appraisal and decision making, in evaluating the project, the formulator should present the data in such a manner that estimates could be checked without much difficulties. The formulator should invariably quote the sources of information explicitly, state all the assumptions used in project formulation. Though some sort of educated guess cannot be avoided, the formulator should try to avoid guesses; instead, he should clearly state them so that they may easily attract the attention of evaluator. There is generally time lag between the preparation of the feasibility report and final decision. During this period, many variables especially prices may change. The formulator should therefore, present data in such a manner that it becomes easy to incorporate the impact of change in any variable. For this reason, the data of preparation of feasibility report must be indicated.

Appraisal Stage

Project appraisal or ex-ante evaluation of a project is carried out before the project comes on ground for implementation. It is process by which all the major aspects of the project are thoroughly assessed with a view to make a judgement on its worthiness. This process of appraisal is carried out at different stages of project planning. Once the project feasibility study is ready, the project is appraised for final selection; as a matter of fact some sort of appraisal

is carried out at every stage. At identification stage, projects are appraised for selection of pre feasibility stage. Similarly when the projects are selected for feasibility studies again there is some sort of appraisal. However, appraisal of feasibility reports for final decision is the most important form of appraisal. As indicated earlier, the purpose of project appraisal is to appraise the project worthiness, viability from different angles which includes the viability of the project from technical, commercial, financial, economic, environmental and organisational point of view. Under this process project can be recommended for selection, modification or rejection. In addition, the project appraisal techniques can be applied for the following purposes:

(i) To choose between the alternative techniques of production

(ii) To select between alternative locations.,

(iii) To determine the optimum allocation of common property resources.

(iv) To determine whether the investment in a particular project should be undertaken now or postponed to a later date.

Commercial Appraisal or Financial Appraisal

The commercial appraisal of project that follows the technical appraisal normally covers an examination of the arrangements and procedures for procurement of the goods and services required to construct the project and of similar arrangements for obtaining the necessary inputs for the operation phase of the project including measures for disposal of expected output. On the procurement of inputs, it is essential to ascertain the reliability of the sources of supply (domestic and foreign), the quality of inputs required, prices, freight costs, financial arrangement, storage facilities and provisions for the distribution of annual inputs in the project area. All these are **necessary to ensure that the best value for money** is obtained. On the output side, the purpose of the commercial review is to check the data, parameters and variables, used in demand projections and assesses the viability of forward price estimates and possible movements of price received and paid by the customers. The commercial review also covers a careful examination of prospective market outlets, arrangements for the storage and disposal of supply, effects of indirect taxes on the output, insurance cost and credit arrangement.

Financial appraisal covers two major aspects. The first relates to the reliability of project cost estimates, their composition in terms of loan and equity, local and foreign currency, the phasing of capital and current expenditures, unit cost of specific works, adequacy of contingency funds for unforeseen charges in the project works and rising prices, the source of funds, terms, conditions and legal arrangements on which funds are to be obtained. The second aspect covers a thorough review of the financial viability of the project from the point of view of project authority of the financing agency, and of the Government. The financial viability should also be carried out from beneficiaries point of view. This analysis includes a reexamination of the projects cash flow, the pattern of income and expenditure at project levels, the

net operating result the project authority, the adequacy of rate of return on invested capital and the scale of revenue accruing to the Government. In the light of this assessment, it should be possible to judge whether the financing plan of the project is sustainable or not. It would also help to establish the condition on which finance can be made available to the project e.g. the interest rate to be charged on loans, imitation on freedom to raise additional debt, procedures for the distribution of profits etc.

Economic Appraisal

The Economic Appraisal of the project re-examines the economic justification put forward in support of the project from the point of view of planned goals or development priorities. This, in turn, necessitates an evaluation of development priorities of the sector in which the project falls including an examination of the relative scarcity of resources to be employed by the project. The economic review gives the special attention to the criteria employed in measuring the economic costs and economic (or social) benefits, including the validity of the values of parameters used in measuring social costs and benefits, i.e. social rate of discounting, price of labour, foreign exchange, capital, inputs and outputs etc. The area of risk about the project itself and of general environment in which it operates are thoroughly reviewed, including the sensitivity of the project to change in the value of major parameters e.g. prices, yields, environmental impact, exchange rate, delay in project execution etc. The problem of course, does not end here. The economic calculations can only be meaningful to the extent to which costs and benefits can be quantified. There may be some costs borne by the economy which actually relate to project operation, e.g. investment in infrastructure to support the project or there may be indirect benefits resulting from the project which can not be quantified such as increased employment opportunities, better income distribution and future market expansion. All such indirect costs and benefits should receive a careful reexamination under the economic appraisal of the projects. In short, the following steps are involved while evaluating the project from the economic angle.,

(i) Identification of all costs and benefits (direct & indirect/secondary),

(ii) Revaluation of costs and benefits with the help of shadow prices,

(iii) Assign a weight/premium to group income redistribution,,

(iv) Assign a weight/premium on regional income redistribution,

(v) Assign some special weight on self-sufficiency,

(vi) Assign some special weight on merit want promotion,

(vii) Assign some special weight on saving and investment, and

(viii) Estimate the economic rate of return or NPV or SBCR or IRR.

The conclusions of economic evaluator are based on the foregoing facts and forecasts and must express judgment on the following questions:

1. Should priority be accorded to the needs which the project is designed to meet;
2. Is the project soundly conceived and likely to produce results which will meet these needs at reasonable costs?
3. Is the project suitable for financing and execution and what would be appropriate terms and conditions?
4. Is the project capable of meeting the needs of the present as well as future generations?

Environmental Impact Assessment (EIA)

EIA is a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-markers.

By using EIA both environmental and economic benefits can be achieved, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations.

The Key Elements of EIA are

- ❖ Scoping: identify key issues and concerns of interested parties;
- ❖ Screening: decide whether an EIA is required based on information collected;
- ❖ Identifying and evaluating alternatives: list alternative sites and techniques and the impacts of each;
- ❖ Mitigating measures dealing with uncertainty: review proposed action to prevent or minimise the potential adverse effects of the project;
- ❖ Issuing environmental statements: report the findings of the EIA.

Decision Management System:

In the DMS there should be a plan to ensure participation of all the stakeholders including the developer/contributor, bureaucracy, technocrats, end users of the product/services, and the PAPs Since ones efforts to develop a new project or any change is always subjected to criticism by environmentalists/activists, our effort should be to address the main issues and the remedial action plans. The basic elements that should go into any plan are partnerships and new institutions. In this regard J. Frank Yates (2003) in his recent book on *"Decision Management"* has suggested that there are **five key institutions, viz., commitment, a czar, decision management brown-bags, regular decision audits, and appropriate use of performance appraisal and compensation.**

VI Conclusion

Based on our empirical analysis, it is argued that the success of any development project necessitates that the policy makers should adhere to sustainable environmental managerial tools at the stage of planning of projects. It is suggested that to accomplish these objectives, the policy makers should adhere to the approach of EIA and LCA.

Hence, it is reiterated that in order to pursue the sustainability approach of development the planners and policy makers should adhere to proper project appraisal/evaluation, which encompasses an objective, analytical and constructive study of a project against its explicitly stated objectives. By undertaking proper appraisal/concurrent evaluation of a project one can examine many issues, such as, the relevance of formulation and designing, execution including land acquisition, R & R plans, adequacy of inputs and effectiveness of implementing machinery etc. Furthermore, one can study the intra-departmental and intra-sectorial linkages to identify impediments, remedial measures as well as the success and failures of a project in terms of sustainability.

The components of a project cycle as discussed above generally function in the same manner as our human body systems work. Human body is a complete system and the whole system has different components/subsystems. If any subsystem becomes weak or non-functioning, its immediate effects are observed in the whole system. Similar is the case with the different component of project planning. If any component/stage is given less importance or ignored by project planners, the chances of project failure would increase. Thus, for a sustainable project in terms of its success, there should be sound project planning covering all stages of project system, i.e., Life Cycle Assessment and EIA should be given priority.

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Sustainable Development in Orissa Issues and Options

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Introduction:

Development is a process that involves use of both natural as well as man-made resources. Economic development, in particular, is a highly resource-consuming activity. As it comprises production of goods and services for human consumption, understanding the process of economic development is quite necessary to measure the exact level of consumption of resources (both natural and man-made). The adequate availability of resources like land, water, forests, etc. are required not only for a healthy ecosystem, but also for a sustainable long-term economic growth. The attempt to unlimited production of consumable goods and services requires large scale exploitation of these resources, thereby causing of environmental problems like deforestation, desertification, soil erosion, global warming, Ozone depletion, salinity, water pollution, air pollution, etc.

The growth process causes continuous depletion and degradation of the natural resources. As long as economic activities are at a level below the regenerative capacity, there is no secular decline in the quality and quantity of these natural resources. The problem arises, however, when these limits are crossed and when secular decline in the quality and quantity of natural resources takes place (Hirway and Mahadevia, 1999). The problem can arise in two respects: when natural resources are overused (that is, the rate of use is more than the rate of regeneration), and when the discharges from economic activities are more than abating capacity of the nature. In both the cases, natural resources are depleted, degraded or polluted, which puts limit to the sustainability of growth process. Therefore, the limits put to the sustainability of growth processes are more in the case of non-renewable natural resources than the limits put by the renewable natural resources.

This paper is an attempt to discuss some environmental issues as a result of development process and to suggest policy measures for sustainable development in the developing economies, more particularly in Orissa. In the next section, we discuss the concept of sustainable development and then link the development strategies and environment in the third section. The fourth

section deals with the environmental issues as a result of development process. The last section discusses some policy measures leading to sustainable development.

Concept of Sustainable Development :

Development is a complex process. The approaches to measures development are varied in theory as well as in their practical manifestations. The qualitative measurement of economic development can be assured by the performance of various economic indicators like per capita income, per capita consumption, growth rate, etc. The partial measurement of development in terms of economic indicators is methodologically incomplete. Economic development, in addition to improvements in income and output involves radical changes in institutional, social and administrative structure as well as in popular attitudes, customs and benefits (Misra, 1982). This definition assumes development as a long-term phenomenon, and covers the socio-cultural dimensions of the development process. Similarly. Amartya Sen (1987) defines development as "a process of expansion of choice in life through improve capabilities". These capabilities, however, include not only the individual capabilities, but also macro level capabilities like better environment, safety and security etc. Both these definitions of development convey two important characteristics of a sound development model: firstly, development process should add additional capacity to existing potential and secondly, its impact should be all encompassing and comprehensive. These two themes of generating additional capacity and ensuring all round development of the society in long-run have attracted the attention of many economists and ecologists during the last three decades, which finally resulted in the concept of sustainable development.

The above definitions revealed the normative strands that guided the development approaches in different periods of time. So, the relevance of understanding the basics of development to have a definite meaning of sustainable development is of paramount importance. Sustainability is the core element in the meaning of sustainable development. The term has been defined in various ways, and has manifold interpretations.

The definition of Aldo Leopold (1994) is considered the logical predecessor of the modern conception of sustainable development. He argued that" it is the health of ecosystem that is of paramount importance: an environmental policy is right if it preserves the integrity of the ecosystem and wrong if it does not". This philosophy is perfectly consistent with natural resource, provided the use does not degrade the system. This definition also conveys a message that preservation of ecosystem and its individual units should be adopted as a policy measure for healthy survival of human being. Subsequently, Donnella H. Meadows et al (1972, 1992) propagated the idea of the 'Limits to Growth', which argued about the impossibility of infinite growth. This theory was an understanding of the development dynamics in developed countries. The pre-occupation of developed countries was the belief in the

strength of invisible hand (as propagated by Adam Smith) and capitalist model of economy producing material goods for consumption and luxury without laking into account its environmental implications So, the above two definitions can be taken as a precaution to the policy makers about the scarcity of resources and their efficient use.

The concept of sustainable development got wider acceptance after publication of the Brundtland Commission Report (1987). The Commission defined sustainable development as "a process which meets the needs of the present generation without compromising the ability of the future generations to meet their own needs". The alternative interpretation of this definition is that "Sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. The Brundtland Report was a watershed in development literature. It also implied important policy implications like adoption of environment-friendly production systems, preservation and scientific management of natural resources and protection of environment. Adding to this, another definition, which is relevant in the present context, is of Robert Solow (1992). He defined sustainability as making sure the next generation is as well as the current generation and ensuring that this continues for a time. All these definitions centred around two important dimensions of development. Firstly, environmental resources can not be regenerated keeping in pace with the present trend of consumption, and secondly, substitution of natural capital by man-made capital is feasible up to a certain extent and appropriate technologies should be developed in this direction. In this way, sustainable development requires efficient use of non-renewable resources, economic use of renewable resources and proper disposal of polluting materials at the rate, which permits their natural recycling etc. All these steps in totality will bring sustainability in the development process (Daly, 1990).

Development Strategies and Environment:

The development model implemented so far was capitalistic in nature and sought for increased production of material goods and services. The guiding principle under capitalism was that expansion of production and consumption would bring welfare for the society. The incorporation of environmental factors into the models was little recognised. It was because of the belief in 'invisible hand' and self adjusting nature of the economy. The logic of economic models was generally biased towards welfare whereas that of ecological systems to security. Economists who argued on the basis of growth models and trickle down hypotheses, that the problem of unemployment and poverty will be taken care of by the invisible hand coming through market forces and capital accumulation, soon started referring to development as distinct from growth (Kadekodi, 1991). So, under capitalism massive damage was caused to the environmental resources. Forest products like timber, minor forest produce, minerals, extraction of ground water, conversion of agricultural lands into

residential and commercial areas etc. are the important natural resources that were used in disproportionate proportions to increase output and income.

Similarly, under the socialistic era, as propounded by Marx and Engel, production and distribution were regulated by the collectivity. The production decisions and their equal distribution was the discretion of the collectivity. Though some changes occurred in development approaches that were transitory. The development experiences of countries following Marx-Engel line of thinking reveal increasing inefficiency and mismanagement of common property resources, and misallocation of environmental resources during the course of development (Kadekodi, 1991).

Then came the globalisation era in which private initiative got pivotal role. The squeeze of state intervention to regulatory level, opened new vistas for private sector to generate wealth. The process of liberalisation is new, but it has revealed some adverse implications on environment and human settlement. So the development strategies implemented so far could not be able to incorporate properly the environmental factors into the development policy. A lot depends on the actions of Government, corporate sector and people in general to protect the environment and the natural resources.

Major Environmental Issues:

For the above analysis, it became clear that some kind of environmental degradation is associated with development. As we know, the availability of environmental resources (land, forest, grazing land, water, clean air etc.) is scarce and their immediate substitution, though not possible, is also not feasible, then calculated use of these resources may ensure long term sustainability. The major emerging environmental issues identified by UNEP (2000) are fresh water scarcity, environmental pollution (chemical), invasive species, reduction in human immunity and resistance to diseases, collapse of fisheries and food insecurity. All these emerging environmental problems are concomitant of continuous degradation of land, forests, bio-diversity, water bodies etc. Besides the threat to basic natural resources, there has been disastrous effect of industrial pollution, automobile pollution, stock of solid waste in roadsides, etc. The emission of greenhouse gases, depletion of ozone layer, loss of resilience in bio-diversity, contamination of water resources are some potential threats to environmental sustainability. The negative impact of this type of degradation is detrimental on human livelihood. The adverse impact on immediate environment disturbs the conditions of local habitat affecting the poor by low agricultural yield, and continuous decline in agricultural productivity. So, the domain of environmental degradation is large and it needs careful understanding to adopt any policy measure. In brief, it can be aggregated that the ecological loss caused by development, from the ecologists/natural scientists view, are reduction in carrying capacity of the earth to regenerate itself and the extent of sink power. These two indicators represent the strength and resilience of nature to protect itself. Similarly, for economists and social scientists, the major environmental problems caused by development is the

reduction in the total stock of natural resources and its consequent impact on human survival.

The extent and severity of some important problems are discussed in the following.

Water Pollution:

Water pollution has reached epidemic proportions in almost all parts of the world. Water pollution causes serious health problems. The contamination of potable drinking water, flow of industrial waste into rivers and dumping of urban wastes are various forms of water pollution. The surface water sources like rivers, ponds, stream, etc. carrying industrial waste are being used by the people in downstream areas. The concentration of arsenic also affects human health. The increasing level of water pollution (surface) reduces water quality and causes serious illness among users. Besides that because of deforestation, run-off of rain water becomes higher in plain areas. In this way, the availability of safe drinking water is a rare commodity now.

The water quality of different rivers is found to be worst. Industrial and urban wastes are dumped into the rivers as a result of which rivers are getting polluted. Brahmani River, among others, is most polluted and poisonous due to the industrial waste dumped into it. A number of industries, which discharge wastewater into this river, are Rourkela Steel and Fertiliser Plant (Rourkela), Fertiliser Corporation of India (Talcher), Talcher Thermal Power Station (Talcher), National Aluminium Company Smelter and Captive Plants (Angul), ORICHEM Ltd. (Talcher). The river in the lower reaches passes through very populated areas from where domestic pollution load into the river is expected to be high. The water of this river is not suitable for use as potable water. It is also not classified as a source of direct drinking water without any kind of treatment or disinfection. Similarly, the rivers Mahanadi and Baitarani along with others are also polluted. Besides the pollution of rivers, community resources like ponds and tanks are polluted due to their misuse and continuous neglect (Meher, 2000).

Land Degradation :

Land has no longer been regarded as a free gift of nature. The burgeoning growth of population, massive increase in industrial development, concentration of a large proportion of people in urban areas put severe stress on availability of land. The economic value of land got increased along with the development process. Besides competitions for land for commercial use, a large-scale conversion of agricultural land into residential areas is taking place in all cities of the developing world. This symbolizes the poor management of land. Land degradation as a result of deforestation, decertification and mining activities aggravates the situation more. Against this backdrop, it is used to understand the proper use of land for sustainability. All these problems which are purely man-made can only be checked through scientific management of land. It is because poor land management increases susceptibility of soils to

erosion, reduce moisture retention and accelerates leaching of nutrients (UNEP 1997).

The extent of land degradation is severe in Orissa. Due to increasing population, the per capita availability of land is declining rapidly. The major factors that led to higher land degradation are soil erosion, shifting cultivation and degraded forest. Al these three sources combinely share 92.29 per cent of the total degraded land (Table.1).

Table-1: Status of Land Degradation in Orissa (Area in Lakh Ha.)

Sl.No.	Type of Degradation	1994 Assessment	% of Geographical Area
1.	Soil erosion	—	—
	a. Water	25.70	16.50
	b. Wind	—	—
2.	Ravines	0.18	0.1
3.	Saline	1.35	0.9
4.	Water logged	1.42	0.9
5.	Mine and Quarry Waste	0.97	0.6
6.	Shifting cultivation	1.84	1.2
7.	Degraded forest	26.56	17.1
8.	Total Orissa	58.02	37.3
9.	All-India	1074.30	32.7

Source: Meher (2000).

Deforestation :

Deforestation and desertification are two important environmental problems that have eroded the natural ecosystem substantially. The increased demand for forest produce, land hunger by the increasing population and poverty are among the main causes of deterioration in forest cover (Oberai 1997). Forest is a means of livelihood in Orissa especially in tribal areas. The tribal people collect fuel wood, fodder, minor forest produce for their sustenance. So, a good level of forest cover will ensure its dependents a sustainable source of livelihood. But, deforestation is a chronic environmental problems for Orissa. The forest areas have been used for various purpose including mining and developmental projects. As a result, the pace of degradation is higher than its regeneration. In Orissa the districts like Kalahandi, Koraput, Puri, Dhenkanal, Ganjam, Sambalpur, Mayurbhanj, Sundargarh, Keonjhar and Phulbani have forest cover of more than 30 per cent of the total geographical areas of the districts. At the same time, the decline in forest cover is also high in these districts (Meher, 2000). As per 1997 assessment in

all the districts except Phulbani Koraput, Kalahandi and Bolangir, the forest has declined significantly in comparison to a 1991 assessment. As we are concerned with the cause of deforestation, especially the activities promoted through the development process, the following table will explain various purposes for which forest resources are being used massively causing deforestation.

Table-2 : Deforestation Between 1980 and 2000

Sl.No.	Purpose of deforestation	Area (ha)	% of total
1.	Irrigation	5616	23.28
2.	Mining	7397	30.66
3.	Industries	2367	9.81
4.	Power transmission	2270	9.41
5.	Railway line	1910	7.92
6.	Defence	3865	16.02
7.	Road and building	216	0.90
8.	Misc:	483	2.00
	Total	24124	100.00

Sources: Meher (2000)

It is evident from the above table that deforestation is caused because of mining activities and large irrigation projects. The extent of deforestation is also severe, which can have deleterious effects like soil erosion, productivity drop, flooding, desertification, increased suffering to the landless labourers and tribal people depending on forest for their livelihood, etc. This questions the sustainability.

Exploitation of Mineral Resources:

Mineral is an important non-renewable natural resources of Orissa. The state has nearly 20 per cent of India's total mineral resources which include 98 per cent of chromite, 70 per cent of bauxite, 38 per cent of graphite, 26 per cent of iron ore and 24 per cent of coal (Govt. of Orissa: 1998-99). During the year 1995, mineral reserve in the state was 54599.9 million tons and its exploitation was 50.97 million tons (i.e. less than one per cent of the total reserve), showing a very low average rate of exploitation. Assuming that this rate (i.e., the rate of 1995) of exploitation of minerals will continue, it would take more than one thousand years to exhaust all the minerals (Meher, 2000), provided that no new reserves of minerals are discovered. However, minerals like graphite and lead ore would exhaust within two-to-three decades if the present rate of exploitation continues. The position regarding others is more comfortable.

However, the problem is that the rate of exploitation of minerals is increasing rapidly over time, posing danger in the future. The exploitation of

minerals in the state has increased from 2.8 million tons in 1947 to 51.32 million tons in 1995-96, i.e., by about 18 times (Meher, 2000). The exploitation is much higher in the 90s than the earlier periods. Therefore, the low average rate of exploitation cannot be a sign of relief to the state. Rather the increasing exploitation can pose a potential threat in the future.

Operationalising Sustainable Development-Policy Measures:

Sustainable development has been the primary goal of development policy in recent years. It is a goal that needs various means to achieve it. Sustainability is a process of change that takes care of both present and future generations. A lot of literature is available on the concept of sustainable development and its practical application. So, operationalising sustainable development requires the practice of the attributes of sustainable development requires the practice of the attributes of sustainable development approach. It also comprise necessary changes in regulatory, institutional and management aspects of the environmental policy. The policy measures that are to be employed to bring the development process into a sustainable path should be integrated and cost effective for quality result in future.

As population is growing at a steady rate, ensuring food security is the important task of the government. In such a situation application of modern technology is inevitable to increase output. At the same time, indiscriminate use of technologies for mass production affects environment adversely. This reveals the fact that there is increasing demand for material goods, which can only be produced with the application of modern scientific methods. So the practice of sustainable development should adopt process innovations instead of a cut in consumption level. The process innovation may be in the form of new method of production, new method of waste disposal and recycling etc. Similarly, equality should be maintained in the distribution of resources among its stakeholders. In a nutshell, it can be said that achieving sustainable development requires reduction of consumption, recycle of waste, and reuse of the recycled material (TERI 2000).

The above analysis gave us an idea about the broad theme on the basis of which environmental policy is to be formulated to operationalise sustainable development. The following policy measures are expected to bring sustainability:

(1) Adoption of clean technologies for production.

(2) Afforestation in forest and non-forest areas.

(3) Updating environmental law.

(4) Adoption of scientific recycling of waste and residues.

(5) Promotion of joint forest management.

(6) Environmental education and awareness.

(7) Development of non-pollution renewable energy system.

(8) Enforcement of the 'polluter pay principle' to seek industry support for sustainable environment management.

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Political Economy Of Sustainable Development

(Lessons From Kerala Model)

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Development is concerned with the enhancement of living conditions. Sustainable development is one of the many processes of development. It goes without saying that human welfare requires production and distribution of goods and services, which, depend on the availability or supply of four major factors of production or resources such as human capital, man-made capital, renewable natural resources, non-renewable natural resources. Sustainable development takes note of both the economic and ecological aspects of the resources. As a matter of fact a gradual shift in development paradigm towards sustainable development has been observed in the history of development. Sustainable development is development that meets the needs of present without compromising the ability of future generation to meet their own needs. Sustainable development is a process of change, in which exploitation of resources, the direction of investment, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. Sustainable development is a process of economic activities which leaves the environmental quality level intact with the policy directives corresponding to the notion being the maximization of net benefits of economic development for the present and future generation, subject to maintaining the services and quality of natural resources over time. The definition tries to combine efficiency with sustainability. The policy direction can be on equity, justice, technology and institutional changes.

As a matter of fact the present generation does not have the right to deplete the opportunities offered by current resources base since it does not own it. As long as all the profits (rent) from the use of extracted non-renewable resources are re-invested on either man-made capital formation or on regenerating renewable resource, the stream of consumption flows remains constant over generations. Rate of extraction of exhaustible resources and use of renewable resources are to be tuned as to arrive at such a rate that can be reinvested. It is now widely recognized that the goal of sustainable development

is an equity rather than an efficiency issue (Howarth and Nargaard, 1993) Economics can not logically be isolated from ecological science and political science. Externality can not be ignored any more. The collective action aimed at social welfare, a concept much dealt with by Amartya Sen, John lock argue that, distribution of the gains form economic activities should be guided by justice. Govt. can act as eminent domain, but its action may conflict with social justice.

Participation is a process of initiation and continuation of an active process by which beneficiary/clients groups influence the direction and execution of a development activity with a view to enhancing their well-being in terms of personal income growth, self-reliance or values they cherish including equity. The governance for participating development will include rules on sharing the benefits, responsibilities and dutics, transparency of the system and complete self governance. The Ninth plan ensures environmental sustainability of the development process through social mobilization and participation of people at all levels. The structural adjustment programme may have some effects on common property rights, medical plants, fishery products, flowers etc. Recent example is the exploitation of prawn and fish from Chilika lake in Orissa mainly for exporting, because of which the local fishermen have had to face hardship. Macro economic policies are ought to be conducive to environment and development.

The present paper makes on attempt to highlight how sustainability is a matter of distributional equity of sharing development opportunities between present and future generation and ensuring intragenerational and intergenerational equity in access to opportunities. The doctrine of sustainable development points to the possibilities of turning over development around, not only to repair the damage caused but to lay the basis for holistic development of the economy.

The paper intends to incorporate how economic sustainability in terms of sustained macro economic growth is a necessary, but not a sufficient condition for sustainable development in developing countries. Social sustainability has gained currencies in recent times which includes the strengthening of community based collective action for achieving goal of sustainable development the local groups playing a key role in regard to sustainable water and forest management. It goes without saying that environmental sustainability includes the up keep or improvement of essential ecological process, biological diversity, and the natural resource base. The concept of sustainable development suggests a potentially positive relationship between socio-economic development and environmental sustainability.

The paper is divided in to three sections Section I-as the introductory one specifies the problem/objective and the methodology of the study. The second section presents the strategies for sustainable development. The third section includes the standard arguments for Kerala model. The fourth section includes the lessons for community- based sustainable development, various

problems emerging out, importance of synergies between local govt. and civil society.

Earlier works in neoclassical growth theory incorporating natural resources constraints on economic activity (Hotelling 1931, Coase 1959, Solow 1974, Hartwick 1977, 1994, Daly 1991, Dasgupta 1997, 1999, Van Pelt 1993, Howarth, and Norgaard, 1992) have examined how there was a misconception that if all environmental externalities are correctly valued then the bill moves towards a sustainable development path. On the other hand the correct valuation of non-market environmental goods is essential for an economy to be efficient in its use of resources, it does not guarantee that the economy will develop sustainably.

The mainstream concept of sustainable development has focused on the relation between natural and produced capital. Proponents of this concept have rejected the notion that economic growth leads to environmental degradation. The outcome depends on the nature of economic growth. Growth can be made more environmentally sustainable and resources efficient through development of appropriate technologies and substitutes for non renewable resources (Pearce and Warford, 1993). Sustainable development also suggests that many environmental problems might originate from lack of development (for example poverty might be cause of environmental degradation and that environmental degradation can reinforce poverty.

High local and global inequality in wealth and access to resource can also lead to unsustainable use of resources, In 1980's and 1990's there was lot of discussions about how development and environment can be reconciled and how sustainable development can be achieved.

Strategies of sustainable Development:

The emphasis on natural and produced capital has also been reflected in the widely advocated market- based instruments to achieve sustainable development. OECD countries in particular have considered introduction of price incentive and market based measures such as environmental taxes, tradable emission permits system. These measures are guided by "polluter pays" principle. In case of less developing countries regulatory and market-based instruments tend to be ineffective because of state failure to control environmental standard and market failure to give right price signals (R. Veron, 2000). In less developed countries, community participation is believed to be most effective strategy because people depend directly on their local physical environment and thus have a genuine interest in protecting it (Ghai Vivian, 1992). Sustainable environmental management can occur where active local level support and participation exist. Local communities develop technologies that are well adapted to local socio-economic and environmental conditions. (Gibbon, Lake & Stocking, 1995), Such an approach tries to make better use of (renewable) human and social capital than the regulatory and market based instruments. The local adopted technical knowledge and positive social capital

in form of trust, local committees are regarded as appropriate units to restore and manage their local environment. Decentralization seems an adequate instrument for providing the appropriate political system that secures effective citizen participation in decision making. Locally elected representatives know the local situations and are better positioned to deliver certain public services. Physical proximity makes it easier for citizens to put pressure on local officials and hold them accountable for their performance. There has been rising interest in decentralization because liberalization and globalization in 1990's have undercut the scope for governance at the national level (Evans, 2000). But as a matter of fact empirical research has shown that decentralization can reinforce vested interests in existing pattern of patronage if there is no synergy between local Govt. civil society and an active central govt. that is committed to support the mass of the local people in the struggle against local power holders (Tendler, 1997, Crook and Manor, 1998).

The state of Kerala is located in the southwest of Indian subcontinent, on a narrow strip of land between the Arabian sea and Western Ghats. The state covers an area of 39000 km. and has 29 million inhabitants as per 1991 census. The state has the highest density of population in the world: 747 persons per km; as compared to 267 in India as a whole. Kerala has unique development pattern despite its poverty in terms of economic indicators. The state has a set of very high social indicators of development, Kerala's life expectancy is of 72 years, infant mortality rate of 13 per 1000, literacy rate 91% follow only slightly behind those of industrialized countries. Kerala's unique development pattern and its outstanding accomplishments achieved with little foreign aid and this kind of development through public action has become known as "Kerala model of development" Kerala offers how appropriate public action can improve social opportunities. Kerala can not however offer an easily reproducible model for other countries because of particular historical and geographical contingencies and conditions that facilitated the development of positive social capital and emergence of popular movements, creating strong accountability of the state (Sen, 1992). The new Kerala model tends democratic decentralization, decentralized planning. It is further noted that administrative decentralization was accompanied by financial devolution and the provision to ensure participation of citizens, panchayats and municipalities in the formulation and implementation of development plants (Rene Veron, 2001).

Conclusion:

It goes without saying that Kerala has now reached the stage of institutionalization. The model seems to rely on the same old Kerala model: development through public action by a responsible state and effective popular participation. Moreover the emphasis of state policies now shifted from welfare to participatory growth and from top-down intervention to bottom-up planning. The decentralized participatory planning explicitly aimed at increasing production and productivity in agriculture, alleviating ecological problems, including the depletion and pollution of resources, improving the quality of

social infrastructure, tackling gender injustice and deprivation of tribal population. As a matter of fact that Kerala model has pursued objectives of productive development, social improvement and environmental sustainability. (Veron, 2001) further more, comity-based projects can support sustainable development if people at grass-roots opt for environment protection and consider the needs for future generations, which have no say in the planning process. But the scope for environmental co-management is limited because of particular goods to be produced. Most environmental resources are under private control and agro-ecological system such as watershed has both public goods and private good characteristics. Another important factor is that community- based resource management can only occur between groups that have interests, whether common or conflicting in the same resources. Further the success of decentralized planning depends heavily on the commitment and dynamism of individuals, local govt. officers and development volunteers. The community-based sustainable development meets very conducive social conditions in Kerala. The population in cities, towns and villages is educated, informed, politically conscious and well organized. Kerala's prospects in achieving considerably sustainable development may be limited due to the failure to create private-public synergies at the macro level. Moreover community based sustainable development and co-management of resources are no substitutes for environmental planning.

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Population Growth, Indian Society And Appropriate Technology: Towards Sustainable Development

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I. Introduction

The most discussed question during nineties is whether human being will be able to survive in the new millennium. This doubt has been aggravated among academicians, scientists, technologists and economists since Earth Summit held in Rio-De-Jenerio in 1992. The race of global population growth, rampant air, water and noise pollution, inclination of modern society for comfortable standard of living say requirement of automobile, Air-conditioner, telephone, electricity etc. may spell significant trouble for human existence. It is unfortunate enough that this pace of development, so called modern technological development has led to environmental degradation and ecological cost. It includes continuous global warming, ozone depletion, unbridled exploitation of both renewable and non-renewable resources, pollution of air, water as well as noise and erosion of bio-diversity. The possible solutions for these issues include appropriate technology, efficient use of resources, minimization of waste and penalty for creating pollution. But these solutions are in dispute as the planners, businessman, and law makers are more involved in the process of needing more comfort at the cost of others. The root of this model of development lies in self-centeredness of human beings lack of attention for consequences and side effects of modern technology.

Sustainable development depends on the positive impact of economic activity upon the natural environment. As we know economic activity affects the natural environment and vice-versa, the state of natural environment affects economic activity. But the level of economic impact through modern technological development on natural environment is now such that its capacity to support future economic activity is in question. The present paper is an attempt to detect negative impact of modern technology, and suggest appropriate technology for the modern society through which some inputs can be given for a sustainable development of the economy.

The present paper concentrates on the following facts:

(a) To educate both masses and government the impact of each economic activity upon future generation.

(b) To develop and cultivate ethics in the scientific and technological development.

(c) To create awareness among the scientists and technocrats to develop appropriate technology, which will be socio-eco-friendly.

(d) To sensitize technocrats businessmen and industrialists for considering the unintended consequences of technologies and their impact on both society and environment while bringing technologies for the use of human being.

II. Sustainable Development: The Concept

The concept of sustainable development provides a framework for discussing problems and solutions for ecological imbalance in the environment. The most complete and useful definition is provided by Herman Daly who states that "sustainable economy is attained when rates of use of renewable resources do not exceed regeneration rates, rates of use of non-renewable resources do not exceed rates of development of renewable substitutes, rates of pollution emission do not exceed assimilative capacities of environment". While discussing the concept of sustainability it is rooted in three basic hypothesis. These are a) economic viability, b) environmental quality and c) social justice.

Economic viability can be achieved through proper environmental planning. The attention should be on identifying carrying capacity keeping population growth in view to bring the development, which can be sustained by the natural environment.

Environmental quality means the ecological sustainability through which we can meet current and future needs while maintaining a good quality of life.

Social justice can be achieved through holistic vision and socio-eco-sensitivity among the planners, administrations, lawmakers, economists and social scientists. Providing good quality of life to a small group at the cost of large ones should be abstained from.

Above all, a sustainable development is that which equitably provides scope for satisfying livelihoods and a safe, healthy quality of life for current and future generation.

III. Population And Sustainability:

Population growth is an important factor in worldwide sustainability. A majority of all people of earth live in the six most populous nations: China, India, USA, Indonesia, Brazil and Russia. The projected population size of these six nations is given in Table-1.

Table-1 : Population Size in Millions

	1998		2050	
Rank	Country	Population	Country	Population
1.	China	1255	India	1533
2.	India	976	China	1517
3.	USA	274	Pakistan	357
4.	Indonesia	207	USA	348
5.	Brazil	165	Nigeria	339
6.	Russia	147	Indonesia	318

Source: World Population Prospects 1996, UNO

This high growth rate is due to advancement of medical sciences and technologies, which cause reduction in death rate and extended life expectancy. As the world's population grows it is becoming more urbanized. In 1950, just 30% of the world's population lived in cities but by 2000 it reached 50%. Above projected figure of population growth will share more than 60% of urban population in the year 2020.

With the above figures of population growth and keeping sustainability in development, it has been a basic need to implement plans with some ethics. The following points to be noted to check population growth and urbanization.

1. Improvement in the status of women.
2. Widening the availability and enhancement of safety contraceptives.
3. Creation of moral value among the younger generation.
4. Importance on rural development rather than urbanization.
5. Creation of awareness 'to go back' to village and providing same facilities at par with urban areas.

Ethics for maintaining sustainability may be stressed as follows:

1. Socio-eco-friendly development through maintenance of necessary conditions for processes in an ecosystem.
2. Deeper analysis of the role of modern technology to keep the operation within the carrying capacity of the eco-system.
3. Up-gradation of nature and content of technological education in which awareness can be created to keep waste emissions within the assimilative capacity.
4. Education for producers to keep harvesting rates below the regeneration rate.

IV. Indian Society And Sustainable Developments:

Today, the most challenging task before us is to create a sustainable and desirable society. The main objective of this society will be with the attribute

of consciousness of sustainability. During last few decades the Indian society has developed with characteristics like a) self-centeredness among the people, b) lack of concern for unintended consequences of modern technologies, c) insatiable lust for money and d) no consideration for impact of technology transfer, so on and so forth. To bring a society having holistic vision for sustainability is the urgent need for development. The challenging jobs before us may be the following to bring such society.

a) To create 'political will' for innovation in planning for sustainable economy.

b) To create consciousness to reduce the material consumption which is inherently unsustainable.

c) To develop shared vision in order to create a society which is ecologically sustainable, fair, sound and secure.

d) Implementation of the shared vision should be such that multi faced happiness among the upper class at the cost of lower class will be reduced to a great extent.

V. Appropriate Technology

Modern technology has led to environmental degradation. The existing technological development has given sensual pleasure to the human society along with global warming, ozone depletion, and pollution of air, water and noise and erosion of bio-diversity. It has failed to compromise with the ability of the future generations. Numbers of examples are there in this respect. A few of them are as follows:

Example-1: Technology developed during 80's to produce plastic carry bags by Central Institute of Plastic Engineering Technology, New Delhi. This provides easy carrying facility without considering its sustainability. Production and use of such plastic carry bag has been so acute that Union Environment Ministry has been waiting for an answer to this weighty question to finalize rules for banning small carry bags. Now Indian Centre for Plastic in Environment and Tamil Nadu Plastic Manufacturers Associations are supporting and suggesting for banning the production of the carry bag.

Example-2: Recent news "noise causes cracks in Charminar" is another example of unsustainability. Vibrations caused by vehicles, coupled with high noise pollution levels have weakened the 400 years old monument and large crack has developed on its pillar. Archaeological Survey of India (ASI) suggested to prevent further damage to the already threatened monuments and to construct a buffer zone of thirty meters around the structure. National Geophysical Research Institute said the underground vibrations due to heavy traffic around the monument are way about the permissible level.

A number of examples will be there to support how modern technology has failed to maintain sustainability. In this juncture the need for "appropriate technology" is inevitable. Appropriate technology is the technology, which

identify, transfer and implement most suitable technology for a set of sustainable conditions.

Appropriate technology includes social factors that go beyond routine economic and technical engineering constraints. Identifying them requires attention of an array of human values and needs that may influence how a technology affects novel situation. Thus according to Richard C. Dortu, appropriateness may be scrutinized in terms of scale, technical and managerial skills, materials and energy, physical environment and social and human values".

VI. Conclusion And Suggestion

Sustainable development translates into better lives for people only if social programmes lead to certain liberties. A more general reason we should care about what happens to appropriate technology is that appropriate technology provides that liberty. Appropriate technology may not be the best choice in all situations but in some cases it has been proved best. The complex modern technology on the other hand is a threat, which results in a lot of imbalances in the process of sustainability.

Keeping in view the rapid population growth and lack of ethics and value in Indian society it is suggested that appropriate technology is most suitable technology for sustainable development. Appropriate technology may be a way to make people's life richer and safer. In conclusion the remarks given by Prof. Dorf, an appropriate technology is inevitable to accept it for third world countries like India. According to him, "We should care about the future of appropriate technology because the hardware promoted can be more effective than the alternatives because it promotes valuable social attitudes and also the approach reminds us to take a full range of factors into consideration when making a choice".

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Sustainable Development: Some Reflections

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The current concern for achieving development objectives without any ill effect either on the neighbourhood (in its widest meaning) or depriving the future generation of the benefits of resources use emerged after undergoing a long process of changes occurring both in technological as well as social and institutional set ups. The present emphasis is on sustainable development. That development calls for a continuous process of increased (or stable) production of goods and services giving ever increasing (or at least not decreasing) levels of welfare without jeopardising the interest of the future generation. Such a development process protects both environment and ecology. For any deterioration in any of these not only would harm the present generation but also cause immense injury to the future generations.

A glance over the process of development (earlier the concept of development was synonymous with growth) shows that the process started getting greatest momentum with Industrial Revolution, nd the subsequent growth of industrial capitalism. The flood of knowledge, particularly science and technology added further impetus to the economic growth process where the key elements emphasised were (a) nature could be conquered, (b) science and technology could provide a solution to every problem as and when arise, (c) traditional knowledge is useless, (d) ever increasing availability of goods would lead to ever increasing welfare of all the people.

Industrial Revolution (further strengthened through Second and Third Industrial Revolutions) changes in Economic and Social Institutions giving rise to capitalism and its further strengthening through colonialism and now multinational industrial structure, have led the human civilization to a state where amidst plenty, no one is happy. Every one is worried about what would happen to his offspring the future generation. Every one seeks what is called a sustainable development.

Let us look to a country like India which has long been considered as a country with a rich tradition, a country with rich reservoir of knowledge and a country that once was considered the most civilized country of the world. The Indus Valley Civilization and, for that matter all river valley civilizations, flourished in this country. The land was so fertile that it attracted many nomadic clans to fight for these. And today i.e. year 2002, India's land is only 2 per cent

of the world's land, fresh water resources are just 4 per cent of world's fresh water resources, but carry 16 per cent of the world's population and 10 per cent of cattle population. What a skewness ? As high as 23 per cent of Inida's land is barren and uncultivable; forests account for only 23 per cent and only 47 per cent of land is under cultivation. The pressure on land is enormous due to heavy population pressure. Between 1950 to mid nineties, per capita land availability has come down from 0.89 ha. to 0.37 ha. and is expected to fall to 0.19 by 2010.

The onslaught on land quality is stupendous due to irrational depletion of forest cover. It is estimated that over 5.3 billion tons of top soil (rich soil) are lost due to soil erosion every year. One must remember that nature takes about one thousand years to form one centimetre of soil. On this score imagine how ghastly is the soil erosion in India.

Look at what we have been doing to feed our population. For every ton of food foodgrains we produce we take out 105 kg. of nutrients from the soil. A cereal crop removes 35-46 kg of NPK to produce a ton, a leguminous crop absorbs 210 kgs of NPK to produce a ton of grain while fixing about 450 kgs of nitrogen per hectare per year. In nutshell, we have been raping our land to feed our population. Further, rampant and unjudicious use of chemical fertiliser turns thousand hectares of land unsuitable for cultivation due to heavy salinity. This process goes on unabated with the wasteful thinking that science will provide with an answer to tackle this situation someday and sometime. But when?

The entire process of unsustainability began with the capitalist mode of production with profit motive. The economic philosophy of laissez-faire strengthened the process and the unstated human greed led to merciless depletion of resources. It is now doubted whether the posterity will ever enjoy the same level of welfare. There is ample evidence to show world-wide that at the initial stages of growth, onslaught on environment is enormous. But with growth reaching a certain level, concern for preservation of ecology and environment grows and substantial resources are allocated for the purpose. The relationship between growth and environmental degradation is like the proverbial 'U' shape. The findings will induce some countries to go ahead with destruction of environment and ecology for faster growth. For once they are affluent, they think that they can take care of environment and restore it back with the help of science and technology. They forget that some losses are irrecoverable. Such is also the case with the knowledge. Traditional knowledge, how rich and useful may be, trampled by the force of modern scientific knowledge may be lost for ever. The western education has always taught us how to conquer nature. It never teaches, like Eastern Knowledge, how to live with nature.

There are several equally forceful views defending the present ethos of development based on science and technology. Many even question the very predictions about the future. It is worth quoting from the address of Shri Murli

Manohar Joshi, Minister HRD, Govt. of India, at the Brazilian Academy of Sciences in Rio-de-Jeneiro on 6th July 2001 (Monogram published by ICSSR) where he quoted R.B. Heap's famous writing- 'The future is difficult to predict and predictions are usually wrong'. However, future can be invented.

Mr. Joshi went further to question the sustainability of present level of consumption and said, "Could sustainable consumption become one of those inventions?.....If it is to become a useful means to achieve sustainable development, rather than an end in itself, then science, technology and industrial ecology will need to concentrate on reduction, recycling and reuse of everything in ways that are more common in the natural world. It is already possible to substitute less damaging consumption by replacing non-renewable and toxic products with less toxic products, ozone- depleting components with more benign ones, and coal by natural gas".

It should however, be borne in mind that knowledge, both eastern and western, have an important place in sustainable development. Ethics too plays a significant role in creating the mind-set. As long as a symbiotic relationship is not established between the two sources of knowledge, as long as the eastern philosophy is not appreciated, it would be extremely difficult to save our mother earth. Let us remember the Vedic Dictum:

Ayusodhaya Santhi,

Vanaspathaya Santhi,

Apah Santhi,

Prithvi Santhi

Let preserve the medicinal plants,

Lets preserve the flora and fauna,

Lets preserve water,

Then we can live peacefully on this earth.

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Sustainable Development and Governance

A Case Study of Decentralised Democracy of a LDC*

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There is enough in the world for everyone's need,
but not for everyone's greed

Frank Buchman[1]

The term 'development' basically means 'unfolding', 'revealing' or 'opening up' something which is latent. When applied to human beings, it therefore means 'unfolding' or 'opening up' their latent powers[2]. But generally speaking development could be conceptualised as a set or vector of desirable societal objectives or a development index, which does not decrease over time. Some of the objectives that are usually included in the set are as follows[3]:

- increase in real income per capita (economic growth);
- improvement in distribution of income (equity);
- political and economic freedom; and
- equitable access to resources, education, health care, employment opportunities, and justice.

Thus, development has multiple dimensions such as economic, social, political, moral and technical. But, the present emphasis is on sustainable development. As such development calls for a continuous process of increased (or stable) production of goods and services giving ever increasing (or at least not decreasing) levels of welfare without jeopardising the interest of the future generation. Such a development process protects both environment and ecology. For any deterioration in any of these not only would harm the present generation but also cause immense injury to the future generations.

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A glance over the process of development (earlier the concept of development was synonymous with growth) shows that the process started getting greatest momentum with the Industrial Revolution, and the subsequent growth of Industrial Capitalism. The flood of knowledge, particularly in science and technology added further impetus to the economic growth process where the key elements emphasised were (a) nature could be conquered, (b) science and technology could provide a solution to every problem as and when arise, (c) traditional knowledge is useless, (d) ever increasing availability of goods would lead to ever increasing welfare of all the people[4].

Industrial Revolution (further strengthened through Second and Third Industrial Revolutions) changes in economic and social Institutions giving rise to capitalism and its further strengthening through colonialism and now multinational industrial structures have led the human civilization to a state where amidst plenty, no one is happy. Every one is worried for the future.

The World Commission on Environment and Development (the Brundtland Commission) Wrote "Humanity has the ability to make development sustainable- to ensure that it meets the present without compromising the ability of future generations to meet their needs. The concept of sustainable development thus implies- the limitations imposed by the present state of technology and social organisations on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organisation can be managed and improved to make way for a new era of economic growth—. In the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are made consistent with future as well as present needs. Constancy of natural stock (including natural resources and environment) is a necessary condition for sustainable development. But the sufficient condition for sustainable development policy is to set up an institutional framework and a good governance system. (WCED, 1987:43)[5].

The definition covers both the economic and environmental dimensions of development and emphasises the need for ensuring intergenerations equity which means access of both present and future generations to basic necessities of life such as food, clothes, shelter, security, freedom, basic literacy, and health care on a long term basis. Thus defined, sustainable development is cherished by all individuals, communities and nations irrespective of their culture, religion and spatial locations etc.

Economic growth is the pre-condition for sustainable development, as it increases income and wealth to make it possible to improve our well being. Quality of life and well being are, however, not only determined by income and wealth but also by people's health, level of education, cultural diversity, environmental quality and the beauty of nature. Sustainable development must ensure fairer distribution of the fruits of development which lead to inter-

temporal, international, inter-class equity and gender equality. In other words distribution must be between generations, between the poor and among affluent nations.

The Criteria for Sustainable Development:

There are certain criteria which must be satisfied by the country/countries to achieve the global objective of sustainable development.

(a) The first criterion is to assess the demographic, social landscape and the rate of urbanisation. Here the question arises whether population growth can be maintained indefinitely?

(b) Second criterion is related to agriculture and food grains production scenario. Whether a country is destroying the ecological system to supply food to its growing population? There is clear evidence that in many developing countries, they are removing great deal of plant nutrients from land making them barren and unsuitable for future cultivation.

(c) Population growth, with higher standard of material living creates serious problems such as pollution of water, atmosphere and deforestation, which have adverse effects on the ecology. It is estimated that over 5.3 billion tons of top soil (rich soil) are lost due to soil erosion every year due to depletion of forests, whereas to form one centimetre of soil nature takes about one thousand years. Such ecological problems are not only confined to local, or national levels but also have implications for region/regions comprising several nations and international communities at large. For example, pollution of river water in India may have effects in Pakistan and Bangladesh. Deforestation in Nepal may have long-term adverse environmental impacts in both Bangladesh and India. In this way both local, regional and international communities may suffer. The depletion of ozone layer and green house gas emissions (due to industrialisation and urbanisation) not only affect one country but also have serious global implications beyond national boundaries.

(d) Sustainable development must also satisfy the criterion of promoting intergenerational equity meaning thereby that the current generation use the existing resources without affecting the potential material living standards of the future generation.

The western concept of development through its instruments of ever-newer technology seeks to achieve 'growth' through conquering nature. Technological development creates other problems of sustainability in terms of its effects on the users as well as on the society, both in the short and the long run. The Westerners, because of their own vested interest, would advocate that science and technology can always move a step ahead to tackle the problems in the process of conquering nature (use of pesticides and fungicides to control plant diseases or use of lime to reduce land salinity etc.). These

solutions, however, are always short-period solutions. Even if long term solutions are found out, they are likely to be over looked[6].

Since our earth is finite and non-growing, there is natural limit to several critical functions. Particularly, those relating to minerals, oil and gas. One cannot go on increasing the production of goods and services using the existing natural resources forever. There are ecological/ natural limits to economic growth which cannot be sustained for ever. The present environmental crisis is mostly due to increasing production activities to maximise output by using both human and natural resources including environment. Development through use of renewable resources sector including food grains, marine resources and livestock can only be supported within the framework of a sound ecological, environment and regional practices. The non-renewable resources are to be managed properly for sustainable development. Global efforts are also needed for efficient use of non-renewable resources, which the advanced countries would continue to import from less developed countries.

(e) Sustainable development requires that in the process of economic growth, we maintain our natural resources and environment intact by using only that much quantity which is regenerated naturally i.e., we live on "flows' and keep the 'stock' on natural resources and environment[7]. For example fish catch and prawn culture can be increased sustainably through artificial feeding and breeding; crop yields can be increased through application of balanced organic and inorganic fertilisers, pesticides, scientific soil and water management. Forests can be regenerated faster and their natural productivity increased through application of fertilisers and water. Thus, the carrying capacity of our biosphere in terms of living beings is, to some extent, amenable to augmentation through technological and managerial interventions. Therefore, contrary to what growth maniacs and technocrats believe, there are limits of economic growth, and also, contrary to what ecologists assert, the limits are not absolutely rigid; they can be relaxed. Proponents of sustainable development recognise this truth and advocate the middle path between the two extremes represented by technocrats, ecologists and to some extent by spiritualists by emphasizing the need to conserve and improve world's natural resources, and limiting the use of natural resources within the carrying capacity of the planet earth[8]. The spiritualists would advocate for restraints in consumption and acquisition by making a distinction between 'to have' and 'to grab'.

(f) Sustainable development assumes a process of an extension of human rights embracing civil and political liberties. It is worthwhile to quote the declaration of the World Summit: "We are deeply convinced that economic development, social development, and environmental protection are independent and naturally reinforcing components of

> sustainable development, which is the framework for our efforts to achieve a higher quality of life for all people. Equitable social development recognises that empowering the poor to utilise environmental resources sustainability is a necessary foundation for sustainable development. We also recognise that broad-based and sustained economic growth in the context of sustainable development is necessary to sustain social development and social justice". (Declaration and Programme of Action, World Summit for Social Development, March 1995).

From the philosophical point of view it is realised that to make development sustainable, nature is to be accommodated rather than conquered. Accommodating nature requires respect for tradition, knowledge, including ethics and religion. Sharing experiences of the people who know nature or who have inherited knowledge from their forefathers. It is desirable to learn from the existing stock of knowledge, rather than replace them irreversibly in the process of development. Alternatively sustainable development would mean accommodating nature through knowledge- the knowledge found in all disciplines, in traditions, in cultures and, in knowledgeable persons who may not be educated in the Western system of education.

Unfortunately today, development means consumerism leading to greed and lawlessness, sabotage of the laws of nature and even laws formed by the human society for its own survival.

Democracy has been considered as the form of governance that can achieve sustainable development. This has been also the view expressed in Project "250". Nagpal therefore writes "Indeed, there was reasonable consensus that a sustainable society must be democratic, with multiple for a for negotiation"[9]. (Quoted in Kar, G.C., Paper Presented in the International Workshop on "Good Governance and Sustainable Development" in Indian Ocean Ream Countries, University of Western Australia, Perth, Australia, 1996).

Although it is believed that in a democratic form of governance, through negotiations and discussions everything could be achieved for sustainable development, still the reality may be very different. In a federal structure, governance has multiple layers- National, State and Local. Their goals may run counter to each other, ultimately jeopardising sustainable development. What in reality is happening is far from the desired ones. Chilika, a huge salt water lake with an openings to Bay of Bengal provides an example of conflicting interests, leading to governance problems at every level, in a democratic set up ultimately questioning sustainable development.

Chilika, the brackish water lagoon has been a source of living for a large number of people living in and around it since time immemorial. They use small country boats to catch fish including prawn and crab for their livelihood. Prawn/ shrimp catch has been an age-old practice of thousands of fishermen of the villagers dependant on the lake. Things started changing when international

demand for prawn/shrimp went up enormously leading to entry of entrepreneurs for exploiting the marine resources of Chilika. Shrimp/prawn culture was taken up with great enthusiasm and huge investment. Due to competition among those who depend on it either for profits or for living, growth of population around Chilika began threatening the age-old fishing techniques and replacing it by motorised boats, nylon nets and shrimp culture, and an export market for tiger shrimps. There began indiscriminate exploitation of fishing resources. All these above are responsible for environmental degradation directly or indirectly in Chilika. This also has threatened the livelihood of thousands of poor people.

Due to shrimp ponds there is water pollution, oxygen depletion and land pollution etc. The protein feed used for shrimp culture is highly polluting. Besides fertilizer, therapeutants and drugs used for growth of shrimps pollute the water. Excess amount of phosphorous and nitrogen lead to 'hyper eutrophication' resulting in massivc algal blooms and oxygen depletion which are harmful to aquatic life. These blooms such as 'Red tide' cause fish mortality leading to environmental pollution. The continuous use of lime hardens the soil and loses their productivity for crops[10]. As no other seedlings grow in a shrimp pond and because of shrimp culture there is reduction in the natural growth of fish ultimately leading to stock degeneration in the lake.

Here the local people who depend on the lake for their livelihood suffer more because of commercial entrepreneurs. The entrepreneurs always want surplus of fishes because of profit motive. With more mechanisation tiger prawn exploitation has been started in areas of the lake. State's interest is natural. Greater the production of fish yield greater becomes the revenue by way of taxes and fees. The excess of profit means more export to outside and more income generation to the state. The local interest is directly linked with fish harvest. The greater the harvest, the better is the income level and life style. The local self-government in the area receives greater revenue from fishing sources. Hence, there is general reluctance to accept a policy of lesser catch. But, the Nation's interest is to preserve the fish. So, there is a clash of interest between the local people, entrepreneurs, State and the nation which is very difficult to reconcile. Probably an active judiciary can set the stage for stronger enforcement of the laws relating to ecology, environment and sustainable development.

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Population Growth And Sustainable Development Of Forest Resources

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Introduction:

Population of our country is growing by leaps and bounds. From a population of about 350 millions at the time of independence has grown to one billion by 2000, certainly a distressing picture. While world population is growing at the rate of three people every second and more than 2,50,000 every day, in India with the passage of two seconds outcomes a new child, as a result 55,000 children are born in a day and yearly output is 15.5 million. Supporting 16 per cent of the world's population in 2.4 per cent of global land in India has serious implications on the sustainability of forest resources due to their over exploitation. This paper therefore makes an attempt to study the effect of over population on forest resources.

Methodology:

Here the study has been undertaken collecting data in purposive sampling method from 5 officials of Forest Department of Cuttack district through development questionnaire. Besides this, relevant information has been collected from many published sources of certain government and non-government organisations.

Forest Resources:

Forests form an integral component of the biosphere. They are home for countries plants and animals that are vital elements of our life-supporting systems, as well as for millions of forest dwellers. They provide several products of daily use such as food, timber fire wood, wood pulp forage and fiber, apart from being a vast store house of medicinal plants. Which are yet to be fully explored and exploited. They are potent sources of many industrial raw materials. The greatest significance of forests, however lies in their critical role in maintaining ecological process. The National Forest Policy of 1952 recommends that 33 per cent of the land area of the country should be under forests. Contrary to this guide lines however forests have been under increasing assault since independence. Excessive exploitation of forests and over grazing have seriously decimated our forest resources.

Analysis:

From the cent per cent responses collected through developed questionnaire, it is revealed that there is threat to the sustainability of forest resources. There are various factors like human beings, livestock, forest fire, natural calamities etc. that threaten the sustainability of the forest resources. All the respondents are of the opinion that the loss to the sustainability is magnified when the factors causing it increase.

The nature of threat caused to the sustainability of forest resources differs from factor to factor. While the sustainability is threatened more by human beings and forest fire it is less affected by the natural calamities and the livestock.

According to the cent per cent respondents the loss of sustainability of forest resources is caused due to the rising demand for fuel wood, fodder for cattle population, raw materials for rapid industrialisation, valuable timber for house construction and furniture making due to growing urbanisation, unsystematic, unauthorised and unscientific felling of trees by jungle thieves, contractors corrupt officials, practice of shifting cultivation by tribal people, charcoal making by gold smiths and others, establishment of industries, construction of roads, irrigation, hydel and any other developmental projects. While 40 per cent of the respondents opine that sustainability is threatened due to rehabilitation of tribal people on the forest land, 20 per cent of them point out that seed and seedlings are damaged due to fire made by Kendu Leaf Wing of the Forest Department to regenerate qualitative kendu leaves.

The nature of threat caused by livestock to the sustainability of forest resources is by grazing and browsing. While cent per cent of the respondents give opinion in favour of the former, only 40 per cent of them give their opinion for the latter which is caused specially by the goats.

The threat caused by the fire to the sustainability of the forest resources is innumerable. While cent per cent respondents say that burning by the tribal people for shifting cultivation and fire made by the goldsmiths, antisocials for preparing charcoal is the major cause of loss of forest resources, 40 per cent of them say that burning for collecting mohua flower, driving game at the time of hunting, and promotion of forest grass by the graziers are the other causes for the depletion of forest resources.

Though the respondents say that threat to the forest resources is made by natural calamities like washing away trees by flood, eliminating rare species by drought, uprooting of trees and breaking branches by wind and cyclones and damaging of leaves by hailstorm, the damage caused by the natural calamities is negligible.

The respondents say that though heavy loss of revenue of the government is made due to felling of big trees by the forest thieves and plunderers but irreparable loss is caused to the forest resources by the people cutting small trees for fire wood, tooth brush and burning of forest for preparing

charcoal. They agree at the point that the magnitude of the threat increases when forest resources remain constant and demand for them increase due to rise in population.

The magnitude of threat to the forest resources can be determined from the demands for Fuel wood, Bamboo, Timber & Fodder due to rising number of human beings and livestock and the availability of the resources depicted in Table No.1.

Table No.1 : Requirement Of Fuel Wood, Bamboo, Timber And Fodder Per Annum In The State Of Orissa During 1991,1996 And 2001 AD.

(In MT & Cum)

Sl. No.	Items	By 1991	By 1996	By 2001
1.	Fuel wood for domestic use	115,61,600 MT	126,71,400 MT	138,87,600 MT
2.	Fuel Wood grade material for Industries	2,40,000 MT	2,40,000 MT	2,40,000 MT
	Total fuel wood	118,01,600 MT	129,11,400 MT	141,27,600 MT
3.	Bamboos for domestic use	2,08,142 MT	2,29,465 MT	2,48,842 MT
4.	Bamboos for paper pulp	2,60,000 MT	2,60,000 MT	2,60,000 MT
	Total requirement of Bamboo	4,68,142 MT	4,89,465 MT	5,08,842 MT
5.	Timber for domestic use	3,48,000 cum	3,50,000 cum	3,50,000 cum
6.	Timber for Industrial use	17,000 cum	17,000 cum	17,000 cum
	Total requirement of Timber	3,65,000 cum	3,67,000 cum	3,67,000 cum
7.	Fodder	335,24,200 MT	339,29,600 MT	343,66,400 MT

Source: Statistical Branch, Office of the Principal CCF, Orissa, Bhubaneswar.

It has been estimated that total requirement of fuel, wood, bamboo and timber in Orissa by the year 2001 is 141.28 lakh MT, 4.34 lakh MT and 3.67 lakh cum against which the production is only 1.35 lakh MT. 2.5 lakh MT and 0.18 lakh cum making short fall of 139.93 lakh MT, 1.84 lakh MT and 2.67 lakh cum respectively in Orissa. The figures above depict the magnitude of threat to the sustainability of forest resources.

Similarly the revenue receipts of the state from the forest products in successive years have been depicted in Table-2 which reveals the magnitude of the threat to the forest resources.

The revenue receipts of the state government from various forest products from 1990-91 to 1998-99 reveal that these have been reduced from rupees 109.08 crores in 1990-91 to 68.26 crores in 95-96 except slight increase in 96-97 and 98-99 to rupees 76.62 crore and 86.81 crore respectively. The figures above indicate the magnitude of threat to the sustainability of forest resources.

Table-2 : Revenue Receipts From Forest Products

(Rs. In crores)

Sl. No.	Item	1990-91	94-95	95-96	96-97	97-98	98-99
1.	Timber & Fire Wood	21.10	17.39	7.95	11.74	10.24	6.47
2.	Bamboo	6.45	8.91	10.02	8.74	9.06	8.52
3.	Kendu Leaf	76.85	71.09	43.58	47.86	40.60	63.50
4.	Others	4.68	8.21	6.71	8.28	13.21	8.32
	Total:	109.08	105.60	68.26	76.62	73.11	86.81

Source : Forest and Environment Department, Bhubaneswar.

Consideration the factors causing threat to the sustainability of forest resources, the nature and magnitude of the threat by them the determinants & processes of sustainable development have been found out by soliciting the opinion of the respondents.

It has been found that the level of population and the availability of forest resources are the two major determinants of the sustainable development of forest resources.

The process for the solution of the problem is not far to seek. The population of the state or the country will either be controlled or stabilized and the forest resources will have to be regenerated and the existing resources have to be protected.

Conclusion:

Considering the above problems and taking into account the responses of the respondents the following designs, strategies and policies are suggested for the sustainable development of forest resources.

(i) Besides the existing 'block plantation', 'Rehabilitation of degraded Forests', 'Farm Forestry', 'Avenue Plantation', 'Social Forestry Projects' with the assistants of Swedish International Development Authority (SIDA), the practice of agro forestry, water shed based farming system are highly pertinent.

(ii) Regions having more waste land should be used for afforestation.

(iii) Afforestation should be done either on land which previously did not carry forest or land which carried forest earlier.

(iv) Organising village resource management society (VRMS) is required for effective management and exploitation of natural resources.

(v) Some urgent measures in re-orienting the management practices and modifying the social/community forest afforestation models to ensure greater participation of the rural population.

(vi) Employment generation programmes and effective sharing of the benefits in social forestry programmes with the local population should be made irrespective of status.

(vii) It is essential to ensure greater co-ordination between government, people and voluntary organisations in regard to enhancement of productivity of forest lands under protective care and supervision.

(viii) The tribals rely heavily on shifting cultivation and traditional practices of forest exploitation. The right approach for them should be to plan for forest development in such a manner that there would be net addition to a perpetuating stock even after meeting the essential food, fodder, fuel and timber requirements of the people as well as growing requirements of commercial exploitation.

(ix) More funds should be allocated for forestry development.

Not only regeneration of forest but also protection of existing forest is vital for the sustainability of its resources. So the following measures may be undertaken for the protection of forest and its resources.

(i) Conservation of forest resources is to be ensured intensifying protective measures and enlisting people's involvement in their management. Forest protection committees (FPCs), Village forest Committees (VFCs) Vana Samrakhyana Samities (VSSs) are to be formed at village level to protect forest.

(ii) Deployment of forest protection force should also be extended.

(iii) Stringent laws should be passed to punish the forest thieves, plunderers of forest, contractors and corrupt officials. The recent Supreme Court judgement banning the felling and exploitation of forests is of great significant in this regard.

(iv) Newly, introduced Modern Forest Fire Control Project should be extended to all the regions Besides NGOs local clubs should also take a major role. Local community should also take stringent steps for controlling forest fire by way of imposing fine against the culprits.

(v) Public awareness is the key to effect a change in the attitudes of people and policies affecting the environment. So seminars symposia and conferences should be organised, exhibitions should be arranged and messages may be communicated through mass media like TV, Radio, Newspaper, pamphlets, leaflets, slogans, propaganda to create

awareness among the masses against the depletion of forest resources and their adverse effects on the environment.

(vi) A nationwide people's movement may be undertaken for scientific felling of trees, planned management of forest and judicious use of its resources.

(vii) Population stabilization through appropriate institutional fame work and governance system and conservation of forest resources in socially responsible manner are essential for promoting sustainable development of forest resources.

So we need to find a way to balance human consumption and nature's limited productivity in order to ensure that our communities are sustainable locally, regionally and globally. To achieve this goal and a higher quality of life for all the people, states should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

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Sustainable Development: One Missing Dimension

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The concept of sustainable development goes beyond the ethics of normal development process. It is the most challenging proposition that is equally concerned for both present and future generation. While it ensures all round development of people and society under the existing conditions of resource availabilities, it also takes every care to preserve the resources for meeting the needs of the people and society of future generations under the philosophy of equity, justice and protection. Basically, it controls wasteful consumption, maintains an efficient production system, avoids sectorial & vested in interests and conserves the exhaustible resources judiciously.

Process

The sustainable development is the most appropriate technology for complete socio-economic system with a long run perspective. But its process of operation appears to be difficult because of its very conceptual framework. Even the report of the World Commission on Environment and Development, 1987 admitted that arriving at a common definition of sustainable development remains a challenge for all actors in development process. Ethically, any development project to be made sustainable must be technically feasible and economically viable. It has to take into account the population factor, poverty factor, social justice factor, equity factor, and balanced growth factor while husbanding and conserving the natural resources and ecology with appropriate technology. In other words the carrying capacity of the development project ought to be guided by its supporting capacity and assimilating capacity that are inextricably linked with the environment factors.

Till recent years, in developing States in specific, the sustainability of any development project had been mostly based on the techno-economic feasibility. Even the concept of economic viability faced some transitional phases. In the initial years before forties, investments were for growth only. In post fifties, investments look for balanced growth. In the next phase, investment was planned for growth without destruction.

Orissa Experience :

Possibly, under these economic considerations and social returns along with natural and financial resource stock taking and prevailing technology availabilities, a number of industrial towns, urbanized centers, growth foci like in Rourkela, Cuttack, Bhubaneswar, Ganjam, Angul etc. development in Orissa. This sort of development was usually characterized by high mass consumption and pattern, centralized production system and a rational distribution process.

Negative Impacts :

But the sustainability of development is in doubt in regards to its negative externalities. The off shoot of industrialization, mining activities, establishment of social overheads and high mass consumption have been responsible for surfacing acute air, water, land and noise pollution hazards in both urban and rural areas. The added factors, are poverty and misused wealth which continue to afflict the states economy as a major pollutant. The inevitable consequences are being that Rourkela became one critically polluted city in India. All the industrial and mining towns of the state suffer from irreversible health hazards. The major perennial rivers are so polluted to become damaging for human consumption. Talcher and Angul have been included among the list of few environmentally hot spots of India. Acute Automobile pollution levels have immensely increased in Cuttack and Bhubaneswar cities. Forest area in the state is dwindling to less than minimum prescribed limit of 33%. Eco-sensitive forest area increased to more than 6 per cent of total forest areas. Annual rainfall shows a departure from normal rainfall. The state faced severe natural calamities at regular time intervals between 1965 and 2003. Mahanadi river is identified as most vulnerable to a 1 meter sea level rise due to the global warming. Fuel wood crisis worsens from time to time. These are only few examples of unending series of spill over effects of development activities in the state.

The Missing Dimension :

It was not surprising to experience such environmental catastrophe under the prevailing situation of population growth, poverty technology development and sea change in human needs and consumption pattern. While this was inevitable, one was inclined to search for the missing dimension of sustainable development i.e. environment variable. Of late, planners could feel the strategic need for integrating environment factor techno economic feasibility to mark the complete process of sustainable development. Thus the era of development without destruction that was seemingly sidelined so far has begun. In this context, the environment assessment is essential for the following reasons:

- ❖ It is a broader concept than impact analysis.
- ❖ It identifies all the forces that influence the use of natural resources by individuals, institutes etc. of the project.
- ❖ It identifies the problem areas in the course of resource use and misuse.

- It quantifies the positive and negative impacts of these forces by taking into consideration all physical phenomena, social economic forces, institutional arrangement and resources management.
- It offers policy options for minimizing the externalized cost of environment.

Data Need

Thus, the work can not be isolated as technocrat's job only. It essential requires a multi disciplinary cooperation. The environment data need, economic analysis and even technical analysis obviously ask for some supplementary and complimentary role of specialists like economists and statisticians. There have been uneasy concern by all major international, national and state level institutes in regards to the stock taking environment monitoring & evaluation, particularly in developing nations. UNEP expressed its serious concern about the weak and fragmentary data base on stock taking on environment problems for developing countries. World Bank is also equally concerned about the inadequacies of reporting system on environment assessment. Even Central Pollution Control Board of India very often fails to its commitment on environment measures due to inadequacies in the scientific and physical data base system. 9th plan sees environment statistics as a major criterion. In realizing the gravity of environment database needs and their impact analysis, it is imperative to explore the strategic role of Statisticians and Economists both in public and Private sectors.

Statistician's Role

The statistician's role in regards to the environment information system begins much before the establishment of a development project. His job extends to the following requirements:

- Inventory of natural, physical, human and financial resources.
- Existing status of land, soil, water, forest, wildlife, human settlements, air etc.
- Identification environmentally sensitive areas.
- Economic, social and cultural profile of the area.
- Surveys, Statistical analysis of case studies, research studies, etc.
- Presentation of environment data. Evaluation process.
- Projection of socio, economic, demographic, natural, physical, and environmental profile of the area.

Economist's Role

It is a unique coincidence that economy and ecology, the two conflicting issues, were originated from the same Greek word 'OIKO' i.e. Habitat or Household. The process of sustainable development has consolidate the decisive role of economist along with that of technocrat in environment assessment. Environmental analysis is rather treated as applied welfare

economics. The scope and coverage of economic analysis extends from preparation of pilot project level to the post development care. It covers the following areas:

- Determination of private and social costs of polluting goods.
- Determination of production and distribution of outputs.
- Rational allocation of natural resources.
- Determination of taxation, incentives and price control for polluting agents.
- Sensitivity analysis to environment.
- Assessment of externalities caused by polluting agents.
- Cost-Benefit analysis of environmental factors.
- Deciding the consumption, production and investment pattern and priority sector in accordance with the environment impact analysis.

Concluding Remarks

Hence, while delimiting the field of analysis on environment in multidimensional pattern, it is the coordinated efforts of the multi-disciplinary agencies like SET i.e. Statistician- Economist-Technocrat which can ensure a complete and efficient system of environment assessment and consequently an effective sustainable development process. Of course this missing dimension of environment information system is gaining recognition from global to micro level in recent years. SET faces an uphill task in coming years in search of harmonious and quality OIKOs. Establishment of a perspective Nodal agency for SET at State level might be the rightful answer to build up the strong edifice of sustainable development.

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Inactive Administrative Machinery, Over Exploitation Of Natural Resources And Emerging Environmental Problems: A Study Of Some Hili-Tract Villages Of Balasore District

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Introduction

The environment is considered to be an important asset of the society. For a sustainable development, protection of environment is barely necessary. Now-a-days, 'Protect Environment and Save Mankind' is the global slogan. The advanced countries have framed and implemented several policy measures in order to control and manage environmental pollution. In developing countries, people have already started realizing the fact of environmental problems, but the policy measures framed till now for pollution abatement are not much fruitful on account of several reasons in which 'inactive administrative machinery' is being found an important one. In India, the failure of administrative machinery in controlling environmental pollution is largely attributable to some internal factors. Out of which three are most crucial, e.g.(i) negative role of local politicians for the sake of their vested personal interest, (ii) higher degree of corruption at the administrative levels, and (iii) non-cooperation between pollution control boards and administrative/judiciary bodies. This piece of study will authenticate the above facts.

The main objective of the study of environmental problems in a typical hill-tract areas are to:

- Examine the processes of exploitation of natural forest resources,
- Investigate into the matters of environmental problems emerging from the over exploitation of forest resources,
- Evaluate social costs and social benefits of resource exploitation through introspection, and
- Critically discuss the policy steps undertaken by the administrative bodies and pollution control boards.

The hill-tract areas of Balasore district (Orissa) are chosen for our sample. The study is mainly based on primary information collected through personal investigation. The villagers in the above areas are interviewed by personal

direct contact. The hill-tract villages, hills, forests and quarries are visited by us. The findings of our survey are summarized in three sections.

SECTION-I

Over-exploitation of Forest Resources and Emerging Environmental Problems

The south-western part of Balasore district comprises hill-tract areas where more than a hundred villages are located. A large number of villages remain under the jurisdiction of Nilgiri Sub-divisions. All these villages are adjacent to the ranges of 'Nilgiri' and 'Devgiri' hills. Some villages (more than fifty) remain in a valley formed by the two hill ranges of Devgiri and Nilgiri which mostly come under Soro block of Balasore Sub-division. All hill-tract villages including their adjacent hills, some years ago, were full of flora and fauna. Arable lands in these villages were highly fertile and farmers were rarely using chemical fertilizers or farm-yard manure. The entire area was full of natural beauty. The beautiful hills and green scenery of the villages particularly in the valley region were attracting many tourists from distant places. But, today, the scenario of this area is totally different. The green area has been converted into grey area due to human interferences. The people, who once upon a time were leading peaceful living, are under the grief of fear, terror and suffering due to acute pollution and damage of their properties. Over exploitation and indiscriminate use of forestry resources by some selective groups of persons have created the above problems. Contractors, stone-crusher owners, thhikadars and some tribal communities generally belong to these groups. These people exploit forest resources directly or indirectly in different manners. Each manner of exploitation has distinct adverse impact on the environment and human. Some selected modes of exploitation of forest resources and their adversities are discussed below.

A. Quarrying and Blasting of Hills

In hill-tracts, some pockets of forests come under the jurisdiction of revenue department which are indiscriminately leased out to contractors on rental basis by the concerned Tahsildars, and a major part of forests and hills is governed by the forestry department of the state which is not leased out. There is no clear-cut demarcation on the surface between revenues areas and forestry areas on account of which in many instances there is encroachment to forestry areas by miners for quarrying. Many contractors, in pen and papers, are granted leases for quarrying in revenue areas, but practically, they locate their quarries in forestry areas for more benefits. These matters are rarely investigated by the revenue departments.

Now-a-days, almost all contractors of quarries are habituated with the practice of serial blastings of giant stones and hills with the help of highly explosive and hazardous materials. On a piece of giant stone, hundreds of holes are drilled by compressor and then, all the holes are filled up by explosive materials, and with the help of remote-control device, all are blasted one after

another. Each blasting causes thunderous sound. Hundreds of small pieces of stone are shot up and scattered around a half Km. radius. Since these blasting places are very close to villages and human settlements, the inhabitants of the villages suffer from these blastings in various ways. The shot-up stones very often reach villages and human settlement and damage houses and injure/kill human and domestic animals. Besides this, the pacca buildings in the nearby villages are badly damaged due to heavy vibrations caused from blastings. Again, since many blasting units are located within dense forests, the shot-up stones also ruin flora and fauna surrounding them. Wild animals and birds are leaving the nearby forests. The main purpose of the contractors using the above blasting technology is to produce at massive scale and earn huge profits. Although the magnitude of pollution due to stone blasting is not accurately known, yet we can say that it must be heavily polluting air and directly hitting the ozone-layer. From this, one can judge the magnitude of negative externalities of the stone blastings. The society has to bear the highest cost on account of the usage of the present blasting technology. According to our survey, the hill side villages under Mahumuhan and Gopinathpur Panchayats are mostly affected due to regular practice of stone blastings and quarryings.

B. Mushrooming of Stone Crushers

Mushrooming of stone crushers within hill-tract areas has posed people to several types of pollution. Just before ten years, there were only two to three stone crushers in the entire hill-tract areas. Now, there are more than a dozen stone-crushers in operation and three/four are in the process of completion. Stone crushing machines create three types of pollution: (i) sound pollution, (ii) air pollution and (iii) stone-dust sedimentation on the nearby cultivable lands. Particularly, in Mahumuhan and Gopinathpur panchayats, at every 2-3 Kilometers distance one crusher plant is situated. Most of the crushers are located at roadsides and village sides. While a crusher operates, it creates thunderous sounds which reach far-off villages and crates clouds of stone-dusts which spread out over a half Km. radius. Due to heavy sound pollution from the stone-crushers, particularly the school children in the surrounding areas are severely affected while the study in schools or at homes. Since the timing of crusher's operation is not fixed, many also operate during the night hours. People in the surrounding areas cannot sleep peacefully in the night due to thunderous sounds blown from stone crushers and stone blastings. Due to stone-dust pollution at massive scale, many people in nearby villages have reported of being prone to lung-diseases. The patient records in hospitals in these areas authenticate this matter. There are reports from the farmers that arable lands surrounding a crusher-campus are silted up to two-to-three inches thick annually by stone-dusts blown from the crusher. This significantly reduces the fertility of land. Unfortunately, many owners of these lands are poor farmers. They cannot raise voice against the crusher owners since these people are economically more powerful and have a strong nexus with the local politicians and corrupt officials. Besides these pollutions, sometimes, the crusher-owners create traffic problems as well. As said earlier.

many crusher units are located at the sides of many busy roads. In the peak seasons, when the premises of the crushers are not sufficient to dump materials, the public places like the nearby roads are used by many for stone dumping. This congests the roads and causes traffic-jams. In the past, many road accidents at the above places were mainly due to road-blockages created by the crusher-owners.

C. Quarrying Amidst Dense Forests

There are many instances, particularly in Mahumuhan and Gopinathpur Panchayats in Soro block, of quarrying amidst dense forests and at high altitudes. This has caused environmental problems in three ways: firstly, for locating a quarry, on average, one-to-two hectares of forest area are cleared which directly affect flora and fauna; secondly, due to crowded interference of quarrers at the forest side, the inhabitations of wild animals and birds are severely disturbed and become unsafe; and thirdly, a large scale deforestation and quarrying at high altitude cause massive soil erosion and landslide due to which small stones, sand and mud are carried down by rain water and silt cultivable lands. Every year, cultivators in the surrounding areas have to bear heavy cost for clearing these silts. Quarrying amidst forests and at high altitudes implies a greater degree of negative externalities on the society. From social angle, quarrying amidst forests and again, at high altitudes would be highly objectionable.

D. Massive Deforestation for Hill-side Cultivation (Pud-chasa)

Recently, a peculiar behaviour among tribal people is found in respect of their cultivation process. In earlier times, many tribal people, for their livelihood, were collecting fire-woods and forestry-products for sale in the markets at remunerative prices. The amount earned by them was adequate for their survival. Now-a-days, a commercial motive is inducted in their minds. Many tribal families in the hill-slopes and hill-tops (at the altitude varying between one-to-five thousand feet) for 'pudu' cultivation. Between 'Nilgiri' and 'Devgiri' hill ranges, there are about more than five hundred units located each one at the distance of 3 to 4 Kms. Each unit comprises of, on average, one-to-three hectares of forest area. Total forest land area covered by 'pudu-chas' is about 1500 hectares. Again in every 2 years, the cultivation spot is shifted which is done by further clearing of forests. From this, one can imagine the magnitude of damage to the forests and inhabitations of the wild-lives. For forest clearing for 'pudi' cultivation the tribals are habituated to cutting timbers and burning forests. This has caused ecological imbalance, massive soil erosion and landslide. The arable lands beneath hills are covered with silts and stones carried down by rain water. For clearing these silts and stones, the concerned farmers spend a lot of money annually from their own accounts.

Although the local politicians and administrators knew all these activities, yet they were silent because they did not want to displease the tribal community by raising voice against those practices, merely for their political interests.

E. Charcoal Preparation and Damage of Timers

Some tribal people are also habituated with the practice of charcoal preparation by cutting and burning timbers in the dense forests. This generally happens in Devgiri hills where timbers are plentily available. According to a report of some experienced people, for preparing one quintal of charcoal, at least, one hundred quintals of timbers are burnt. From this, one can imagine the extent of loss of timbers in the forest for preparing hundreds of quintals of charcoal at a time. This causes many environmental and ecological problems.

F. Clearance of Fallow-lands and Cultivation in Undulating Hill-slopes

A new trend in the cultivation process of the tribal communities is found. The public and hillside fallow-lands are cleared for the cultivation purpose. The undulating lands on the hill-slopes are cleared and cultivated. Of course, these are illegal encroachments to the hill and forest lands by the tribal communities. Some tribal people, due to shortage of space for housing, select settlement amidst dense forests. These activities have added to the problems of soil-erosion, land-silting and ecological imbalance. The total forest area is gradually shrinking.

According to our survey, total population depending directly and indirectly on the above forest activities constitute only 3 to 5 per cent. Over exploitation of forest resources by this small proportion of population in the concerned areas has augmented the environmental problems and negative externalities on the society in the recent years. The major forms of environmental problems are ecological imbalance, air pollution, sound pollution, soil erosion, landslide and silting of cultivable lands. As a result of deforestation and quarrying and stone-blasting at hill-slopes and hill-tops, the water flow of many natural springs between Nilgiri and Devgiri hill ranges has largely been reduced. Consequently, the cultivation depending mainly on the above spring water is severely affected.

Besides the above problems, the other negative externalities on the society are in the forms of child labour problem, scarcity of agricultural labour, unwarranted hike in wage rates for the agricultural labourers and increase in anti-social elements.

Expansion of quarries in the nearby hills and attractive wages for quarrers have brought about some problems for the children (below 14 years) in these areas. In each unit of quarry, the average number of child labour is estimated to be five. The children regularly work on full time basis. The total child labour in quarrying, stone blasting, stone-crushing and other related activities constitute about 30.0 per cent of total labour force. Since the payment to child labour for the above activities is very attractive to the poverty stricken families in these areas, the parents in these families compel their children to stop schooling and work in quarries or in stone-crushers along with them. According to reports of teachers of different primary schools in these areas, the schooling dropouts of children (of poor families) aging between 8 and 14 years have

tremendously increased over last five years since the very days of mushrooming of quarries and stone-crushers in these areas. The administration is quite silent towards this matter.

Another problem has occurred in the field of agriculture in these areas. Since the wage rates and per day earnings of the labourers in quarries and crushers are relatively much higher as compared to those in agricultural activities, almost all labours run away from agriculture, which creates acute labour shortage for the latter. Wage rates for agricultural labour in these areas have increased to Rs.60/-, which is roughly Rs.20/- higher than the government rate. Due to sharp increase in wage rate for agricultural labour, the agriculture has become very expensive and less attractive profession in these areas.

There is an increasing trend in the flow of unwarranted and black money to the hands of some unscrupulous persons due to over exploitation of natural resources in a very quick succession, and unexpected profits therefrom. This has increased the rate of anti-activities in these regions.

SECTION-II

Cost Benefit Analysis

A cost-benefit analysis of the above activities would provide some insights towards their desirability from a social point of view. Since the quantitative data and scientific methods for accurate evaluation of pollution are not available, we adopt introspective methods for cost-benefit analysis in the above context.

A. Social Benefits

From exploitation of forest resources through quarrying, deforestation, stone crushing, etc., a society gains some benefits. For evaluation, we consider net income flow to labourers, contractors, thhikadars, crusher-owners, transporters, cultivators (pudu-chasa), and so on and increase in social utility from construction materials, timbers and firewood. Increase in social utility is same as the aggregation of increase of individual consumers utility. A consumer's willingness to pay higher over and above the normal price measures the increase in his utility. Logically, an increase in social utility is equal to an increase in income flow to labourers, contractors, thhikadars, crusher-owners, transporters, electricity suppliers etc. (all agents involved in the activities). Because, increase in income flow to these agents is effected through an increase in price of forest materials.

There is also another method for estimating the social benefits in terms of increased income to factors. We call it as 'opportunity cost method'. The opportunity costs of all factors involved in forest activities is to be determined. The opportunity cost of a factor is the earning forgone in its best alternative use. For example, for a labourer in quarrying, the opportunity cost is the wage rate for a agricultural labourer. The excess earnings of all factors over and above their opportunity costs will measure the increase of social benefits.

B. Social Costs

Exploitation of forest resources increases negative externalities on the society. This is known as social costs. Since natural resources are public goods, their costs cannot be reflected through market prices. Same problem happens with the negative externalities. For evaluating the cost of the negative externalities, we use shadow price mechanism. In the previous section, we have identified various negative externalities of quarrying, stone blasting, stone-crushing, deforestation and cultivation on hill slopes and hill tops, cutting of timbers, etc. The negative externalities are in the forms of air pollution, sound pollution, soil erosion and land silting, damage of private properties and life, loss of flora and fauna, increase of child labour, unwarranted hike in wage rate for agricultural labour and increase in antisocial elements. Although the estimation of all these negative externalities in monetary terms is a very difficult task, yet we can introspectively gauge their severity from their increasing trends.

Through introspection, if the incremental social benefit is compared with the incremental social cost (increase in the severity of negative externalities) of the forest activities, one prudent could argue against the indiscriminate and over exploitation of forest resources in our study areas. Ultimately, the society is the net loser due to over exploitation of forest resources.

SECTION-III

Inactive Administrative Machinery

As stated earlier, from, Nilgiri to Devgiri hills, some hill-tracts remain under the jurisdiction of revenue department and a major part of hill-tracts is governed by the forest department. Almost all tracts are full of flora and fauna. The hill-tracts lying under the revenue department, as quarry contractors reported, are largely leased out for quarrying activities. In terms of rent, the government might be receiving some amount of revenues. The terms and conditions of lease to contractors are not known to us. But, it could be said that leasing out hill-sides, hill-slopes and small mountains which are full of flora and fauna is not advisable from social and environmental point of view. Due to lack of a proper demarcation on surface between revenue areas and forest areas, there is large encroachment of quarries to forest areas. The quarries are permitted in the revenue areas, but they are practically located in the forest areas. These matters are not inspected by the forestry department nor by the revenue department.

As cited earlier, contractors are habituated with serial blastings for quarrying which cause sound pollution, air pollution, damage to flora and fauna and loss of human property and life. In spite of continuous objections by the inhabitants of the surrounding areas stone blastings, neither the contractors nor the administration is serious about it. The number of blastings in the village areas is increasing everyday.

The matters regarding deforestation and 'pudu' cultivation amidst dense forest area have been many times brought to the kind notice of the administration by the local people. But, till now, no action has been initiated by the administrators.

While the administration permits a stone-crusher to locate in a specified area, the issues of environment and negative externalities are rarely taken into consideration. No spot supervision nor evaluation of externalities and environmental pollution is done before or after the permission to a stone crusher. The crusher owners have a very strong nexus with the corrupt local politicians and officials for which they frequently escape from the eye of laws.

In sum, the administration is completely inactive and has failed in controlling and managing forest resources, and in minimizing environmental problems and risks arising from over and indiscriminate exploitation of these resources by selective group, of people.

SECTION-IV

Suggestions

On the basis of findings of the study, some measures can be suggested for policy actions.

(1) The existing blasting methods should be completely banned in the study areas. The traditional method of quarrying should be encouraged. Because, the chance of over-exploitation of stone resources with the traditional method is least. Again, the traditional way of quarrying leads to a lesser degree of environmental pollution and negative externalities.

(2) When a quarry or a stone-crusher is to be permitted by the administration under certain situation, its social costs and social benefits should be properly evaluated. Comparing social benefits with social costs, the decision for permission shall be given if the land is in a forest there, the land should not be permitted for quarrying nor for stone-crushing. Any form of human interference amidst forest should be strictly prohibited.

(3) The usage of forest resources should be properly managed and controlled in such a manner that they must not have any adverse impact on the environment and the society.

(4) There shall be complete ban on the deforestation. The practice of 'pudu chas', preparation of charcoal and cultivation at hill-slopes is to be strictly banned. The administration should make the provision of rigorous punishment for the people adopting the above practice.

(5) The public awareness towards the preservation of forest resources is most essential. The administration should arrange public meetings frequently on the subject of environment and forest, forest

preservation, etc. The school children should be educated and trained how to develop social forest and protect forest.

(6) For preservation of forest resources, some social committees can be formed. A social committee should be headed by an educationist or a social leader or an environmentalist. Such committees should comprise of members drawn from various sections of the concerned locality. The decision of the social committee should be the base for the administration for permitting a land for quarrying or for setting-up a stone crusher or developing other activities in the hill-tract areas.

(7) There should be provision of severe punishment for the corrupt officials or local politicians those who indulge directly or indirectly in violation of environmental laws.

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Sustainable Development of Marine Fishery in Orissa

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Fisheries have been an important part of the national economy for many years as a source of protein and rural employment. With the declaration of Exclusive Economic Zone (EEZ) in 1970s the potential of these resources became more apparent in successive development plans of the central and state government which emphasised the importance of increasing fish production both in inland and marine fisheries. As a result India occupied the seventh position in fish production in the world by 1990. Marine fish production in India is estimated at about 45 million tons. The Government strategy was to increase the level of mechanisation, motorization and introduction of new fishing technologies through improved infrastructural facilities. In later plans there was increased focus on export markets and in improving the living standards of fishing communities.

Environmental conservation and economic development have been viewed as competitive policy objective in recent years. Evidences now suggest that they can be mutually consistent (World Bank, 1987, Pearce, 1988, Daly and Cobb 1989). As the single minded pursuit of economic growth it gradually resulted to a movement towards "sustainable development" over the past two decades. The economic dimension of development has come to be seen as only part albeit a very important of an environmentally sound socio-cultural, political and institutional transformation. However, sustainable development rests on an underlying ethical foundation of international equity. This is clearly reflected in world commission on environment and development (WCED) which states that the sustainable development "meets the needs of present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987). Better understanding of the complex linkages between environmental degradation on the one hand and poverty and powerlessness on the other as they relate to common properly resources in developing countries now argue for the adoption of operational approaches to sustainable development that are needed equally in poverty alleviation. Since government policies provide the context within which resources are accessed, allocated and used, they play a crucial role in fostering sustainable development.

There are indications that the marine fishery resources are diminishing world wide (Muthiah, 1991, Happert, 1991, Santh, 1996). The condition of coastal fishing in India is deteriorating because of uncontrolled fishing and pollution. The

exploitation of common property resources is mostly done on private basis, and there is conflict between short-term preferences and long-term danger of depletion of resources.

This paper seeks to examine the aspects of sustainability of marine fishery in Orissa. The development of marine fisherman is linked to marine fishing activities to a greater extent for their development. Both central and state government are making effort to promote fish production through mechanisation and modernisation of fishing technology. At the same time, various schemes under fishing sector are implemented to improve the standard of living of fishermen. How far the mechanisation of crafts can sustain to increase fish production? To what extent the schemes of fishermen development can ensure sustainable development of marine fishermen in Orissa. These issues need to be carefully examined on the basis of past and present experience of marine fishing activities.

Marine Fishery In Orissa

Orissa has a coastline of 480 kms forming 6.3 per cent of the total coast line of India. The continental shelf area upto 200 meter depth is about 24,000 square kilometers (John & Sudarsan, FSI, 1990). Southern part of the coastline has wide sandy beaches and surf-beaten shores which are also typical of South India, whereas the coast of North Orissa is characterised by several estuarine systems and an extended continental shelf. The state, which covers an area of 155,707 sq.kms. earlier had 13 districts has split into 30 districts since 1993. The four earlier maritime districts have been divided into six Balasore, Bhadrak, Jagatsinghpur, Kendrapara, Puri and Ganjam having the coastal length of 80,50,67,68,155and 6880 kilometers respectively. Entire coastline of Puri and Ganjam remained as it is prior to the division of the district. The maximum sustainable yield (MSY) of the state is estimated to be around 125,000 tons which are harvested by different types of mechanised and traditional crafts. The marine fish catch was approximately 133, 462 tons in 1996-97 (H.S., D.O.F., Orissa 1996-97) which indicates that the present marine fish catch has already crossed the limit of MSY. The total number of 50,207 marine fishermen are engaged in actual fishing in the state out of them 44, 709 (80.05%) are in full time fishing, 4060 (8.09%) are in part time fishing and 1438 (2.86%) are engaged in occasional fishing. A total number of 1,26,135 marine fishermen live in 329 villages catered in four undivided coastal districts of Orissa. The literacy rate is found to be as low as 11.08% among the marine fishermen in Orissa. It is the lowest at 1.9% in Ganjam district.

Growth Of Mechanised And Traditional Boats

The present position of operations mechanised and traditional boats and district wise fish lending shows that Balasore has the highest fish landing of 35,491 tons with Jagatsinghpur's fish landing is closer to it. The Ganjam district shows the lowest position in terms of fish landings. The district has the lowest 112 number of mechanised boats whereas Puri, Jagatsinghpur and Balasore district are having considerably large number of mechanised boats.

Growth of mechanised boats indicates that there were 200 mechanised boats in 1976-77 which gradually increased to 724 in 1986-87 within a decade. The number

of mechanised boats increased to 4,861 during the decade 1986-87 to 1996-97. There has been rapid increase in the mechanisation of boats 1990-91 onwards.

Marine Fish Production And Productivity:

The impact of mechanisation of boats on marine fish lending can also be seen from (Table-5). It reveals that with the mechanisation of boats marine fish production is increased. With the rapid mechanisation of boats from 1990-91 fish catches by mechanised boats also increased rapidly from 38131 tons in 1990-91 to 88893 tons in 1996-97. The productivity of mechanised boat shows the declining trend of marine fish production during the decades 1986-87 to 1996-97, which indicates a kind of overcrowding effect in marine fishing.

The number of traditional boats gradually increased from 7000 in 1996-97 to 10,653 in 1986-87. This increase continue upto 1989-90. In the year 1990-91 the number of traditional boats did not increase any more, on the contrary after 1991-92 it started declining. In the year 1996-97 the number of traditional boats declined to 8353. The decline in the number of traditional boats can be attributed to rapid increase in mechanisation of boats after 1990-91 onwards. Fish catch by traditional boats has gradually increased from 18,000 tons in 1976-77 to 46262 tons in 1989-90. After that fish catch by traditional boats is more or less constant. One of the important feature of the fish catch by traditional boats is the greater degree of fluctuations throughout. With the decline in the number of boats after 1991-92, productivity is found to have increased significantly. But this is misleading due to the fact that decline in the number of traditional boats may be unreal. The Department of Fisheries, Govt. of Orissa started implementing strictly the Orissa Marine Fishing Regulation Act (OMFRA) for registration and licensing boats in 1988-89 onwards. Many of the fishermen are reluctant to pay the licensing and registration fee for the boats. They use these boats in fishing without any license. As a result the number of traditional boats recorded in Handbook of Fisheries of Statistics is found to be diminishing but the actual number of boats in operation may be much more than that.

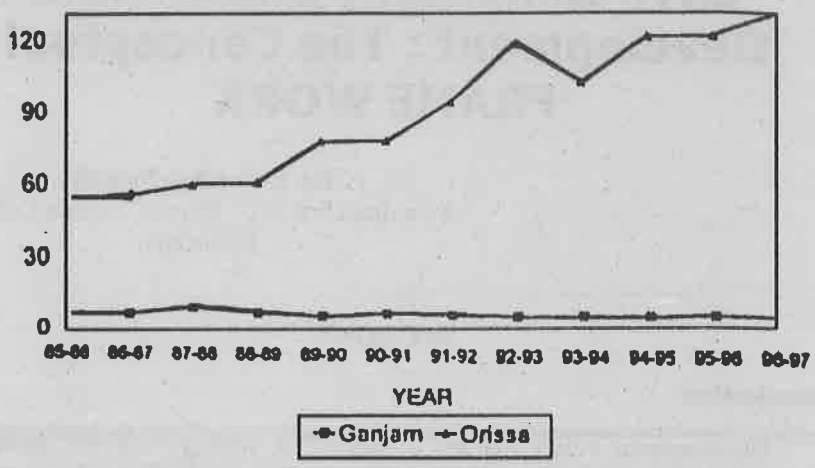
Estimation Of Maximum Sustainable Yield (MSY):

In the study of Pradhan et.al., 1998 the MSY has been estimated taking mechanised and traditional boats as fishing efforts. Estimated Cobb-Dugglas production function revealed diminishing return to scale. In respect of mechanised boats estimates of MSY are equal to 78132 tons for 5044 number of mechanised boats which is illustrated in enclosed. In the year 1996-97 the number of mechanised boats is 4861 and the fish production is 88893 tons graph which indicates that the operation of mechanised boats has already exceeded the limit of maximum sustainable yield. In case of fish lending by traditional boats the rate of growth of yield is slow and almost constant. In respect of mechanised boats yield rate is very high. This shows that there has been over exploitation of marine fishery resources in Orissa mainly due to overcrowding of mechanised boats.

Conclusion :

The findings of this paper suggest that the promotional efforts of the central and state government made significant impact on development of marine fishery in

MARINE FISH PRODUCTION IN ORISSA & GANJAM (1985-86 TO 1996-97)



Orissa through mechanisation of crafts and gears. The rapid rate of mechanisation is recently leading to over fishing as the actual case has already exceeded the level of maximum sustainable yield. It gives the danger signal of over exploitation of marine fishing which may lead to depletion of resources very soon. In India as such, the coastal waters are fast reaching their resource limit with some species already showing signs of over fishing. The mechanised boats are found to be more responsible for over fishing. Some kind of strict regulation through licensing and tax policy is necessary.

It is found that growing number of mechanised boats are doing much harm to the interest of traditional boats consequently fish catch by traditional boats is uncertain day by day. The reckless use of such a common property resource (marine fishery) is not going to ensure sustainable development. If this trend continues the marine fishermen's development cannot be sustained in marine fishing activities. It is high time that greater chunk of marine fishermen should be shifted to other income generating activities through careful development policy.

As marine fisher resources are under increasing pressure to provide food security in respect of protein for increasing human population and employment and income for fisher-folk as well as investment opportunity for business interest, care must be taken to ensure the sustainability of the resources both in biological and in economic terms. There is need for responsible community based fishery management which should be very much concerned with conservation of fishery resources and the allocation of right to exploit these resources. It may consist of agreement, intervention, or regulation to controlled or restricted fishing activities. The people's participation in management of marine fishery resources should look into various aspect of sustainable development.

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Environmentally Sustainable Development : The Conceptual FRAME WORK

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SECTION-I

Introduction:

Development Policy Makers contend that, higher economic growth is necessary to reduce poverty and improve the living standards of population. But, economic growth alone will not lead of good quality of life. Human activities may result in pollution of ocean, atmosphere and land. So, it is necessary to integrate ecological thinking into the planning process, while assessing the potential impacts of projects and plans on the economy. Environment, Economics and development must be balanced to meet the survival and aesthetic needs of man. The present paper contemplates to discuss the concept and principles of sustainable development. The present study is based on secondary data.

Since the publication of the Report of Brundtland Commission (1987), a substantial work has been undertaken to draw out the operational implications of the concept of sustainable development. The Rio Summit (1992) was a step in that direction revealing alarming indicators on environmental disaster. It was well recognised that, the interaction between nature and man gives rise to elements of cooperation and competition. Environment plays a protective and promotional role for survival of mankind by supply of resources to activities, assimilation of waste during the process of production and consumption and provision of utility.

The dark side of the picture is that, industries and automobiles pollute water and air, timber companies denude the forests and fishermen over harvest fishes in lakes. These incidental and unintentional by-products of development have created doubts about sustainability of growth, through industrialisation. The Club of Rome 1972 has drawn the attention of academicians and policy makers to initiate programmes of action to achieve a balance between nature, ecology and environment.

SECTION-II

Concept of sustainable development:

The International Union for the conservation of nature and Natural Resources has presented the world conservation strategy in 1980 and has coined the term sustainable development for the first time in developmental economics. However, the concept of sustainable development has captured the attention of economists and development economists, only after the publication of "Our Common future of the Environment and Development" in 1987. Central to sustainable development is meeting the needs of present generation without compromising the needs of future generation". Economic activities, which leave environmental quality in tact should be taken up.

There is consensus that, production and distribution of goods determine economic welfare of people of a country. This in turn, depends upon the availability of Four factors. 1) human capital 2) Man-made capital 3) renewable resources, like fish, water, air and solar energy 4) Non-renewable resources, like, minerals, top soil, certain types of soil, species and plants.

Pearce and Warford construed sustainable development as a process in which natural resources base is not allowed to deteriorate. The focus here is on everlasting development, which may enhance the quality of life, through improvement in natural environment. Development in a specified region is sustainable, if the total stock of human capital, physical, reproducible capital, exhausted resources and environmental resources do not decrease overtime.

Sustainable development in the broadest sense is defined as the kind of human activity, which nourishes the fulfilment of the whole community life on earth, which includes all life, human and animal and preservation of environment and vital for subsistence. Research oriented activities are crucial for developing eco-friendly products for mass consumption. It visualises to restructure sustainable development in a way that, developmental activities are integrated with environmental policies. Direction of investment and technological change, should increase per capita real income, improve health and education of people and improve quality of natural and environmental resources.

SECTION-III

Principles of sustainable development:

In an effort to strike a balance between renewable and non-renewable man-made capital in production. Process thinkers have expounded various principles.

1) Hawtrick Approach:

This approach envisages re-investment of rent and profits iron use of extracted profits on man-made capital formation or regenerating renewable resources. The measure would go a long way in maintaining consumption standards of future generations.

2) London School Version:

The London School led by pioneers like, David Pearce, Giles and Atkinson entrusts the society, with the task of identification and preservation of all non sustainable material resources. What is required is preservation of values like security, spiritual values and aesthetic values.

3) Daly's approach:

Daly pleads for imposition of limits to human scale (through put) which, if not optimum is within carrying capacity and hence is sustainable. An ecosystem's carrying capacity is the maximum stress, it can absorb, while the resilience of an economic system epitomises its capacity to withstand shocks and disturbances.

4) Safe Minimum Principle:

It counsels the prevention of reduction in natural capital stock below the safe minimum standard identified for each block.

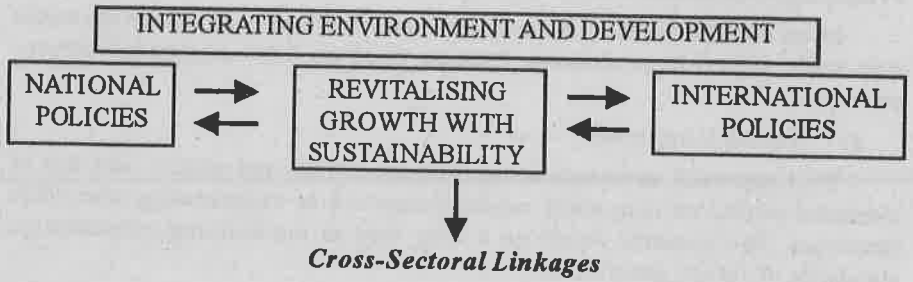
5) Improvement in Efficiency of Factors:

There is a large body of consensus that, the march of economic growth is attended by depletion of natural resources and externality. The way out of the woods is suggested by Theodre Schultz. Schultz suggests that, economic growth or agricultural production could be achieved through efficiency and knowledge without a corresponding increase in material inputs. However, high capital output ratio and the operation of the law of diminishing marginal returns acts as a stumbling block in the path of progress.

SECTION-IV

Links between environment and development:

We need no magnifying glasses to note that, environmental degradation is costly in terms of welfare, human health and productivity. The importance of technological change and resources substitution to combat resource scarcity was explored by Barnet & Morse. There is wisdom in the contention of Barthwal and Sukla, that, technology/technical side of production (natural resources depreciation and industrial waste) alone can not be blamed for environmental pollution. Consumption pattern and life styles of people, political values, customs and values of society are the other villains behind the story.



Combating Poverty: Providing Sustainable Livelihoods.

Changing Consumption Patterns: Less Wasteful Life-styles: Sustainable Consumption Levels; Informed Consumer Choices. *Demographic Dynamics and Sustainability*: Global Challenges; National and Local Level Integration of population and Environment.

Health: Pollution Health Risks; Urban Health; Basic Needs; Communicable Diseases; Vulnerable Groups.

Human Settlements: Shelter; Land and Settlement Management; Environmental Infrastructure; Energy and Transport; Human Resources and Capacity Building, Disaster-prone Areas.

Urban Water Supplies: Drinking Water, Sanitation; Inter-sectoral Planning; Monitoring. *Solid Waste Management*: Waste minimization; Safe Disposal; expansion of Services, Recycling.

Urban Pollution and Health: Air Pollution; Municipal Health Planning; Radiation Protection.

Land Resources: Integrated Assessment; Development and Management; Protection of Quality and Resources; Drinking Water, Sanitation; Water for Agriculture.

Energy: Sustainable Energy Development and Consumption; Household; Transport; Industry.

Sustainable Agricultural and Rural Development: Policy, Planning and Programming; Human Resources; Pest Management Plant Nutrition; Rural Employment; Food Security.

Sustainable Forest Development: Multiple Utilization of Trees, Forests and Lands; Assessment and Monitoring; International and Regional Cooperation.

Managing Fragile Ecosystems.

Combating Desertification and Drought

Information and Monitoring;

Programmes and Action Plans; Drought Preparedness and Relief.

Sustainable Mountain Development.

Information; Integrated Watershed Development; Alternative Livelihoods.

Biological Diversity: Information; Benefits and Use; Conservation; Capacity Building, *Environmentally Sound Management of Biotechnology*: Productivity of Food and Feed; Health; Environment Protection; Safety Enabling mechanisms; International Cooperation.

Atmosphere: Sustainable Energy Development and Consumption; Transport System; Industry, Agriculture; Ozone Depletion; Addressing Uncertainties.

Oceans and Seas: Coastal Area Development, Marine Protection; Living

Resources; Uncertainties and Climate Change; International Cooperation and Coordination; Island Development.

Toxic Chemicals: Chemical Risks Assessment; Classification and Labeling Information; Risks Management Programmes.

Hazardous Waste: Cleaner Production; Waste minimization. Institutional Capacities; International Cooperation for Transboundary Movement.

Radioactive Waste: International Agreements for Safe Management.

Education, Public Awareness and Training.

Strengthening the Role of Major Groups.

Women; Youth; Indigenous People and their Communities; NGOs; Farmers; Local Authorities; Trade Unions; Business and Industry, Scientific and Technological Community.

The Agenda 21 presented by U.N. General Assembly sheds light on the links between environment and development and pleads for initiation of polices at national and international level of achieve growth with sustainability.

Conclusion :

There is some trade-off between environment and development but the relationship between them becomes complementary, when the Governmental effort for the preservation of environmental resources forms an integral part of an overall strategy of economic development. The ten steps advocated by Maurice Strong for survival of mankind are a new approach to social decision making, stabilising global population, a new commitment to conservation, increasing world food supply without increasing ecological imbalance reducing demand on natural resources and revolution in values and behaviour. It is an urgent necessity to redirect urban revolution, organisation and accelerate orientation of Science and technology, management and care of oceans and create a new economic order.

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Natural Resources And Economic Sustainability: A Literature Survey And Analysis

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Sustainability means the capacity for continuing the process of development in 'human ways of life' more or less indefinitely into the future. The human ways of life is a combination of values, objectives, institutions and activities, with economic, environmental, social and ethical dimensions. Therefore, sustainability has also four important dimensions such as economic, environmental, social and ethical. Here questions arise: for the economy, can today's level of economic growth be sustained? For the environment, can its contribution to the economy and human welfare be sustained? For society, can social cohesion and social institutions be sustained? And ethically, does human being highly value other human being and other life forms, now and in future generations? The scope of this paper is limited to the first question.

An economy may be unsustainable due to economic reasons itself (for example, increased inflation or deficit balance of payments); or it may be environmentally unsustainable, e.g., depletion of resources mainly natural resources on which the economic growth itself depends (Ayres and Nair: 1984; Georgescu-Roegen: 1971; Daly: 1991; Bartelmus: 1994; Jena: 1998). An economy may also be socially unsustainable in the context of increasing income inequalities (UNDP: 1996) or undermining structures of social cohesion such as the family or community; or may be ethically unsustainable in the context of attitudes to poverty and economic distribution.

Economic Optimality vis-a-vis Sustainability

Economic sustainability is a condition of non-declining economic welfare projected indefinitely into the future. It is to be noted here that economic welfare is different from economic income. Economic income is commonly measured as Gross National Product (GNP), which exclusively deals with marketed goods and services, or Net National Product (NNP) after depreciating the manufactured capital. GNP can be revised to account for non-marketed environmental and other services such as the Ehvironmental National Product (ENP) (Maler: 1991, 1999; Hamitton and Lutz: 1996), the United Nation's System of Environmental Economic Accounts (SEEA) (Bartelmus et al.: 1994) and

Sustainable National Income (SNI), which adjust the conventional system of national accounts to account for natural capital. However, most measures of income include environmental costs (e.g., the depletion of natural capital) and exclude some benefits (e.g., unpaid household labour).

On the other hand, the measure of economic welfare (MEW) adjusts GNP for some of these factors, but makes no adjustment for environmental costs or distributional effects. In this regard, the Index of Sustainable Economic Welfare (ISEW) (Daly and Cobb: 1989) extends the MEW to account for such effects. Therefore, economic welfare derives not only from income but also from the environment, which performs various functions, some of which contribute to production and hence income, others of which contribute to welfare directly such as assimilation and recycling of wastes, water catchments and erosion control, maintenance of biological diversity and the regulation of regional and global climates (Ehrlich and Mooney: 1983; De Groot: 1992; Daily: 1997)

Economic sustainability, which is defined as non-declining economic welfare, is distinct from economic optimality. Economic optimality is most commonly interpreted as the maximisation of present value of consumption. It does not include future cost of resource depletion, may be due to uncertainty about future stock or substantially higher future price of natural resources than the present price. Thus, economic optimality is very much compatible with unsustainability in the mainstream resource economics (Smith: 1977). However, economic sustainability as non-declining economic welfare is assumed to be directly related to consumption and hence, economic growth, Sustainable economic growth, therefore, is the necessary (though not sufficient) condition for economic sustainability.

There has been disagreement among economists on the issues of sustainable economic growth. The neoclassical theory of economic growth has been used to argue that irrespective of the nature of resources (renewable or non-renewable) there are no environmental limits to growth (Solow: 1956, 1974). The level of economic growth can be sustained by allowing substitution of resources and technical change in the process of production.

On the other hand, most limits-to-growth analysis have focused the limiting factors of nonrenewable resources in growth process (Meadows et al.: 1972). Environmental economists criticise the very basis of neoclassical theory of sustainable economic growth, as the perfect substitution does not account the law of the conservation of matter and the first law of thermodynamics (Georgescu-Roegen: 1971; Ayres and Nair: 1984; Daly: 1991). Similarly, Herman E Daly in his pioneer work "Toward Some Operational Principles of Sustainable Development" has mentioned "sustainable growth is an oxymoron".

It has also been argued that economic growth is not sustainable as it consumes many of the environmental services that underpin the production of goods and services (Heywood: 1995; Postel et al.: 1996; Houghton et al.: 1996; Vitousek et al.: 1997), while it has also been argued that economic growth and development are perfectly consistent with environmental protection.

Now, the question arises-why do the economies particularly rich in natural resources, fail to maintain the tempo of economic growth over time? The issues relating to this question are analysed in the following section.

Natural Resources and Economic Sustainability

Countries endowed with natural resources are expected to have a natural advantage in economic growth. But it has been studied that natural resource-rich countries, on an average, developed less rapidly than countries that are poor in natural resources[1] (Sachs and Warner: 1995). In this regard, the important explanations for not maintaining the tempo of economic growth in resource-rich countries are as under.

First, as per a simple theoretical model of optimal resource depletion, output and value-added decline over time[2] (Hartwick and Olewiler: 1986). For example, two countries with similar non-resource sectors would be expected to have different GDP growth rates if one has, in addition, a resources sector, with the growth rate of that country being lower. Second, prices of resource-based commodities have declined over time in international market. Consequently, export earnings of resource-rich countries have been declining, which bring down GDP growth. Third, natural resources as a form of capital (Pearce and Turner: 1990), if depleted, must be either regenerated or substituted if countries are to maintain or expand their asset base and thus maintain a constant or rising tfend of economic growth (Dasgupta and Heal: 1979). For this, resource-rich countries must have to invest enough in reproducible capital to offset resource depletion; otherwise, in long run, economic growth cannot be sustained. Of course, in this context the nature of investment is important which is beyond the capacity of this paper. This paper focuses the third explanation.

J. Pezzey in his seminal work "Sustainable Development Concepts: An Economic Analysis" has pointed out that for economic welfare (here in terms of consumption) to be non-declining, the stock of capital, which generates it must be maintained. This implies, in turn, that for economic sustainability, 'adjusted net investment'[3] (i.e., 'conventional net investment'[4] minus the 'resource consumption allowance'[5]) must be non-negative. Here, the adjusted net investment (I_t^n) is the value of the net change in the total capital stock.

Let K_t, H_t, and N_t denote the value of physical, human, and natural capital stocks in period t respectively. The value of the net change in the total capital stock (i.e., adjusted net investment) is given by:

$$I_t^n = \frac{dK_t}{d_t} + \frac{dH_t}{d_t} + \frac{dN_t}{d_t}$$

where each item on the right hand side is the net investment (deducting economic depreciation from gross investment) in respective form of capital.

If $I_t^n = 0$, then a country just maintains its total capital stock and can sustain its consumption level. An increase in consumption is possible only If $I_t^n > 0$. This is known as 'Hartwick's rule'.

Measure of Net Change in Natural Capital

a) Non-Renewable Resource:

For a non-renewable resource, the dN_t/d_t is the product of marginal rent and the change in the resource stock, which equals the negative of the amount extracted:

$$\frac{dN_t}{d_t} = -[p-c^1(q_t)]q_t$$

Where P is price of the extracted resource, which is assumed to be constant for simplicity, $c^1(q_t)$ is marginal extraction cost, q_t is the quantity extracted. Hartwick refers to dNt/dt as 'Hotelling rent'. It is to be noted that Hotelling rent is smaller than total resource rent i.e., $pq_t - c(q_t)$. At the initial level of resource extraction, marginal cost is high and therefore, marginal rent is low. As resource extraction proceeds, marginal cost falls and marginal rent rises. Consequently Hotelling rent rises.

b) Renewable Resource:

Maler (1991), and Dasgupta and Maler (1991) have demonstrated that dNt/dt can be modified to a renewable resource:

$$\frac{dN_t}{d_t} = -[P - c^1(q_t)]\,(q_t - r_t)$$

Where r_t is natural growth of the resource.

With this, R.M. Solow has pointed out that investing the above amount of I_t^n including dN_t/dt in physical capital, a country maintains its total capital stock and therefore its consumption possibilities.

The above model of economic sustainability, which based on the 'weak sustainability'[6] approach has been criticised, as mentioned earlier, by many environmental economists. On the other hand, there is uncertainty about the empirical validity of the 'strong sustainability'[7] approach where a very limited or no substitution is allowed.

However, in spite of substitution allowed in the above model, it can be used to our policy makers that there are considerations other than present (or shot-run) consumption and a need to reinvest at least the amount of rent, so that the capacity of the economic process for consumption possibilities can be ensured in long-run, though not indefinitely.

Notes :

1. In the early 1960s, resource-rich Burma, the Philippines, and Sri Lanka, did not maintain the tempo of economic growth over the next 30 years, while 'resource poor' Hong Kong, Singapore, South Korea and Taiwan (known as Asian 'Tigers') could maintain rapid growth.

2. Consider a model of non-renewable resources extraction in which resource price is constant and marginal extraction cost increases with output. To satisfy Hotelling's rule, output must decline over time, thus causing value-added to decline.
3. Adjusted not investment is Repetto et al.'s (1991) term.
4. Conventional net investment is gross investment minus capital consumption allowance. Capital consumption allowance is the aggregate depreciation of physical capital.
5. Resource consumption allowance is capital value of changes in natural resource stocks.
6. Weak Sustainability approach assumes a higher degree of substitution between manufactured and natural capital.
7. Strong sustainability approach assumes a limited or no substitution between manufactured and natural capital.

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The Concept Of Sustainable Development And Gandhian Ethics

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At the out-set it may be observed, that the theme 'Economics of sustainable development' appears to be contradiction in terms. This is because the concept of sustainable development is a highly abstract concept. It has been developed to indicate the limits to 'growth' or 'development'. Economics, on the other hand, is a highly pragmatic term, at least, in the way it is understood in the developed western world. In fact, what has been spelt out as the probable economic aspects or evils of sustainable development by way of sub-themes are not the aspects of 'sustainable development' but of 'growth' or 'development'. So in this paper instead of discussing. Economics of sustainable development', an attempt has been made to discuss the concept of sustainable development' and to show its remarkable consistency with the Gandhian ethics or value-system.

The concept of sustainable development means production of flow of goods as a continuous process to meet the needs of the people in the present and future generations. It involves both growth in production with equity in distribution. Equity in distribution, again, involves both equity in present and future generations. It is something, which while contributing continuously to the growth of production will not impair in anyway, the growth of future production process. The concept is based on the tacit assumption that nature has sufficient resources to meet the needs of the people but not their, greed. This destination between 'need' and 'greed' is very vital. What is considered as 'greed' today, may be considered as 'need' tomorrow with the improvement in the standard of living and life-styles. If this happens (which is quite likely), it becomes very difficult to maintain sustainable development In this context, sustainable development becomes a highly abstract, elusive and complex phenomenon, which becomes extremely difficult to achieve in the real world situation.

This concept 'sustainable development' has a remarkable consistency with the Gandhian ethics. In this context, particular mention may be made of two concepts of the Gandhian Philosophy. One is the concept of trusteeship and other is the minimisation of wants. The Gandhian idea of trusteeship means

the so-called possessors of capital/ resources should not consider themselves as owners but as trustees of these resources. As the trustees of these resources, they should use or consume as little as possible of these resources to meet their daily needs and avoid as far as possible their greed. By practicing the principle of minimization of wants in day-to-day, life, one can conserve resources for the use of others and for future generations. This practice helps in maintaining equity in the present generation as well as in the future generations. Thus, there is a remarkable consistency between the modern concept of sustainable development and the Gandhian ethics and value system.

Thus, the modern concept of sustainable development is a highly abstract concept and the Gandhian thought can be considered as its forerunner. The concept is conceived as an ideal situation, which is free from all types of environmental pollution and eco-friendly. Economic development and ecological balances are automatically achieved. As it is a value-loaded ethical concept, it is not easily amenable to economic analysis at the operational level in the real world situation.

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Abstract

Sustainable Development And Forest Management : The Emerging Challenges

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The forests in India, as elsewhere in the world, have been a source of sustenance to millions of people. The rich bio-diversity has met the subsistence needs of food, fuel, fodder, household articles, agricultural and hunting implements and medicines. The flora and fauna, streams and waterfalls, springs and mountains also have been catering to the emotional and aesthetic as well as recreational needs of the tribals (indigenous people), who dwell in and around the forests from the time immemorial. Besides, forests have been playing different roles and interacting variously in the management of other natural resources like land and water as well as other primary production systems. Of all, the astonishingly wide knowledge base on the usages and ecology of the rich flora and fauna of the forest dwelling communities appears to be very precious. The utilisation of such bio-diversity appears to have been institutionalised through a rich array of social, cultural and religious mechanisms. Therefore, it is not easy to address any specific issue relating to such resource base. Indeed, despite, an intense debate among the environmentalists, conservationists, foresters, researchers, planners, policy makers and social scientists as to how sustainable livelihood from forests could be ensured to forest dependent people, the differences in their perceptions (possibly) on the basic questions; such as: bio-diversity, ecological sustainability, environmental security, revenue maximisation, deforestation and impoverishment of all, seem to have hindered/frustrated to reach at some consensus on their common endeavour to draw a set of definite policy strategies.

Though, forests and communities under various eco-systems are understood to have changed their dynamic relationships over time owing to varieties of use of the forest resource, the ecological changes and the heterogeneous forest policies and forest activities of different forest actors have quietly affected the ecosystems in a big way-resulting in affecting the preservation of rich bio-diversity. Similarly, the future human needs for food,

water, energy and settlement (which depend to considerable extent on how the world's forests are managed) seem to have received serious threats (in recent years) due to fast depletion of forest cover. As a result, notwithstanding, the differences in fixing priorities amongst the conservation of bio-diversity, protecting river flows and watersheds, ensuring secured livelihood and income in terms of increased production and additional work opportunities, the uninterrupted massive deforestation process over years have begun to frustrate all these planned objectives/priorities in a big way.

However, the Stockholm conference in 1972, the Earth Summit in Rio in 1992 and the 11th World Forestry Congress in 1997 have successfully revived a sort of positive thinking towards survival measures to deal with sustainable use of forest resources and livelihood issues of the forest dwelling communities. This is possibly the reason, which has insisted upon the present policy makers/planners to put greater importance on natural resource conservation, strong linkage between environment and development, importance to Sustainable Forest Management (SFM) through people's participation etc. Thus, the process of 'Sustainable Development' evolved as a major thrust evoked a World-wide awareness and consensus that protection and conservation of forest through participation of local people and NGOs could possibly save the world from impeding environmental disaster.

Admittedly, a primary goal of sustainable development is to achieve a reasonable and equitably distributed level of economic well-being that can be perpetuated continually for many human generations. Current activities may be qualified as sustainable, if they do not reduce the productivity potential of the asset base, and the set of opportunities open to future generations. Therefore, sustainability subsumes productivity and equity. In point of fact, natural resource is the base on which development takes place. Development has physical, environmental, economic social, cultural and other processes. These processes influence each other. Physical development that is poorly conceived, planned and implemented causes many of today's severe environmental problems, affecting soil, water, flora and fauna, bio-diversity and the integrity of ecosystems vital for human welfare and security. Though sustainable development is based on dynamic interaction among the production, natural and social systems, planners have tended to focus on production system as a practical entity point. There, it is assumed that natural and social systems will adjust to a changing production system. However, this does not always happen. Only appropriate interaction among ecology, economics and sociology may lead to harmonious development.

From a policy point of view, sustainability is not an option; it is an imperative. Therefore, sustainability needs to link growth to environmental quality and conservation. Without sustainability, environmental deterioration and economic decline will be feeding on each other, leading to social decay and political upheaval. In the process of development, (of all sectors of the economy), development of one sector should not result in sacrificing the

sustainability of another. Sustainable management of renewable natural resources should inherently be based on using income, and not consuming capital. However, the rate of harvest of living resources should not exceed rate of regeneration. This implies maintenance, rational use and enhancement of the natural resource base that underpins ecological resilience and economic growth.

This paper seeks to examine whether sustainable development at the macro level does really indeed succeed in ensuring sustainable use of a renewable resource like forest despite unsustainable commercial harvesting adequately supported by ineffective/obsolete Forest Acts, Laws, Rules, Regulations and lack of appropriate people-centred forest policies in the State of Orissa. Further, though, the primary objective of sustainable development is to ensurer a reasonable equitably distributed level of economic well-being, the unsustainable commercial harvesting of the forest products and their unregulated as well as unauthorized trading activities seem to have defeated the sustainability of the precious resource. As a result, mismatch between the so-called sustainable development and management of the resource does not seem to be in conformity with the livelihood interests of the forest-dependent communities, preservation of bio-diversity, environmental security and ecological balance, the paper argues. Such mismatch indeed is a matter of grave concern and needs appropriate action through series of action-oriented policy strategies in order to do away with environmental deterioration any further and economic decline. The other issue of great concern is the extinction of valuable species from the forests due to uninterrupted commercial harvesting of the forest products and the loss of traditional values. It is now increasingly realized that in the emerging situation the precious traditional needs of the tribals have quietly begun to decay due to commercial as well as unscientific harvesting.

Though tribals do have a long history of sustainable management on their land and resources to draw their livelihood, the sustainable use of the forest resource itself appears to have serious threats in recent years partly due to their increasing alienation from the center of governance and limited role in the management, but, mostly due to ownership of the provincial government over the forest resource. The pertinent question in this context arises therefore, how traditional natural resource like forests will remain far from the control and management of tribals and, whether application of traditional management of forests by the tribals could ensure Sustainable Forest Management (SFM) better notwithstanding their traditional rights and privileges.

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Trends Of Economic Growth In Orissa

Post-Structural Reform Growth Patterns In Orissa And Their Implications For Future Development Of The State

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I. Introduction

The state Orissa is endowed with vast natural resources like fertile green coastal plains, mineral resources like iron ore, bauxite ore etc. It has a natural advantage in agro-based industries, minerals, steel and mine industries. With all these natural endowments, Orissa is still considered as a backward state. Around 47% of the total population of the state lives below the poverty line, which is highest in India, all India average being 26.1%. (Economic survey, 2001, GOI). An analysis of the population as well as the Net State Domestic Product (GSDP) growth rates of recent years reveals that while the population of the state had grown at nearly 3% (all India average being 2.38%), the NSDP had registered a poor growth rate of 1.30% during 1991-2001 (Economic survey, 2001, GOI). Hence, the state has always lagged in terms of per capita income in comparison to other states. Apart from this, frequent natural calamities, like drought and flood in the state have made the state poor. It is therefore a matter of concern for the state economy to revive from these dire straits and set on the path of accelerated growth, so that it can be treated on par with other major states

Objectives

The major objectives of this paper are:

1. To analyse the growth pattern of Orissa in the last two decades and identify the key sectors of the economy.
2. To undertake a comparative analysis of the growth performances of Orissa vis-a-vis other major states in the post-structural reform period.

3. To identify the reasons underlying the poor growth performance in Orissa.
4. To suggest some policy approaches for the future development of the state

In section II, the growth patterns of Orissa is discussed vis-a-vis states. Section III has analysed the reasons of the poor growth performance in Orissa and general discussion has been attempted in order to highlight the major differences in the approaches of various states. Section V concludes with suggestions and policy implications.

II. Growth performance of Orissa vis-a-vis other states

Since inter-state comparative analysis could throw light on the future policy perspectives, in this section we have tried to draw some inter state comparisons of growth rates of key economic indicators with a focus on post structural reform trends. We have selected three periods- 1993-94, which is considered as the starting point of the economic reform in India as well as the new base year, 1996-97, which is the end of the 9th plan and beginning of the 10th plan, and 2000-01, the latest year for which data are available.[1] With a view to examine the growth patterns in the pre-structural reform period vis-a-vis the post reform period for the state, we have analysed the NSDP and per capita NSDP for the periods 1980-81, 1985-86, 1990-91, 1996-97 and 2000-01, which is provided in Table 1. From the analysis of growth trends of both NSDP and per capita NSDP, it is found that the state has registered faster growth rates in the post-reform period than the pre-reform period. The growth rate in NSDP in the state was 19.87% in 1985-86 compared to 1980-81, and 5.28% in 1990-91 compared to 1985-86, the average growth rate being 12.57 in two periods. The growth rate in 1996-97 was 19.90% compared to 1990-91 and 15.90% in 2000-01 compared to 1996-97, the average being 17.90% in two periods. Similarly, Per capita NSDP in the state has registered a growth rate of 9.73% in 1985-86 and 4.10% in 1990-91, with an average of 2.82% whereas it grew by 8.69% in 1996-97 and 11.50% in 2000-01 with an average of 10.1%.

However, despite these growth figures, it is a well-known fact that Orissa is one of the most underdeveloped states in the country. Its position in the percentage of population living under poverty line is highest, around 47%, which is much above the all India average, 26.1%. Orissa's position in terms of per capita income is also very low. These statistics prompt us to undertake a comparative analysis of the growth trends of Orissa vis-a-vis other states. We have chosen some states on the basis of their economic growth performances in the last decades. The states, which have achieved remarkable growth rates in 90's, are Andhra Pradesh, Tamilnadu, Maharashtra, Haryana. and UP.

[1] The data that we have used throughout our study has been made uniform according to the 1993-94 prices.

Table 1: NSDP and per capita NSDP of Orissa in different time periods Base (1993-94)

Year	NSDP	Growth rate	Per capita NSDP	Growth rate
1980-81	1065696	—	4067	—
1985-86	1277465	19.87	4463	9.73
1990-91	1344917	5.28	4280	-4.10
1996-97	1612562	19.90	4652	8.69
2000-01	1869025	15.90	5187	11.50

Table 2 : State-wise NSDP and NNP (Rs. in lakhs)

(Figures in parenthesis indicate the growth rates in relation to the previous year)

State/Year	1993-94	1996-97	2000-01
Orissa	1586130 (4.17)	1612562 (-6.69)	1869025 (-0.63)
AP	5165511 (5.63)	6195503 (6.9)	7370246 (5.3)
Tamilnadu	10176746 (1.9)	12038864 (5.12)	13976947 (2.47)
Maharashtra	5164851 (12.46)	7978079 (5.04)	11564416 (4.43)
Haryana	1942200 (6.78)	2375900 (11.78)	2865500 (6.0)
UP	7778500 (5.39)	9448300 (10.76)	10744800 (6.12)
All India	68591200 (7.06)	85208500 (9.42)	104491500 (3.69)

Table 3: State-wise per capita income (in Rs.)

(Figures in parenthesis indicate the growth rates in relation to the previous year)

State/Year	1993-94	1996-97	2000-01
Orissa	4797 (2.42)	4652 (-7.94)	5187 (-1.48)
AP	7447 (3.92)	8531 (5.5)	9697 (4.06)

Tamilnadu	8952	13784	15410
	(-0.2)	(2.99)	(0.59)
Maharashtra	12183	13335	18786
	(11.08)	(3.84)	(3.59)
Haryana	11090	12664	14331
	(4.75)	(9.45)	(4.53)
UP	5258	5965	6373
	(2.9)	(8.49)	(4.18)
All India	7689	9007	10254
	(4.94)	(6.10)	(1.85)

It is generally expected that in a more liberalized economy, the states should take advantage of the liberal policies and grow significantly. This has in fact happened in states like Andhra Pradesh, Haryana, Tamilnadu and Maharashtra. But Orissa's performance on its economic front during the same period has been meagre and declined in the later half of the last decade. While other states have achieved significant growth rates in the post structural reform period, Orissa not only lagged behind other states, also registered negative growth rates, which is alarming.

We have reported the NSDP and their growth rates of Orissa and other states and the net national product (NNP) of India. Orissa is lagging in terms of NSDP compared to other major states like AP, Tamilnadu, Haryana, Maharashtra and UP. However, the appropriate comparison can be done if we examine the growth rates of NSDP in these states. From Table 2, it can be seen that Orissa's growth rate in NSDP is negative in the 2nd half of the last decade. It is -6.69 in 1996-97 and -0.63 in 2001-01. Whereas, other states have registered positive growth rates during this period. UP, Haryana and AP have achieved remarkable growth rates during this period.

As per capita income is one of the major economic indicators of the growth of an economy, it reflects have average well being of the people. We have investigated the per capita income growth patterns of the state in relation to other states, which is reported in Table 3. Orissa's per capita income is the least among the states that we have chosen; it is much less than the All India average. Unfortunately, per capita income in Orissa has shown a downward trend from 1993-94 (Rs.4797) to 1996-97 (4652). It is evident that in 1996-97 the growth rate in per capita income of Orissa has registered a huge negative value (-7.94) whereas all other states have grown positively during this period. Similarly, in 2000-01, Orissa experienced a negative growth rate of –1.48 in its per capita income.

The above figures well established the fact that Orissa's achievement on its economic front has been meager. The question that arises here is-why Orissa could not grow in compatible with other states? In section III, we have tried to identify the reasons for the poor growth trends in Orissa.

III. Reasons for Poor Growth Performance in Orissa

In order to give an answer to this question we have started with the identification of the key economic sectors in Orissa. An over all analysis of the Orissa's economy has established that the major economic activity in the state is agriculture. Among the three sectors of the economy, namely primary, secondary and tertiary, the former contributes around 50% of the total income of the state. Apart from this we know that around 76% of the people in the state depend upon agriculture. So, it is expected that the share of agriculture in the total pool remains robust. Contradicting our expectations the share of agriculture has declined drastically over the years, that was 38.95% in 1993-94, which has gone down to 32.60% in 1996-97 and 28.54% in 2000-01 Similarly, the share of primary sector in the total NSDP has also gone down significantly during this period, from 49.59% in 1993-94 to 45.34% in 1996-97 and to 42.11% in 2000-01 A state can not develop unless its prioritized sectors grow. However, studies like Ray (1988), and Pal and Joshi (2002) have argued that this is the natural process of the growth. Nevertheless, in a state like Orissa, where underdevelopment and poverty are so deep rooted, it can be a natural process of growth.

The decline in the contribution of agriculture in the state's income is evidenced by the decline in agricultural production in the state in last decade. From the data below it can be seen that all the food commodities namely, rice, cereals, pulses, and oil seeds have declined steadily from 1991-92 to 1999-00.

Table 4: Agricultural Production in Orissa (in lakh MT)

Year/Crops	Rice	Cereals	Pulses	Total FG	Oil seeds
1991-92	66.6	68.3	4.0	72.3	2.8
1992-93	53.9	55.6	4.0	59.6	2.5
1993-94	66.2	68.4	3.8	72.2	2.7
1994-95	63.5	64.9	4.1	69.0	2.4
1995-96	62.2	63.7	4.1	67.8	2.4
1996-97	44.4	46.1	2.0	48.1	1.7
1997-98	48.4	49.2	2.0	51.2	1.7
1998-99	50.2	51.5	2.4	53.9	1.6
1999-00	51.9	53.6	2.4	56.0	1.6

In order to identify the reasons for declined performance in agricultural sector in Orissa, we have to look into its key inputs. Major inputs of agriculture are irrigation, seeds, fertilizer, power and net area sown. Irrigation is considered as the backbone of agriculture in any economy, since the rain-fed cultivation is highly unpredictable (Anant, 2002 and Ray 1988).

Our regression analysis shows that the contribution of irrigation to total agricultural productivity is around 42%, fertilizer consumption is 18%, power

is 15% and net area sown is around 45% (See Annexure). Unfortunately not much attention is given to develop a well-planned irrigation system in Orissa compared to other states. Orissa has spent Rs.1022 cr in the eighth plan (1992-97), which is 10% of the total expenditure on major and medium irrigation projects, while it is Rs.2587 cr in AP, which is 24% of the total expenditure and Rs.3630 cr in Maharashtra, which is 19% of the total expenditure during the same period. Similarly, in the ninth plan (1997-2002), Orissa's expenditure on irrigation is Rs.3085 cr, which is 12% of the total expenditure, while it is Rs.5027 cr in AP, which is around 28% of the total expenditure and Rs.8969 cr in Maharashtra, which is around 19.5% of the total expenditure. The plan wise achievements of irrigation potential suggest that Orissa's place is fairly below AP, Punjab, Haryana, Maharashtra and Uttar Pradesh.

If we examine the percentage of gross cropped irrigated area of Orissa and other major states, we find that only 27.5% of the total cultivable land in Orissa is irrigated (Table 5), while in other states it is much higher, for an example it is 94.1% in Punjab and 78.8% in Haryana. The neighbouring state AP has 43.1% of irrigated land. This is one of the major reasons why Orissa's agricultural production has declined in the last decade.

Table 5: State-Wise Percentage of Irrigated Area

States	% Area Irrigated
Orissa	27.5%
AP	43.1%
Tamilnadu	51.8%
Haryana	78.8%
UP	66.8
Punjab	94.1%
All India	38.7%

Another reason for declined agricultural production in the state is due to the decrease in the net area sown. From Table 6, we can see that the area put for agricultural purposes has gone down over the years in the last decade. The states, which achieved considerable growth in agriculture, have reformed their agricultural sector. The so-called 'green revolution' has taken place in these states pretty early, which has not yet gained momentum in Orissa. States like Punjab, Haryana and AP are using modern techniques of agriculture, which increased their agricultural productivity. But, Orissa is still adopting the traditional way of agriculture and the process of transformation is very slow. Of, course the reform in agriculture in Orissa has been greatly impeded by the ignorance of the farmers to adopt new technologies, lack to subsidies in major inputs like HYV seeds, inadequate credit facilities for agriculture etc. If we analyse the energy consumption pattern in agriculture among the states, Orissa

has used only 7.18 KWH in 1999-00, whereas AP alone has used 138 KWH during the same time. All these factors are responsible for declined growth in agriculture.

Table 6 : Net area sown (in '000 hects)

Year	Net are sown	Growth rate
1989-90	6321	—
1990-91	6304	-0.26
1991-92	6337	0.52
1992-93	6304	-0.52
1993-94	6303	-0.01
1994-95	6279	-0.38
1995-96	6210	-1.09
1996-97	5968	-3.89
1997-98	6122	2.58
1998-99	6048	-1.2
1999-00	6075	0.44

Apart from agriculture the other major economic activity in the sate is industry. By examining the industry profile in Orissa, we found that the growth in industrial sector is very meager and in fact decreasing over the decade. While other states like Andhra Pradesh, Gujrat, Maharashtra and Punjab achieved remarkable growth rates in their industrial sector in 80's and 90's, Orissa has done poorly during this time. Over all growth rate in the secondary sector in AP is a whopping 6% in 1999-00 and it has been envisaged that by 2020, the growth rate in industrial sector will be 11% per annum. The share of manufacturing sector in total GSDP in Orissa was 7.37% in 1993-94, which declined to 6.68% in 1996-97 and to 2.51% in 2000-01 Similarly the share of secondary sector in total GSDP has also decreased during this period from 16.44% in 1993-94, to 14.76% in 1996-97 and to 10.7% in 2000-01. This is supported by the fact that the value added by manufacture in Orissa has decreased significantly in the later half of the decade.

Table 7: Value added by Manufacture (Rs in lakhs)

Year	Value added	Growth rate
1990-91	89793	—
1991-92	125084	39.3
1992-93	148207	18.48
1993-94	167734	13.17
1994-95	209983	25.18

1995-96	259089	23.38
1996-97	222400	-14.16
1997-98	217100	-2.38
1998-99	102500	-52.78

There are many reasons for this receding growth in industrial sector. Since 1980's the major thrust was given to industrial development in the state. The declaration by the then Chief Minister of Orissa to establish 'thousand industries' is a symbolic representation of the policy change. But, unfortunately the promises could never turned out to be realities, rather they remained as pipe dreams in industrial planning. The major industries in Orissa are now either closing or getting sick. Most of them were established in seventies. Many industrial units like Neelachal Ispat. MESCO etc. are existing for the sake of name. However, if we examine the industrial growth pattern in Gujrat, Maharashtra and Punjab, it will be evident that the private entrepreneurship and capital have played a vital role in their industrial development. These states have a long-standing tradition of business groups. But in Orissa, the entrepreneurship and private investment is not significant. Apart from that the infrastructural facilities in the state are not conducive for the rapid industrialization. The state is not able to build up basic infrastructure which would have otherwise reduced the cost significantly and paved the way for higher private investment. Major industries require complementary activities to reduce cost. But in Orissa, complementary industries are few which considered as a bottleneck for the industrial development. Table 8 shows that the per capita infrastructural facilities in the state are much less than other states.

Table 8: State-Wise Per Capita Infrastructure Availability

State/Year	1993-94	1996-97	2000-01
Orissa	364.44	373.29	488.03
AP	465.8	571.47	762.03
Tamilnadu	1056.57	1433.2	1854.32
Maharashtra	659.99	1078.64	1574.83

Apart from poor agricultural and industrial performance in that state, there are many other reasons, which account for the backwardness of the state. Major among them are lack of political will and rampant corruption. Political system in the state has been in a miserable condition, which impedes the growth process. There has been no clear-cut policy regarding the economic activities and the bureaucracy in the state is grossly engulfed in corruption. Due to these inefficiencies the state leadership has no leverage in the central politics, which acted as the main hurdle in getting fund. The private companies are also not interested in investing capital in the state because lack of basic infrastructure. There have been very few central institutes in the state either academically or technically.

Though the service sector in Orissa has grown steadily over the years, their achievement is modest. In the post liberalization era, tertiary and service sectors have been the major thrust in Indian economy. The share of service sector had risen significantly in the total national income during this time. India has progressed considerably in its bilateral trade. Other states like Kerala, Goa etc. have done fairly well in hotel and tourism. States like Andhra Pradesh and Karnataka have now become the hubs for Information and Technology. Orissa has lot to learn from these states. Apart from this banking, insurance and financial services are other thrust areas after the financial liberalization in the country. States like Maharashtra, Tamilnadu, Delhi, Gujrat etc. have broad networks for stock market investments and other types of financial investments. Unfortunately, the banking system in Orissa is not so well developed and deep, let alone other financial institutions.

However, our over all analysis suggests that Orissa is lagging behind many other states in the above stated aspects. We have already drawn the reasons for this backwardness. The major lessons that we must learnt from the advanced states that- a clear cut policy formulation, well directed programmes for irrigation and agriculture, enhancement of social and economic infrastructure, creating a business friendly atmosphere in the state, enhancement of financial and banking services in the state, establishing more technical and higher educational institutes etc. and the most important lesson would be a stable government and relatively more efficient bureaucracy.

IV. Suggested Growth Approaches for the State

An overall analysis of the major sectors of the economy, namely, Primary, Secondary, Tertiary and the Services have established that the following activities have major contributory role in the state's development both from their share in the state's income as well as employment generation points of views. These sectors need to be strengthened for the attainment of the maximum possible growth of the SDP. These sectors are:

1. Agriculture and allied activities
2. Industry and mining
3. Services-Banking & Insurance services, Business services, Community, Social & Personal services.

The above-specified sectors have the potential to set the state economy on the path of economic development. We therefore, suggest a balanced growth approach, which necessitates that all the key sectors of the economy should be given priority while formulating policies. Adequate availability of infrastructure facilities and their constant up-gradation is a prerequisite for the all-round development of all these sectors. We have observed that the factors, which have the potential to boost the key sectors of the economy, are

1. Irrigation
2. Transportation

3. Communication
4. Banking and financial services
5. Education

The infrastructure projects need huge finance and a long gestation period for realization of the investment incurred for the projects. As these investment facilitate development of industrial, agricultural and service sector growth, they lead to increase in the gross domestic income of the state with a time lag. Over the years, the consistent financial crunch both at the National and State levels, as well as the inefficiencies associated with the public utility systems have restricted the growth of the infrastructure financing to a great extent. The inadequate financing of infrastructure facilities like power, roads, and irrigation has been one of the main reasons for inability of attaining higher growth rate. Therefore, the state government should take prior initiative to develop such infrastructure in the state in order to attract private capital into the state.

Orissa has a large coastal line and a forest cover of around 36%. So, there is significant scope for forestry and fishing in the state. Considerable attention was being paid for the development of forest resources in recent years in the state. The government has to take measures to enhance the forestry programmes like, joint forest projects and community forest projects. Similarly adequate measures are required for developing a conducive atmosphere for fishing activities in the state. Government has to consider these aspects while formulating policies.

Since banks and financial institution hold the key for the mobilization and allocation of financial resources, attempts are required to establish more banks, particularly RRBs and other financial institutions to mobilize funds from the rural people. With more financial service created and provided to the people, savings can be mobilized and allocated for investment purposes.

All these policy implications necessitate a proper, efficient and transparent governance system. The need of the hour in the state is good governance and only good governance. The officials who deal with important government departments may be imparted regular training in advance and modern management techniques, which will help in changing their mind-set. This change or reformulation should come from the top of the administrative system. Thus, it is suggested that the policy planners and officials who are very much involved in designing, developing and implementing various development policies and programmes of the state should perform like System managers rather than Bureaucrats.

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Regression Analysis

Dependent variable – Agricultural production (X)

Independent variable –

1. Expenditure on irrigation (Y_1)
2. Net area sown (Y_2)
3. Fertilizer consumption (Y_3)
4. Power consumption in agriculture (Y_4)

Model :

$$X = A + bY_1 + cY_2 + dY_3 + eY_4 + u$$

where u is a random variable.

Results :

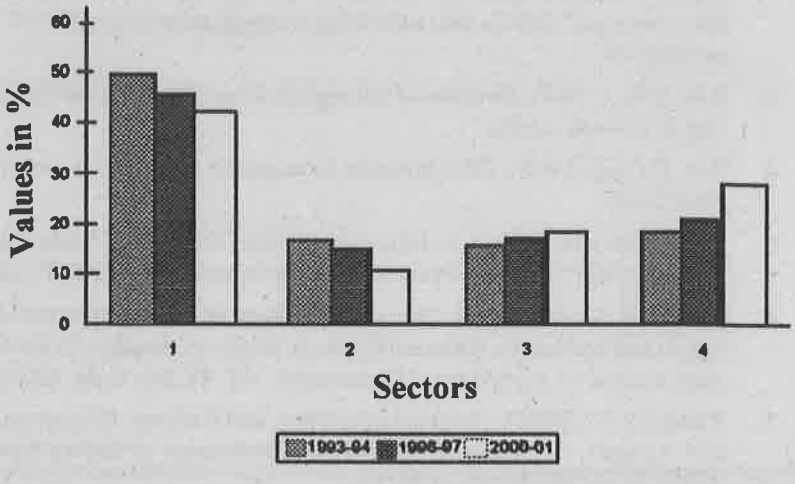
$$X = 67.35 + 35.13\ Y_1 + 37,27\ Y_2 + 18.08\ Y_3 + 9.52\ Y_4$$

(33.19) (8.91) (5.34) (9.67) (7.98)

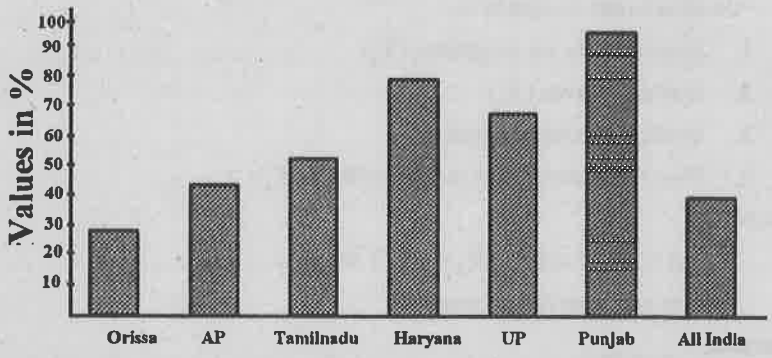
$R^2 = 0.67$

Figures in parenthesis are the t-statistic

Percentage distribution of different sectors in NSDP



Percentage area irrigated in different states



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Sluggish Agricultural Growth In Orissa: Causes And Remedies

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The eastern states of India witnessed green revolution much later i.e. in 1980s, whereas the wheat growing regions of north western states like Punjab, Haryana and Western Uttar Pradesh achieved a quantum jump in agricultural productivity during mid 1960s owing to the adoption of seed-water-fertilizer technology. The eastern states lagged behind due to their inherent inequitable land labour relations, infrastructural bottlenecks, inadequate irrigation facility, difficulty in credit availability and erratic input supply. Of course during nineties some states like Andhra Pradesh and West Bengal have marched forward in the agricultural growth path due to appropriate policy environment and the political will of the party in power to translate the policy into action. Unfortunately Orissa has remained a laggard in spite of being endowed with vast tracts of fertile alluvial soil, good rainfall, a large number of rivers and immense ground water potential. Though in early 1980s there has been a distinct increase in yield rate in Orissa, the yield rates of all major crops grown in the state are quite low in comparison to other Indian states and remain below all-India average. Agricultural growth has stagnated in the state causing widespread rural poverty and misery.

This paper attempts to explore the reasons for low agricultural growth in Orissa and to suggest some remedial measures for bringing about agricultural prosperity to the rural populace.

It needs no emphasis that agriculture is the fulcrum on which the overall development of the state crucially hinges. Agriculture is the state's dominant sector with a contribution of nearly 30 per cent to the Net State Domestic Product (NSDP). About 73 per cent of total main workers are engaged in agriculture including 44.3 per cent cultivators and 28.7 per cent agricultural labourers (1991 census). Nearly 87 per cent of total population of Orissa live in rural areas. Though over the years the contribution of agriculture to NSDP has steadily declined from 67 per cent in 1951 to around 39 per cent in 1998, the percentage of work force engaged in agriculture has remained somewhat unchanged with 73.8 per cent in 1960 and 73 per cent in 1990. This is a pointer to the fact that there has been an overcrowding in agriculture without any perceptible increase in agricultural production. Furthermore, with fast growing population and cultivated land area remaining more or less fixed, the land-man

ratio has worsened over time. The per capita availability of cultivated land has declined substantially from 0.39 ha in 1950 to 0.17 ha in 1999.

In Orissa, the industrialization is as yet in its nascency. Due to sluggish industrialization, transfer of surplus labour from rural areas to urban areas has not perceptibly taken place. As a result, Orissa has remained primarily an agrarian economy and agriculture continues to provide means of livelihood to a significant segment of population. Under such a situation agricultural growth holds the key to the overall development of the state by way of creating gainful employment, generating income, boosting effective demand for manufactured products, providing raw materials to the industrial sector, promoting exports and last but not the least ensuring self-reliance in food production and food security to the deprived sections.

Performance Of Agriculture

The year-wise area, yield rate and production of foodgrains in Orissa have been indicated for the period 1970-2000 in Table 1. A careful analysis of their trend reveals that there has been a distinct increase in area, yield and production of foodgrains in the year 1983-84. The yield of foodgrains has increased from 883 kg/ha in 1970 to 956 kg/ha in 1983. While in agriculturally advanced north western states, green revolution took place around mid 1960s, in Orissa it was delayed by about two decades. After 1983, there has been a marked increase in yield rate in the year 1988 and this rate has more or less sustained till 1998.

The triennium ending compound annual growth rates for area under foodgrains, production and yield rate have been computed for five time periods as shown in Table-2. The growth rates are found to be hovering around one per cent during all the time periods. During the period 1996-99 over 1970-73 the growth rate in area under foodgrains, yield and production is found to be 1.004, 1.004 and 1.011 respectively. These growth rates are much lower in comparison to other Indian states and all-India average. Even during the post-liberalisation period (1996-99 over 1990-93), there has not been any increase in agricultural growth rate, though terms of trade have moved in favour of agricultural produce. The food prices have increased substantially in comparison to prices of manufacturing products. Therefore, for accelerating agricultural growth, technological improvement is necessary for efficient use of agricultural inputs to increase agricultural productivity.

In comparing the growth rate of Orissa with other regions and other states of India, we are using the growth rates of value of yield as computed by Bhalla and Singh (2001) recently Data as contained in Table 3 indicate that the annual compound growth rate of yield over the period 1962-92 was the highest for Haryana (3.2) followed by Punjab (3.1) and Andhra Pradesh (2.8). In Orissa the compound annual percentage growth rate was only 1.3, whereas for all-India it was 2.3 Thus, there has been sluggish agricultural growth in Orissa during the last three decades. A region-wise comparison reveals that the growth

rate of yield was the highest for North-Western region followed by Southern region, Central region and Eastern region in that order.

An inter-state comparison of yield rate of foodgrains in the year 1998-99 indicates that it was only 1080 kg/ha for Orissa, whereas for all-India the figure was quite higher i.e. 1620 kg/ha (Table 4). Also, in the neighbouring states of West Bengal and Andhra Pradesh having similar agro-climatic conditions like Orissa, the yield rate was substantially higher i.e. 2200 kg/ha and 2000 kg/ha respectively. The yield rate was the highest for Punjab (37 40kg/ha) followed by Haryana (2700 kg/ha), Tamil Nadu (2280 kg/ha) and West Bengal (2200 kg/ha). If we consider the yield rate of rice, which is the staple cereal crop of Orissa, the picture is, also not encouraging. The average per hectare yield rate of rice in Orissa was only 1210 kg, whereas the all-India average was 1930 kg. A probe into the reasons for low crop productivity in Orissa unfolds that in agriculturally advanced states like Punjab, Haryana and Tamil Nadu the use yield enhancing inputs like irrigation and fertiliser is very high in comparison to Orissa.

In Orissa foodgrains account for a major proportion of gross cropped area. In 1998, the percentage of gross cropped area under foodgrains was 89.4 per cent. Thus only 11 per cent area was under each crops, which include oilseeds, fibre crops, plantation crops and vegetables. It is disheartening to note that the percentage area under foodgrains has increased from 85 per cent in 1970 to 89 per cent in 1998. Thus, agriculture in Orissa is not yet commercialised. The farmers mainly produce for home consumption and for their own subsistence. Farm production is not market driven. Due to lack of diversification the cropping intensity has declined from 146 per cent in 1985 to 139 per cent in 1998. Thus, Orissa is far behind achieving double cropping.

Causes For Low Crop Productivity

The low agricultural growth in Orissa is attributed to several factors like traditional farming practices, low application of yield enhancing inputs like HYV seeds, chemical fertiliser, organic manure; insufficient irrigation facility; uneconomic size of operational holding; high incidence of tenancy; low capital formation and investment in agriculture; inadequate rural infrastructure and services; and inappropriate policy environment (Swain, 2002). An inter-state comparison of crop output and input use reveals that in the agriculturally progressive states like Punjab, Haryana and Tamil Nadu the application of chemical fertiliser is very high in comparison to Orissa (Table 4). In the year 1998, the per hectare application of fertiliser was only 43.8 kg/ha for Orissa, whereas it was extremely high for Punjab (185 kg), Haryana (149 kg) and Tamil Nadu (163 kg). Moreover, in the year 1996-97 the percentage of gross cropped area irrigated was distinctly higher in agriculturally advanced states like Punjab (94%), Haryana (79%) and Tamil Nadu (52%), whereas it was only 27.5% for Orissa. Thus, the low application of two important yield enhancing inputs i.e. irrigation and fertiliser is considered to be the most immediate and important determining factor responsible for low agricultural productivity in Orissa.

However, it is needless to say that the interplay of various factors in different spheres like socioeconomic, cultural, institutional, technological, infrastructural, policy environment and historical antecedents accounts for low yield in Orissa. For convenience, we have grouped the different factors under four broad heads: agrarian structure, rural infrastructure and services, rural institutions and policy environment, which are discussed below.

I) Agrarian Structure

Though several explanations are invoked for low agricultural productivity in Orissa, many consider skewed distribution of agricultural land, small size of operational holding, high incidence of share tenancy and rural poverty as major impediments to agricultural growth. These features are often viewed as an offshoot of zamindari system of land revenue administration introduced in Orissa during British rule. In the post-independence period, an analysis of trends in the number of operational holdings and area operated reveals that the number of operational holdings in Orissa has increased substantially from about 30 lakh in 1961 to 42 lakh in 1991. During the same period the total operational areas has increased from 43 lakh ha to only 48 lakh ha. Thus within a span of thirty years there has been 42.6 per cent increase in number of operational holdings which for exceeds the 11.4 percentage increase in operated area. As a result the average area operated per household has decreased from 1.44 ha in 1961 to 1.13 ha in 1991 showing 21.5 per cent decline.

The size-wise distribution of operational holdings and area operated (Table 5) shows that in the year 1991-92, more than eighty per cent of farm operators belonged to marginal farmer and small farmer categories cultivating less than 2 hectares of land. Though they constituted 84 per cent of operational holdings, operated only 52 per cent of total operational area. On the other hand, the large farmers (operating land area more than 4 hectares) constituting only 4 per cent of total holdings cultivated a substantial proportion i.e. 20 per cent of operated area. Thus, in Orissa there is skewed distribution of land area with its concentration in a few hands of big farmers. However, percentage of area operated by large farmers shows a declining trend during the period 1961 to 1991.

An inter-state comparison of size of operational holding (Table 4) shows that during 1990-91 it was only 1.34 ha for Orissa whereas it was quite large for agriculturally advanced states like Punjab (3.61 ha) and Haryana (2.43 ha). In the cases of Orissa, not only the size of land holdings is small, but also most of the farmers are ultra-poor and are nearly resource-less. The percentage of rural population below poverty line in Orissa is too high (49.7%). Due to the poor resource base, the farmers in Orissa are not in a position to invest in costly purchased inputs like chemical fertiliser, High Yielding Varieties of seeds, mechanised farm implements, pump-sets and the likes. Though in the case of High Yielding Varieties of seeds the yield rate is quite high; variations in yield are, also, significant. If other complementary inputs like irrigation and fertiliser are not applied in time, in required quantity and in right combination at

appropriate growth stages of plant, the yield is reduced substantially. Apart from this, the high yielding varieties are highly susceptible to plant diseases and pest attacks. On the whole, in the cultivation of HYV seed, production risk is quite high. Given the low resource base, the poor farmers in Orissa are naturally risk averse. In addition to production risk, there is also price risk. In the absence of proper storage, transport and marketing facilities, there is a great risk of post-harvest losses of agricultural produce and farm income. Therefore, the resource-poor farmers of Orissa are not in a position to bear the risk of cultivating High Yielding Varieties and cash crops. In present day Orissa, traditional and subsistence farming is practiced by most of the farmers.

Many argue that high incidence of concealed tenancy particularly sharecropping acts as a barrier to agricultural growth by undermining investment in variable capital including labour effort as well as durable capital. Orissa belongs to the category of high tenancy states in India. In 1991 the percentage of area leased-in to area operated in the case of Orissa was 9.5, which was greater than the All-India average of 8.3 per cent. In 1991-92 there were numerically 6.9 lakh tenant holdings. They constituted 16.4 per cent of total operational holdings. They leased in 4.5 lakh hectares of land, which was 9.5 per cent of total operational area. Average area leased-in per tenant holding was only 0.65 ha. But incidence of tenancy reveals a declining trend. The proportion of operated area leased-in has decreased from 13.5 per cent in 1970-71 to 9.5 per cent in 1991-92.

The major manifestation of tenancy in Orissa is sharecropping. The break-up of total leased-in area into different types of tenancy reveals that in Orissa sharecropping is more pervasive than fixed produce and fixed money tenancy. In 1991-92 about 50.9 per cent of leased-in area was under sharecropping. The coverage under fixed money and fixed produce was only 19.7 per cent and 4.7 per cent respectively. Proportion of area under share tenancy shows an increasing trend. In 1971-72, 41.8 per cent of leased-in area was under sharecropping which has increased to 50.9 per cent in 1991. It is to be noted that in agriculturally advanced states like Punjab, Haryana and Tamil Nadu fixed tenancy is more prominent than share tenancy.

However, NSSO figures on tenancy are considered under-estimates, as tenants are often hesitant to reveal their tenurial identity in fear of eviction. In Orissa, tenancy is legally forbidden excepting under some unusual circumstances. As lease contracts are mostly oral and informal, they remain in concealed form. Recently many micro-level studies undertaken by research scholars report that the share tenancy is quite widespread in Orissa due to emigration of able adult male members of farm family to urban areas for employment, increases in wage cost and difficulty in labour supervision (Swain; 1998, 1999b). Because of scarcity of employment opportunities in non-farm sector, the land deficient and labour abundant farmers are leasing in land to earn their livelihood. In Orissa mostly the marginal and small farmers lease in land. In 1991-92 about 71 per cent of leased in area was in the size classes of

less than 2 hectares and only 5 per cent of leased-in area was in size classes above 4 hectares. Thus, in Orissa subsistence tenancy is more widespread than commercial or capitalist tenancy.

Contrary to popular belief, in Orissa mostly the marginal and small farmers lease out land and not the wealthy landlords. In 1991-92, a significant proportion (90%) of lessor households belonged to category of 'less than 2 ha' and they also accounted for a major proportion (81%) of leased out area. On the other hand, a very small percentage (3%) of lessors belonged to big farmer category owning more than 4.01 ha of land, which accounted for only 8 per cent of leased-out area.

II) Rural Infrastructure and Services

Rural infrastructures include irrigation, roads, power supply, marketing, storage and transport facilities. Under the ambit of services, extension service, technology transfer, credit delivery, input supply, crop insurance may be considered. Amongst the rural infrastructures, Irrigation is considered as the most important and critical input required for agricultural production, as availability of irrigation facility enables the use of other yield enhancing inputs like HYV seeds and chemical fertiliser. It is distressing to note that in Orissa, irrigation facility has been provided to only 34.5 per cent of gross cropped area and the rest 65.5 per cent is rainfed and depends on monsoon. Currently, under the economic restructuring programme emphasis is laid on reduction of subsidy in irrigation and power and decentralizing irrigation management (Swain and Das, 1999). Since 1981 the irrigation water rates for major and medium irrigation projects in Orissa had not been revised. Recently, for Kharif paddy for class I irrigation the water rate has been increased from Rs.39.50/ha to around Rs.100/ha. However, the poor farmers of Orissa are reluctant to pay the higher water charges unless there is corresponding improvement in quality of irrigation service. Farmers expect that water should be delivered to the crop field in time, in adequate quantity in a dependable and predictable manner in consonance with the water requirement of plant at its various growth stages.

Orissa is blessed with immense ground water endowment, but its development is unexpectedly at a very low level (8.4%) in comparison to other agriculturally advanced states. As a matter of fact the cost-benefit analysis of surface canal and ground water irrigation indicates that ground water irrigation is less costly, more efficient, highly productive and does not have adverse ecological and environmental effects like causing displacement of human settlement, deforestation, water logging and soil degradation. The abundant ground water potential of Orissa needs to be tapped facilitating agricultural development of the state. On farm development work and conjunctive use of ground water and surface water should be encouraged.

In Orissa in dry land areas, development of watershed is increasingly being emphasized. The watershed is a manageable hydrological unit that makes a harmonious use of the prevailing climate, soil, water, locally available material

and human resources towards stepping up crop yield. In Orissa, 9663 mini-watersheds, 3729 sub-watershed and 771 watersheds have been delineated by the soil survey wing of the Soil Conservation Directorate covering 14.39 lakh hectares.

The point to note is that mere creating of agricultural infrastructures does not ensure its proper utilisation. For proper management of created rural infrastructures, knowledge on appropriate technology and practices should be disseminated to farmers through effective extension services. Keeping in view the local soil-climatic conditions and financial resources of the farmers, appropriate technology for crop production should be developed, tested and certified to the farmers, appropriate technology for crop production should be developed, tested and certified to the farmers for its adoption. All agricultural inputs like HYV seeds, fertiliser, credit, advice on modern method of production should be provided to the farmers in package under one roof to reduce transaction costs.

III) Rural Institutions

For efficient and sustainable natural resource management, in recent years administrative decentralization through devolution of power to gram panchayats and formation of user groups and self-help groups are increasingly emphasized (Bardhan, 2002, Vaidyanathan 1999). In the irrigation sector, formation of Water Users Association (WUA) or pani panchayats is stressed. Under World Bank aided Orissa Water Resources Consolidation project it is contemplated to hand over some functions like operation and maintenance of the downstream parts of the irrigation canal like minors/sub-minors, irrigation water distribution among water users and collection of water rates to WUA. Similarly with aid from European Commission formation of water user's groups is encouraged in minor surface irrigation schemes. DFID is funding formation of pani panchayat in lift irrigation projects. It is observed that farmers have now realised that operation and maintenance of irrigation structures can be done in a more transparent, efficient and effective manner if these responsibilities are turned over to water users. To this effect Orissa Government has already enacted the Pani Panchayat Bill-2000.

Likewise for credit and marketing facility farmers should be encourage to set up credit cooperatives and marketing societies. Due to small size and fragmentation of land holdings, joint farming may be adopted for reaping economies of scale. In the case of joint farming and through community effort, use of farm implements like tractor, harvester and installation of pump-sets will be easier and cost effective. This will ensure timely completion of farm operations and will be economical and cost saving. Gram panchayats may play a great role in management of common property resources of the villages like renovation of village ponds, reclamation of waste land, undertaking social forestry, afforestation, implementation of land reform measures, formation of grain and seed banks and disaster management etc.

IV) Policy Environment

Though agriculture is the dominant sector in Orissa, it has been utterly neglected during plan periods. Over the plan periods percentage plan outlay on agriculture and allied services shows a declining trend. Also, outlay on irrigation and flood control as percentage of total plan outlay has declined from 31.3 per cent during 6th plan to 22.6 per cent during the 9th plan. Plan outlay on agriculture and allied services, rural development, and irrigation and flood control need to be stepped up to provide the necessary rural infrastructures for accelerating agricultural growth of the state.

Government of Orissa has taken several land reform measured to root out the evils of the regressive land-labour relations inherited from the zamindari system of land revenue administration followed during the British rule. Such land reform measures include abolition of intermediary rights, tenancy reforms (regulation of rent, provision of security of tenure to tenants and conferment of ownership right to tenants), distribution of ceiling surplus land to the landless agricultural labourers and small land holders, consolidation of land holdings, and updating and maintenance of land records. Recently much emphasis is laid on consolidation of holdings. Consolidation of holding includes preparation, correction, and updating of land records and amalgamation of small and scattered holdings in a rational manner with a view to ensuring better land management and optimum utilisation of limited water resources. By the end of 1998-99, consolidation of holdings in respect of 7244 villages covering an area of 10.83 lakh hectares has been completed. Thus, out of a total 60.5 lakh ha of net sown area, only in 17.0 per cent area consolidation has been completed. Tenancy reforms have not been successful in the state. Even though tenancy is legally forbidden, share tenancy is widely observed across the state. The rent is too high i.e. 50 per cent of the gross produce, whereas the legally stipulated rent is only 25 per cent. There is no security of tenure and the tenants are evicted by the land owners as and when they want. The landowners do not in most cases share in input cost. These features of tenancy are inimical to agricultural growth of the state (Swain, 1999).

Orissa being situated in the vulnerable ecological zone, suffers from natural calamities like cyclone, storm, flood, drought almost every year. Therefore, in the event of crop failure due to natural calamities and pest attack or plant diseases, there is a great need for providing crop insurance facility to the farmers to stabilize their farm income. Realising the importance of insurance, the State Government had introduced the Comprehensive Crop Insurance Scheme (CCIS) in the year 1985. This scheme covered only the farmers availing crop loans from co-operative banks, commercial banks and regional rural banks. A high proportion of farmers mostly the poors who had not taken loans from institutional sources could not insure their crops. Thus the CCIS was nothing but a loan insurance scheme. Recently, a modified and a more liberal and broad based scheme formulated by Government of India named as National Agricultural Insurance Scheme (NAIS) has been implemented in the state since

rabi season of 1999-00. Crops like paddy, groundnut and mustard were covered under this scheme. However, the implementation of the scheme is not up to the satisfaction. As the scheme operates on the basis of area approach, individual farmers having substantial yield losses are not benefited from the scheme if the defined area as a whole does not suffer remarkably. During kharif season of 1999-00, an amount of Rs.6653.85 lakh was paid to 2,14,315 farmers for the loss of paddy crop over an area of 3.2 lakh ha. However, regularly complaints are lodged that indemnities are not paid to the farmers in time. The State Agriculture Policy 1996 envisages extension of insurance cover to crops like sugarcane, cotton, jute, arhar, gram, peas, sunflower, soyabeans, til, niger, maize etc.

In recognition of the crucial role of agriculture sector in the State's economy, the State Government has announced the Agriculture Policy in 1996 according agriculture the status of an industry. The Policy aims at doubling the production of foodgrains and oil seeds, generation of adequate employment opportunities in the rural sector and eradication of rural poverty within a specific time frame.

It is laudable that for the first time in history of Orissa, the state government is putting a lot of emphasis on development of agriculture through formation of Pani Panchayats, organising Krushak Bazar, supply of improved seeds, encouraging construction of cold storage and godowns and establishing agro-processing industries. For improvement of irrigation and construction of minor irrigation projects, the state government has recently launched **'Biju Krushi Bikash Yojana'** which is expected to improve irrigation service in Orissa.

Policy Implications

On the basis of the above analysis we recommend the following remedial measures to accelerate the pace of agricultural growth in Orissa.

For increasing agricultural productivity public investments in agriculture sector should be stepped up substantially. Keeping in view the importance of agriculture in creating employment, generating income and ensuring self-sufficiency in food production, share of agriculture in total plan outlay needs to be enhanced. Emphasis should be laid on providing appropriate rural infrastructures and services. Irrigation facilities should be extended to dry land and rainfed areas. The immense ground water potential of the state should be tapped by providing subsidised credit for construction of wells and tube wells and for purchase of diesel or electric pump-sets, and reliable power supply with low tariff charge. Other infrastructural facilities like rural road, transport, power supply, marketing and storage should be improved. Agricultural credit should be provided to the needy farmers in time and as per their requirement. For better recovery of crop loans group lending may be encouraged. Effective extension services should be provided to the farmers.

Farmers should be motivated to diversity their cropping pattern by cultivating more remunerative and cash crops like oilseeds, fibre crops, vegetables and fruits. State government should provide all-out support for cultivation of crops having export potential. In this regard thrust should be given on development of floriculture and horticulture in the state. Orissa has vast potential for development of Horticulture. Different agro-climatic zones have been identified for development of specific fruits, vegetables and spices. Hill tracts of KBK districts and of Phulbani and Gajapati districts have been chosen for intensive horticultural activities. Cultivation of commercial fruits, use of hybrid vegetable seeds, propagation of off-season vegetable cultivation, establishment of bio-centres for production of quality planting materials, use of quality potato seeds, installation of drip irrigation system, beneficiary oriented cultivation of oil palm etc. are the major thrust areas in horticulture. A compact area approach may be applied for propagating horticultural activities. This would help in developing the market and also facilitate establishment of food processing and other down stream activities.

Farmers should be encouraged to follow mixed farming. Along with cultivation farmers should undertake complementary activities like dairy, poultry, goatery and piggery to supplement farm income. A mixed farming system is more desirable from the viewpoint of ensuring better utilisation of family labour and farm by-products and also to meet the increasing demand for nutritious food and farm yard manure.

Also, for adding value to agricultural produce, agro-processing industries should be set up in rural areas. Linkage between agriculture and industry should be improved. Agricultural inputs like quality seeds, chemical fertiliser, pesticides should be made available to the farmers in time and as per their requirement at reasonable prices. It is most important that all the inputs should be supplied to the farmers under one roof and through one window, so that transaction costs can be minimised. Farmers should be motivated to undertake joint farming and to form user groups for efficient, equitable and sustainable management of irrigation system and watershed. Micro-financing through formation of self help groups should be given due importance. The coverage of crop insurance should be extended and instead of defined area approach individualistic assessment of crop loss should be made and accordingly indemnities be paid. Land leasing should be legalised with proper regulation of its terms and conditions for achieving efficient production and equitable distribution of productions gains. Last but not the least, employment opportunities in the non-farm sector should be created by accelerating the pace of industrialisation in the state, so that growing pressure on limited land and declining size of land ownership holding can be checked.

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Table-1 : Area, Yield And Production Of Foodgrains In Orissa

Year	Area ('000 hec.)	Yield (kg/hec)	Production ('000mt)
1970-71	5781	883	5104
71-72	5950	732	4354
72-73	5915	822	4860
73-74	6218	881	5480
74-75	5992	663	3971
75-76	6484	848	5500
76-77	6038	675	4075
77-78	6519	853	5561
78-79	6680	863	5765
79-80	6455	600	3872
80-81	6909	865	5977
81-82	6738	822	5538
82-83	6417	731	4688
83-84	7323	956	7001
84-85	6652	843	5609

85-86	7043	989	6968
86-87	7010	910	6378
87-88	6728	752	5058
88-89	6856	1021	7002
89-90	6972	1144	7974
90-91	7089	992	7031
91-92	7252	1141	8273
92-93	6946	993	6898
93-94	7208	1140	8216
94-95	7120	1122	7986
95-96	7194	1101	7923
96-97	6360	841	5347
97-98	6616	1105	7311
98-99	6516	965	6288
99-00	6075	922	5602
2000-01	5192	958	4976
S.D.	510.16	148.56	1303.30
C.V.(%)	7.75	16.36	21.64

Sources: Agricultural Statistics of Orissa-At a Glance, 1996, Orissa Agricultural Statistics, Various issues; Directorate of Agriculture & Food Production, Orissa, Bhubaneswar.

Table-2 : Growth Rates Of Area, Yield And Production Of Foodgrains In Orissa

Period	Triennium Compound Annual Growth Rate		
	Area	Yield	Production
1980-83 over 1970-73	1.013	0.999	1.012
1990-93 over 1980-83	1.006	1.025	1.032
1996-99 over 1990-93	0.985	0.989	0.975
1996-99 over 1980-83	0.998	1.012	1.010
1996-99 over 1970-73	1.004	1.004	1.011

Source: Computers from Agricultural Statistics of Orissa-At a glance, 1996; Agricultural Statics, Various issues; Directorate of Agriculture & Food Production, Orissa, Bhubaneswar.

Table-3 : State And Region-Wise Levels And Growth Of Crop Yield (At 1990-93 constant prices)

Sl. No.	States/Region	Average value of yield (Rs./hectare)				Per cent annual compound growth rate			
		1962-65	1970-73	1980-83	1992-95	1970-73 over 1962-65	1980-83 over 1970-73	1992-95 over 1980-83	1992-95 over 1962-65
1.	Orissa	4114.37	4072-70	4374.84	5979.16	-0.13	0.72	2.64	1.25
2.	Assam	5727.97	6241.20	6906.69	8196.82	1.08	1.02	1.44	1.20
3.	Bihar	3679.55	4009.73	4048.56	5678.08	1.08	0.10	2.86	1.46
4.	West Bengal	5074.57	5614.56	5943.81	9958.45	1.27	0.57	4.39	2.27
I.	**Eastern Region**	4338.30	4671.31	4944.00	7318.50	0.93	0.57	3.32	1.76
5.	Haryana	3927.21	5090.01	6229.13	10128.73	3.30	2.04	4.13	3.21
6.	Himachal Pradesh	3048.15	3733.76	3917.69	5195.63	2.57	0.48	2.38	1.79
7.	Jammu & Kashmir	2986.95	4481.40	5758.75	5567.01	5.20	2.54	-0.28	2.10
8.	Punjab	5395.62	7476.29	9707.65	13597.22	4.16	2.65	2.85	3.13
9.	Utar Pradesh	3970.10	4589.98	5805.13	8656.20	1.83	2.38	3.39	2.63
II.	**North-west Region**	4092.75	5024.54	6422.63	9582.50	2.60	2.49	3.39	2.88
10.	Gujrat	3673.01	4326.57	5693.43	7460.09	2.07	2.78	2.28	2.39
11.	Madhya Pradesh	2603.49	2835.86	3069.65	4773.12	1.07	0.80	3.75	2.04
12.	Maharashtra	2898.61	2343.57	3794.68	5176.94	-2.62	4.94	2.62	1.95
13.	Rajasthan	1740.45	2217.10	2334.77	3715.22	3.07	0.52	3.95	2.56
III.	**Central Region**	2653.78	2763.12	3464.09	4943.84	0.51	2.29	3.01	2.10
14.	Andhra Pradesh	4064.96	4363.05	6276.23	9390.64	0.89	3.70	3.41	2.83
15.	Karnataka	3207.56	4267.23	4989.92	6969.70	3.63	1.58	2.82	2.62
16.	Kerala	11375.65	12957.56	12333.85	15625.96	1.64	-0.49	1.99	1.06
17.	Tamil Nadu	6689.49	7899.75	8756.47	14073.94	2.10	1.03	4.03	2.51
IV.	**Southern Region**	4873.34	5872.68	6848.20	9990.63	2.36	1.55	3.20	2.42
	All-India	3738.19	4256.79	5090.42	7388.05	1.64	1.80	3.15	2.30
	C.V (%)	56.86	58.19	48.12	46.30	91.34	85.20	39.05	29.26

Note : 1- Average Yield = (Value of output of 43 crops/area under 43 crops)

Source : Calculated from Government of India, Area and Production of Principal Crops in India (various issues), Ministry of Agriculture, New Delhi.

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Table-4 : Inter-State Comparison Of Agricultural Indicators In India

State	Yield Rate of Foodgrains (kg/ha) (1998-99)	Yield Rate of Rice (kg/ha) (1998-99)	% of GCA Irrigated (1996-97)	Fertiliser Use (kg/ha) (1998-99)	Average Size of Operational Holding (hectares) (1990-91)	% of Marginal & Small Holdings to Total Operational Holding (1990-91)	% of Operational Area Leased in (1991)	% Rural Population Below Poverty Line (1993)
I. Eastern Region								
Orissa	1080	1210	27.5	43.8	1.34	79.9	9.5	49.72
Bihar	1440	1300	46.0	97.2	0.93	82.6	3.9	58.21
West Bengal	2200	2260	27.5	136.0	0.90	91.4	10.4	41.72
Assam	1290	1340	14.4	27.7	1.31	82.6	8.9	45.01
II. Southern Region								
Andhra Pradesh	2000	2780	43.1	155.5	1.56	77.3	9.6	15.92
Karnataka	1350	2530	23.7	103.1	213	66.6	7.4	29.88
Kerala	1770	1890	15.4	70.0	0.33	97.7	2.9	25.76
Tamil Nadu	2280	3440	51.8	162.9	0.93	89.0	10.9	32.48
III. Central Region								
Madhya Pradesh	1110	1010	25.8	47.2	2.63	60.1	6.3	4064
Gujrat	1430	1630	33.1	87.8	2.93	52.3	3.3	22.18
Rajasthan	960	1220	32.6	39.5	4.11	49.7	5.2	26.46
Maharashtra	970	1660	14.5	88.9	2.20	63.4	5.5	37.93
IV. North-Western Region								
Utter Pradesh	1960	1960	66.9	125.4	0.89	89.4	10.5	42.28
Punjab	3740	3150	94.1	184.6	3.61	44.8	18.5	11.95
Haryana	2700	2240	78.8	148.5	243	60.5	33.7	28.02
Himachal Pradesh	1770	1420	18.6	13.4	1.20	83.6		30.34
Jammu & Kashmir	1730	2180	41.5	58.2	0.80	90.2		30.34
India	1620	1930	38.7	95.3	1.57	78.0	8.3	37.27

Source : 1. Agriculture, CME, November-2000.
2. Report of the expert Group on estimation of Proportion and number of poor, Planning Commission (1993).

Table-5 : Distribution Of Operational Holding And Area Operated By Size Class Of Land Holdings In Rural Orissa.

Size Class of Operational Holdings (ha)	% of Operational Holdings				% of Operated Area			
	1961-62	1971-72	1981-82	1991-92	1961-62	1971-72	1981-82	1991-92
Less than 1.01	39.42	54.52	54.45	59.99	6.97	18.60	17.02	22.09
1.01-2.00	22.92	25.78	26.11	24.34	12.51	27.32	26.48	30.16
2.01-4.00	19.65	13.90	14.08	12.02	20.73	27.06	26.16	27.87
4.01-10.00	13.66	5.25.	4.63	3.36	31.04	21.56	17.84	16.20
Above 10.00	4.35	0.55	0.73	0.29	28.75	5.46	12.50	3.68
All Sizes	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: (a) N.S.S. Report 17th Round (1961-62); (b) N.S.S. Report 26th Round (1971-72); (c) N.S.S. Report 37th Round (1981-82); (d) N.S.S. Report 48th Round (1991-92).

Disparities in the Industrial Development of Orissa : An Inter-District Analysis.

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1. Introduction

The Indian economy witnessed dramatic changes in its Industrial Policy framework particularly after reforms in the year 1991. The Important changes were deregulation, delicensing, dispersion with M.R.T.P Clearance, greater role to the private sector, gradual shift from direct physical controls to indirect controls, disinvestment of equity by Government in the public sector, rationalisation and simplification of tax structure and market friendly financial sector reforms. These changes helped in bringing about a higher industrial growth during post - reforms period when compared against pre-reform period. Manufacturing sector grew at the rate of 10.2% in the 1990's against 8.0% in the 1980's and 5% in the 1970's. This growth was not only the highest in all the past five decades but also much faster than the growth rate of GDP, which grew at 6.7%, 5.5% in the 90's and 80's respectively. UNIDO study of 2001 reveals that India's manufacturing value added grew at a rate of 7.4% in the 90's and this growth rate was higher than the corresponding growth rate in the other developing countries.

However, higher growth in the manufacturing sector has become insensitive to the distributional issues and hence has raised many apprehensions about its desirability, future direction and sustainability, The present trend of Industrialisation after reforms reveals that rich and industrially prosperous states have prospered further while poor ones have become poorer. The two western states of Maharashtra and Gujrat generate more than one third of the total manufacturing value added in the country. They have attracted substantially large share of India's manufacturing Investment. The three southern states-Tamilnadu, AP, and Karnatak together come next in importance. But this is at the cost of states like Bihar, Orissa and Madhyapradesh, each of which was witnessed a decline in its share in NDP and this is not all. The small and economically poor states like Arunachal Pradesh, Tripura, Sikkim have been marginalised further. This is enough to construe that inter state disparities

in the level of industrial development has widened after reforms. Further the problem of regional disparities seems compounded when the imbalance is found to have perpetuated with the states. In the absence of positive changes in the institutional structure governing the locational policy pattern and structure of industries, benefits of industrial progress is bound to go in favour of developed states and developed regions of the backward states. That has finally happened in India. The Planning Commission is no longer worried about widening regional disparities and its evil consequences. The polices of the Central Government has nearly stopped taking into consideration such issues.

The New Economic policy has no scope for pursuing welfare economic in the new era, where Globalisation, Privatisation and Liberalisation are the key parameters. The unspoken declaration is that those regions will grow which have the capacity and willingness to do so. Others will lag behind and sink. Thus the economic reform has dispensed with the concept and ethics of balanced regional development.

Give this backdrop, the present paper makes a modest attempt to study the pre and post reform trend of industrialization across the districts of Orissa.

II. Data and Methodology

The present study makes use of secondary data collected from Annual Survey of Industrial (ASI) published by the Directorate of Economics and Statistics. It broadly covers a period of 16 years from 1980 to 1997. The period of study has been divided into Pre-Reform period (1980 - 90) and Post - Reform period (1990-97) since 1996-97 is the latest year for which ASI data are available, the study could not be extended beyond this period. The 13 undivided districts have been studied in terms of four Indicators such as number of Industries, persons employed, invested capital and gross value of output. The definition of the terms is the same as given in the ASI.

Simple statistical tools like exponential growth rate and co-efficient of variation are used to interpret the results at three points of time 1980-81, 1990-91 and 1996-97.

III. Results And Discussion.

Number of Industries

The number of units and the annual compound growth rate of the number of units in the districts of Orissa are presented in table-1.

Table -1 : District wise Distribution and growth of Industries

Districts	Years			Exponential growth rate		
	80-81	90-91	96-97	80-81 to 90-91	90-91 to 96-97	80-81 to 96-97
Balasore	66	90	175	3.1	8.2	5.2
Bolangir	38	45	52	1.7	2.1	1.9

Cuttack	206	221	243	0.7	1.4	1.1
Dhenkanal	37	47	68	2.4	5.4	3.6
Ganjam	123	110	83	-0.12	-.3.98	-2.28
Kalahandi	31	34	43	-.2.5	6.2	2.0
Keonjhar	19	19	28	0.0	5.7	2.2
Koraput	89	66	79	-.2.93	5.1	0.69
Mayurbhanj	52	50	50	-0.39	0.0	-0.21
Phulbani	5	5	3	0.0	-.7.06	-0.51
Puri	163	318	322	6.9	.0001	4.0
Sambalpur	168	180	195	0.7	0.12	0.15
Sundargarh	133	178	217	2.8	2.9	2.8
Orissa	1130	1353	1540	1.8	1.9	1.8
C.V.	75%	90%	83%			

Source :- Annual survey of Industries, 80-81. 90-91 and 96-97, Directorate of Economics and Statistics, Orissa, BBSR.

It is evident from the table that the exponential growth rate of the number of Industries in the state stands at 1.8% during the period from 1980-81 to 1996-97. Balasore district is found to have the maximum growth rate (5.2%) and Mayurbhanja district exhibits the minimum growth rate (-0.21%) during this period. The districts having growth rates above that of the state are Balasore, Bolangir, Dhenkanal, Kalahandi, Keonjhar, Puri and Sundargarh. Other districts such as Cuttack, Ganjam, Koraput, Mayurbhanja, Phulbani and Sambalpur have growth rates below the state average. It is to noted that a negative growth trend is found for the districts of Koraput, Mayurbhanj and Phulbani.

It is also revealed from the table that, while Balasore, Cuttack, Dhenkanal, Kalahandi, Keonjhar, Koraput, Sambalpur and Sundargarh districts have high growth in terms of number of industries in the post-reform period. Ganjam, and Phulbani districts had less negative growth in the Pre-reform period. However, their is an absolute increase in the number of industries in Puri district and an absolute decrease in the number of industries in Ganjam and Phulbani districts.

The Coefficients of variation as shown in the table, reveal that the disparities in terms of the number of units increased between 80-81 and 90-91 and then decreased in 96-97. In spite of the overall decrease, the C.V (83%) is highly significant even after economic reforms.

Growth of Employment

The performance of the factory sector in terms of employments is indicated in Table 2. It is found that the growth rate of employment in the Post- reform period (2.0%) is better than that in Pre- reform period (1.5%). This Implies that the reform period has accelerated the growth of employment. A perusal of the

district wise growth rates of employment reveals that Dhenkanal region (13.4%) staged the maximum growth rate followed by Keonjhar (8.1%) and Balasore (7.3%). Ganjam district has witnessed the lowest negative growth rate of -3.53%, preceded by Kalahandi (.2%), Puri (.4%), Cuttack (.6%) and Sundargarh (.7%).

If overall growth rate of employment (1.6%) in Orissa is taken as cut of point, 6 Districts (Balasore, Bolangir, Dhenkanal, Keonjhar, Koraput, Mayurbhanj and Phulbani) are high growth regions and remaining districts are low growth regions. This means that all the highly Industrialized districts such as Cuttack, Puri, Sambalpur, and Sundargarh are observed to have growth rate lower than the state average.

Table - 2 : District wise Distribution and Growth of Employment

Districts	Years			Exponential growth rate		
	80-81	90-91	96-97	80-81 to 90-91	90-91 to 96-97	80-81 to 96-97
Balasore	2,690	3,326	8,864	2.1	15.0	7.3
Bolangir	1,321	2,318	4,164	5.8	8.0	7.0
Cuttack	18768	16,354	20,752	-1.35	1.4	0.6
Dhenkanal	1,962	8,757	16,817	17.0	9.8	13.4
Ganjam	5,439	4,105	3,002	-0.54	-4.34	-3.53
Kalahandi	2,143	628	2,220	-87.58	19.90	0.2
Keonjhar	1,236	5,067	4,726	17.9	-1.0	8.1
Koraput	7,058	5,572	10,685	-2.34	9.7	2.4
Mayurbhanja	1,239	2,776	2,829	8.4	0.2	5.0
Phulbani	112	358	206	10.7	-0.76	3.6
Puri	35,261	47,938	37,836	3.1	-3.35	0.4
Sambalpur	17,967	18,729	21,663	0.4	1.4	1.1
Sundargarh	38,814	39,090	44,096	0.7	1.7	0.7
Orissa	1,34,010	1,55,018	1,77,860	1.5	2.0	1.6
C.V.	130%	127%	103%			

Source :- Annual survey of Industries, 80-81. 90-91 and 96-97, Directorate of Economics and Statistics, Orissa, BBSR.

Further analysis at the disaggregated level shows that more than 50% of the districts are growing at an increasing rate in the post-reform period. These districts are Balasore, Bolangir, Cuttack, Kalahandi, Koraput, Sambalpur and Sundargarh. All other six districts have witnessed unfavourable growth trend. Ganjam (-4.34%), Keonjhar (-1%), Phulbani (-.76%) and Puri (-3.35%) districts have registered a decline in the employment during the post reform period.

The coefficient of variation in the employment across the states exhibits declining trend from 130% in 80-81 to 127% in 90-91 and 103% in 96-97. This shows a decline in interregional inequalities in employment. But the level of inequality is still remarkable which should be taken care of by planners and policy makers.

Growth of Investment

Table -3 shows the district wise distribution and growth of manufacturing sector in terms of invested capital for the period of analysis. It is evident from the table that the reform process have favourable impact on the growth of investment 17.3% in the first sub period, 20.2% in the second sub-period and 18.4% over the entire period of analysis, Dhenkanal again records a maximum growth rate of 52.2%, followed by Balasore (35.9%), Bolangir (29.6%) and Kalahandi (23.5%). Phulbani registers the lowest growth rate of 4.28% preceded by Mayurbhanj (3.2%) and Ganjam (7.9%). Further analysis of the table reveals that districts except Phulbani, Mayurbhanj & Ganjam register growth rate higher than that of the state (18.4%).

Again these three districts Phulbani, Mayurbhanj and Ganjam have also witnessed unfavourable growth trend in the post-reform period along with Dhenkanal. It is astonishing that Dhenkanal which recorded the maximum growth rate observed to have a 14.9% growth rate in the post-reform period against 85.1% in the pre-reform period. This contrasting trend of growth is mainly due to lower industrial base in 80-81 and large scale public investment by NALCO & NTPC in the pre-reform period.

The value of C.V. is placed at 200%, 149% and 134% in the years 80-81, 90-91 and 96-97 respectively. The pattern of variation is same as that of variation in employment.

Table - 3 : District wise Distribution and growth of Invested Capital

(Rs. in Lakh)

Districts	Years			Exponential growth rate		
	80-81	90-91	96-97	80-81 to 90-91	90-91 to 96-97	80-81 to 96-97
Balasore	365	5,692	67,169	31.6	42.0	35.9
Bolangir	262	1,506	21,365	19.1	46.6	29.6
Cuttack	5,000	34,946	1,38,637	21.4	21.8	21.6
Dhenkanal	395	1,86,661	4,94,465	85.1	14.9	52.2
Ganjam	1,817	3,241	4,412	5.9	4.7	7.9
Kalahandi	201	168	7,274	-1.78	71.4	23.5
Keonjhar	1,582	16,898	34,182	0.7	53.7	19.8
Koraput	5,912	26,767	1,06,199	16.3	21.7	18.5

Mayurbhanja	2,867	6,109	4,908	28.02	21.7	3.2
Phulbani	37	37	178	0.00	10.05	4.28
Puri	33,616	1,24,141	4,42,723	14.0	19.9	17.0
Sambalpur	6,571	17,807	1,86,774	10.5	39.9	21.7
Sundargarh	66,070	1,79,024	6,84,719	10.5	21.2	14.8
Orissa	1,24,695	6,02,997	2,193,041	17.3	20.2	18.4
C.V.	200%	149%	134%			

Source :- Annual survey of Industries, 80-81. 90-91 and 96-97, Directorate of Economics and Statistics, Orissa, BBSR.

Growth of output

Table-4, reveals that the annual growth rate of gross value of the output in the state between 80-91, 91-97 and 80-97 stands in the order of 16.1%, 15.0% and 15.7% respectively. The marginal decline in the post-reform period may be due to growing excess capacity in most of the industries, relative price stability and constraints in the demand side.

Dhenkanal district again has the maximum rate of growth of out put (69.8%) followed by Balasore (29.2%) Bolangir (25.5), while Ganjam has the lowest growth rate (8.9%) per annum.

It is evident that nine districts are high growth districts having growth rate above that of the state average. The districts registering growth rate below state average are Ganjam (8.9%), Sundargarh (10.0%), Phulbani (11.9%) and Mayurbhanja (14.7%). All these low growth districts along with Keonjhar and Dhenkanal have also witnessed a declining trend in growth rate during the post reform period.

The C.V. in the output across the districts declines from 203% in 80-81, to 150% in 90-91 and 104% in 96-97. It is disheartening to conclude that the regional disparities in terms of output are still glaring.

Table-4 : District wise Distribution and Growth of Value of output

(Rs in Lakhs)

Districts	Years			Exponential growth rate		
	80-81	90-91	96-97	80-81 to 90-91	90-91 to 96-97	80-81 to 96-97
Balasore	1,145	6,993	92,512	19.9	44.5	29.2
Bolangir	358	2,633	13,417	22.0	25.9	25.5
Cuttack	8,616	31,095	1,11,634	17.3	20.0	16.2
Dhenkanal	27	91,935	2,15,368	125.9	16.7	69.8
Ganjam	1,714	4,555	7,258	10.3	6.9	8.9

Kalahandi	189	781	5,219	14.9	31.2	21.5
Keonjhar	1,731	14,633	31,733	24.0	15.2	20.3
Koraput	5,396	19,229	80,001	13.6	22.6	17.1
Mayurbhanja	1,042	5,700	10,639	18.5	9.3	14.7
Phulbani	25	51	174	7.2	19.2	11.9
Puri	8,876	52,575	1,87,116	19.5	19.9	19.6
Sambalpur	14,557	41,006	1,49,536	11.9	28.5	14.8
Sundargarh	59,441	1,87,776	3,12,129	11.2	7.7	10.0
Orissa	1,03,117	4,58,962	12,24,73	16.1	15.0	15.7
C.V.	203%	150%	104%			

Source :- Annual survey of Industries, 80-81. 90-91 and 96-97, Directorate of Economics and Statistics, Orissa, BBSR.

IV. Findings

The reform process has accelerated industrialization in terms of number of units, investment and employment and output. It is also evident that the invested capital grows at the highest rate (18.4%) followed by the growth of output (15.1%) and growth of employment (1.6%). This indicates that there has been growth of capital intensive industries in the state in conformity with the pattern of industrialization by the planning process in the country.

The analysis reveals that, there is concentration of industries in the industrially developed districts. The prosperous districts such as Cuttack, Puri, Sambalpur and Sundargarh have 63.4% of the total number of units, 66% of the invested capital, 68.7% of the total employment and 62.1% of the total value of output of the state in the year 96-97. The conclusion is also corroborated by the declining but higher level of coefficient of variations at three points of time. However, Balasore is fast moving in terms of all indicators.

The districts with higher level of industrialization are not necessarily the ones with high growth indices. Sambalpur in terms of number of industries, employment and value of output; Cuttack in terms of no of industries and employment; investment lag behind the average growth rate of the state during the period under reference. On the contrary, many backward districts grew at a higher rate. The negative association between the level of industrialization and the rate of growth might lend these districts to converge over a period of time implying reduction in inter-regional disparity. However the conclusion might mislead due to statistical gimmick of the low base and high value of the variable at the terminal point.

However, Dhenkanal and Keonjhar exhibit a mixed trend. Dhenkanal, though records a maximum growth rate over the entire period, in terms of employment and output has shown a declining trend during the post-reform period. This is mainly because of the low industrial base in the beginning of

80's and large amount of public investment by NALCO and NTPC towards the end of the 90's

Similarly Keonjhar, even though experiences a favourable increasing growth trend in terms of registers a declining growth trend in terms of employment and output. Such a behaviour explains the growth of capital deepening industries in the region. At the same time, it reflects the under utilisation of the existing capacity.

Thus, the analysis of the regional patterns of industrialisation across the districts of Orissa reveals that, even though the regional disparities has narrowed down, the level of disparities is as gloomy, glaring and disheartening as before.

V. Conclusion

The above findings lead to the conclusion that inter-district disparities in the level or industrial growth has marginally declined during the post reform period. But the existing level of disparity as revealed by the relative change in the highest and lowest compound growth rate is significant and hence a cause of concern. It calls for interventionist strategies and policies in the line of "lifting the bottom rather than putting up at the top" to maintain the current growth trend. Therefore, following two policies are suggested.

1. Spatial cum sectoral flow of resources needs to be planned at the district levels. Region specific industries - specific to raw material are to be identified for each district Region non-specific industries are fairly universal and holds out hope for backward districts.
2. Since industrially developed districts have in-built tendency to grow automatically, the second line of districts rather than most backward districts must be assigned priority by the Government in its inter-regional allocation policy.

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Sectoral Growth in Orissa : A study of Agriculture

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The history of civilization mirrors the pivotal role of agriculture in moving the human evolution from one phase to another. The Neolithic or New Stone Age which began about two thousand years ago is characterised by the beginning of agriculture leading to the use of pottery and proper cooking, plaiting and weaving and domestication of animals. Once the value of agriculture was understood, man became food producer instead of food-gatherer or full time hunters. Cultivation being a continuous process made the man live permanently near his fields. As a result settled human communities developed at suitable places leading to improvement in social relations, setting of villages and building of huts etc. Trade and commerce in the form of crude barter system developed gradually as men learnt the use of metals. Thus agriculture brought epoch- making change to human civilization. Hence significance of agriculture in agrarian economies like India as a nation and Orissa as a state is certainly unquestionable. For the present study an attempt has been made to highlight the salient features of the growth of agricultural sector in general and agricultural productivity in particular during the period 1950-51 - 1997-98. The entire period has been divided into two parts, such as, pre-reform period 1950-51 to 1984-85 (phase-I), and the period, starting with the year in which the idea of reforming the Indian economy was conceived, 1985-86 to 1997-98 (phases-II). The pre-reform period has again been divided into two phases. The first phase (1950-51 - 1974-75) is a period without any perceptible economic and political events in the country and the second phase (1975-76 - 1984-85) is a period starting with the year of national emergency. Thus the time period covered in this study has been phased into three, such as Phase-1 (1950-51 - 1974-75) Phase-II (1975-76 - 1984-85) and Phase-III (1985-86 - 1997-98).

Different sectors of the Orissan economy contribute to its National State Domestic Product (N.S.D.P.) in varying proportion over time. The annual average percentage growth rate during phase-1 (Table-1) is the highest in case of secondary sector followed by the tertiary sector and it was very negligible (i.e..0.01) in case of primary sector during the same time period. In contrary to this the annual average percentage growth rate was the highest at 0.04 in the

Finance and Real Estate etc. Services sector during Phase-II. The average growth rate per annum in the primary sector does not show any change during this Phase. During Phase-III the average percentage growth rates per annum of all the sectors except primary sector have shown rising trend though the Finance & Real Estate etc. Service is the highest achiever. It is clear that the growth rate of the primary sector has remained stagnant in pre-reform and post-reforms periods.

Table-I : Sectoral growth rate of NDSP of Orissa

Sl.	Sector	Phase-I 1950-51 to 1974-75	Phase-II 1975-76 to 1984-85	Phase-III 1985-86 to 1997-98	Overall 1950-51 to 1997-98
1	2	3	4	5	6
1.	Primary	0.01	0.01	0.01	0.02
2.	Secondary	0.05	0.02	0.05	0.04
3.	Tertiary	0.04	0.02	0.05	0.05
4.	Finance & real estate etc. service	0.02	0.04	0.06	0.04
	NSDP	**0.02**	**0.02**	**0.03**	**0.03**

The overall growth rates covering the period from 1950-51 to 1997-98 show that this growth rate is the highest at 0.05 in the tertiary sector followed by the secondary sector and Finance & Real Estate service sector at 0.04. This growth is the lowest at 0.02 per cent in case of primary sector.

Table-2 Shows the contribution of each sub-sector enfolded in the primary sector to the NSDP of Orissa. The annual average per cent growth rate in the sub sector of "agriculture and animal husbandry has been very slow at 0.01 in the first two phases and in the third phase it has diminished by (-)0.01 % per annum. A similar growth trend is also seen in case of "forestry and logging". Though the sub-sector of fishing has started with a negative growth rate, it has risen in the next two phases and has come up to 0.50 per cent in the third phase. In the sub-sector of mining and quarrying the growth rate is the highest at 0.07 per cent amongst all other sub- sectors in phase-1 and has reached 0.13 per cent in the phase-III though has declined in the mid-phase. Thus the growth rates of fishing, mining & quarrying exhibit rising trend during the post-reform period. The rest two sub-sectors show negative growth rates. It is clear from the overall annual average percentage growth rate covering the period from 1950-50 to 1997-98 that the growth rate is encouraging only in the sub-sector of fishing. This growth rate is insignificant in case of agriculture and is negative in case of forestry and logging.

Table -2 : Growth Rates in the primary sector.

Sl.	Sector	Phase-I 1950-51 to 1974-75	Phase-II 1975-76 to 1984-85	Phase-III 1985-86 to 1997-98	Overall
1	2	3	4	5	6
1.	Agriculture & A.H.	0.01	0.01	(-) 0.01	0.01
2.	Forestry & losing	0.01	0.003	(-) 0.04	(-) 0.003
3.	Fishing	(-) 0.01	0.06	0.50	0.23
4.	Mining & quarrying	.07	0.01	0.13	0.08
	Primary sector	0.01	0.01	0.17	0.02

Agriculture provides employment directly or indirectly to 63.75% of the total working population (1991 census) in Orissa. Nearly 50% of the NSDP of Orissa is earned from agriculture through the average percentage growth rate of this sector per annum over the years has remained stagnant at 0.01. The size and area of cultivable land remaining constant an increase in population would cause fall in per capita production of agriculture. During the period 1950-51 to 1990-91 the population of the state has risen at an average rate of 0.02 per cent per annum while the area of land under cultivation has increased hardly at the average rate of 0.003 per cent per annum. Thus the excessive pressure of population on land persist for years. In addition to that low rate of industrialisation and lack of rapid modernisation in agriculture the situation has been aggravated by low productivity in agriculture. Institutional inadequacies like small size of an over-whelming number of holdings have made it almost impossible to introduce new technology. Moreover the feudal land tenurial system in agriculture has discouraged the actual permanent tillers from making any improvements of permanent type in the land. Services like easy agricultural financing, provision of inputs, storage of products, marketing of the produce, extension services for propagation of modern knowledge, its demonstration and application are far from satisfactory. Technical improvement in agriculture is lagging behind due to two major inputs like land water.

With a view to increasing in the production from agriculture, net sown area is to be increased which is not physically possible on the ground of limited supply of cultivable land. Such an objective could be realized if intensity of cultivation is increased. As most of the cultivable land has been brought under cultivation, the rise in net sown area in the state (Table-3) has become highly negligible over years. Similarly the gross cropped area has expanded at a very slow rate, that is, at the average rate of 0.0001 per cent per annum over the same time period. No perceptible growth in net sown area or gross cropped area is seen during any phase.

Rise in cropping intensity contributes to the growth of cropped area over and above the net sown area. The intensity of cropping is measured by

the proportion of area sown to the net area sown The cropping intensity in Orissa has declined by 6.14% during 1999-2000 in comparison to the year 1995-96. This implies that uses of land in agriculture have shown no progress considering the large demands for agricultural products and the acute shortage or adverse land-man ratio.

Table-3 : Growth of land use classification (%) in Orissa.

Sl. No.	Year	Net sown area	Gross cropped area
1	2	3	4
1.	Phase-I (1950-51 to 1974-75)	0.0004	0.01
2.	Phase-II (1975-76 to 1984-85)	0.002	0.013
3.	Phase-III (1985-86 to 2000-01)	(-) 0.013	(-) 0.02
4.	Overall (1950-51 to 2000-01) (P)	(-) 0.002	0.001

Moreover, besides forest area and net sown area a large percentage of area is used for non-agricultural purposes like the sites for buildings, roads etc. including the barren area and area unfit for cultivation. The land area under all such uses is 5.56 per cent of the total geographical area of Orissa during 1998-99. There is very limited scope for improvement in agriculture through extensive cultivation. Hence the only alternative available is to follow the system of intensive cultivation methods to make optimal use of existing area of land under cultivation.

Adequate irrigation facility is an essential input for intensive cultivation. Sixty two per cent (62%) of cultivable land in Orissa depends upon erratic and uncertain monsoon. An area of 23.44 lakh hectares of net irrigation potential had been created till the end of 1996-97 (8th Plan) through all sources of irrigation, which is only 39. 73% of the total estimated irrigated land. An additional area of 11.60 lakh hectares of agricultural land is going to get irrigation facilities by the end of 9th Plan. Still the chronic effects of drought in some parts of northern and southern Orissa indicate inadequacy and imbalance provision of irrigation facilities in Orissa. The use of high breed seeds or HYV seeds and fertilizers has been continuously getting popular among the farmers..

Cropping pattern is one of the indicators of agrarian diversification. The cropping pattern of principal drops in Orissa shows that only a limited variety of crops is grow in the cultivable land of Orissa. The highest per cent of cultivable area is used for the cultivation of cereals. Second priority in cultivation is given to pulses. Area used for oil seeds though below 10 per

cent comes next to pulses. Area used for fibers and other crops is negligible. It signifies the fact that traditional system of cultivation with emphasis on growing of paddy for self-consumption has been the main motivating factor of Orissan agriculture. Commercialisation of agriculture is yet to achieve its significant role in the economy of the state. Adoption of conventional system of cultivation may be farmer friendly, but is not certainly viable. In order to make it viable, the farmers need to apply the modern technology in to cultivation.

The growth in agricultural output is a function of rise in yield rate, area and changes in cropping pattern. Economic Survey Report shows that growth rates of yields of cereals, pulses, oilseeds and fibers alongwith tobacco are declining. The growth rate in case of potato and onion is a little encouraging and in case of sugarcane it seems fluctuating. As the rise in yield, area and changes in cropping pattern is not at all significant, the effect on yield is also not satisfactory.

The value of output depends upon the yield rate of a crop. In the past the area under cultivation was to be treated to be the determining factor of the yield rate and hence productivity of land. The invention of new technology and its application to agriculture as caused such hypothesis no more valid. It is now felt that the application of such technology has been cause of increase in productivity of land. Enhancement in the yield of crops per hectare is a direct indicator of technical inputs added to the land resource. The effect of technical inputs is noticed only in case of all cereals over the period from 1995-96 to 2000-01. However the yields of pulses, oil seeds and other crops have declined where as the yield of fibers has shown a marginal rise during this period.

Table -4 : Annual Average Percentage Growth rate of Major Crops in Orissa.

Sl. No.	Item.	Phase-I 1950-51 to 1974-75	Phase-II 1975-76 to 1984-85	Phase-III 1985-86 to 1996-97
1	2	3	4	5
1.	Rice	0.01	0.00	(-) 0.02
2.	Wheat	0.04	0.01	(-) 0.003
3.	Jowar	0.01	0.01	(-) 0.04
4.	Maize	0.03	0.01	0.01
5.	Ragi	0.04	0.004	0.04
6.	Gram	0.02	0.01	0.01
7.	Arhar	(-)0.01	0.02	(-)0.02
8.	Groundnut	0.02	0.01	(-)0.04
9.	Sugarcane	0.01	(-)0.01	(-)0.35

Table-4 depicts average percentage growth per annum of land productivity during 1950-51 - 1996-97. Here land productivity is taken as the total quantity of output of major crops like rice, wheat, jowar, maize, ragi, gram, arhar, groundnut and sugarcane divided by the cropped area under these crops. It is clear from the table that the annual average percentage growth rate of land productivity has been gradually decelerating over the phases in case of almost all the crops. In fact, the land productivity has become insignificant with the declining output performance of the state. It indicates that major technological breakthroughs are to be attained to control the falling rate of yield level and land productivity in agriculture in future.

Rise in production and productivity depends upon suitable and successful application of modern technology. The process of mechanisation contributes to agricultural development through enhancing the power, process and precision of farm operation. Mechanisation can improve yields through the improvement of water control, better soil preparation for planting, more efficient weed control, pests, diseases management, proper and timely harvesting , handling, drying, strong processing of food, feed and fiber crops. Table-5 presents the status of modern inputs used in agriculture in the state over last six years.

Table-5 : Level of inputs used.

Sl. No.	Year	No.of Tractors sold	No. of Power Tillers sold	Consumption of fertilizers (Kg/hect.)	% of GCA irrigated	Cropping Intensity (Area in '000 hect).
1	2	3	4	5	6	7
1.	95-96	1623	152	24.60	27	156
2.	96-97	2279	208	30.52	27	138
3.	97-98	2668	482	34.93	28	141
4.	98-99	2012	540	35.51	30	139
5.	99-00	2524	970	40.57	29	140
6.	00-01	5031	1150	49.73(P)	27	124(P)

Source : Agricultural Engineering Today, 1999-2000 and 2000-01 Agricultural Statistics of Orissa at a Glance, Economic Survey. 1998-99, 1999-00, 2000-01.

As the table shows consumption of fertilizers (Kg/hect.) has doubled in the year 2000-01 as compared with 1995-96. Total production of different crops has gone down from 9086 thousand M.T. to 6281 thousand M.T. (P) during that period showing a fall of 31 per cent. Numbers of tractors and power tillers sold have risen by 32 per cent and 13 per cent respectively over the same period. Percentage of gross cropped area under irrigation has remained the same during the same time period.

In summary the following points area observed.

(1) The annual percentage growth rate of the primary sector has not shown any change over the two phases of study i.e. 1950-51 - 1984-85 and 1985-86 - 1997-98.

(2) The of the Sub-sector, "Agriculture and Animal Husbandry" has shown a negative trend in the post-reform period in comparison to pre-form period.

(3) No perceptible growth either in net sown area of gross cropped area is seen over the periods.

(4) The cropping intensity has declined over the last five years (1995-96 - 2000-01) implying thereby that uses of land in agriculture have not been changed.

(5) Cropping pattern of principal crops of Orissa indicates that growing of paddy for self-consumption has been the main motivating force and commercialisation of agriculture is yet to come to the forefront.

(6) As the rise in yield, area and changes in cropping pattern is not at all significant, their combined effect on yield is not also satisfactory.

(7) Mechanisation in agriculture in Orissa is gradually gaining momentum. But it is still not effective due to large number of small holdings, lack of adequate resources and awareness, lack of interest of the tenants and landowners etc.

The sectoral growth rate (Table-1) show gradual diversion of the economic activity of the state from agriculture to industry and trade over the years. Still agriculture plays a decisive role in the process of economic development of Orissa.

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Analysis of Growth in Foodgrains during Five-year Plans of Orissa

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INTRODUCTION

The guiding principles of five-year plans in India are provided by the basic objectives of growth, employment and social justice. The basic aim of planning is to bring about rapid economic growth through the development of agriculture, industry, infrastructure and all other sectors of the economic. Extensive farming, intensive farming and technical change are the three options for agricultural growth strategy. While extensive agriculture is no longer feasible due to limited availability of land frontiers that can additionally be brought under cultivation, intensive farming is not sustainable. The third option i.e. growth through technical change is the most efficient and sustainable option. This is possible due to breakthrough in scientific knowledge for agriculture. Therefore, agricultural growth strategy has evolved with changing emphasis from extensive to intensive farming and finally through technological change opportunities. Besides limited availability of land frontiers, this strategy has been guided by other factors like the need to meet the growing demand for food and other agricultural commodities on account of increases in population and per capita income and also due to the fact that agricultural growth is a means to large goals of economic growth, self-reliance and alleviation of poverty.

Within agricultural sector, foodgrains production is the most important. It has been estimated that our requirements of foodgrains by the year 2000 was 80.17 lakh tons per year, while the average production per year during the 9th plan was 67.46 lakh tons (Samal, 1998). As per the above estimate, a deficit of 12.71 lakh tons has been created in the state. Foodgrains constitute 81 per cent of the total gross cropped area and these are sources of income and employment of the rural people of Orissa. Analysis of data across states revealed a high degree of correlation between the extent of poverty and yield in foodgrains production. Poverty is more acute in Orissa, Bihar and Madhya Pradesh, where foodgrains yield has remained low and growth has been slower than in more progressive states such as Punjab and Haryana (Hossain, 1995). The per ha agricultural SDP in Orissa is lowest (Rs.2,685) among all the states as computed by Roy and Pal (2002) for the period 1996-97 to 1998-99, which

has resulted in high per cent of rural poverty. Therefore, increasing the yield of foodgrains in Orissa is a major area of concern of the policy makers and researchers. This paper analyses the growth of foodgrains during planning periods and helps to understand whether the development of the crops under foodgrains has taken place at an adequate pace and in the right direction and suggests policy measures for the future years.

Foodgrains constitute the broad crop groups of cereals and pulses. The main cereals grow in Orissa are Rice, Ragi and Maize and the important pulses are Greengram, Blackgram, Kulthi and Arhar. Cereals accounted for 76 per cent of total area under foodgrains and among cereals rice accounted for 91 per cent of total area under cereals, when data for the triennium ending 2001-02 were considered. Considering from production side, cereals accounted for 91 per cent of total foodgrains production and rice accounted for 85 per cent of total foodgrains production and 94 per cent of the total cereals production. Therefore, in this paper the growth analysis of broad crop groups such as foodgrains, cereals, pulses and the crop covering largest area i.e. rice is considered for discussion.

DATA METHODS

The data for the purpose of the study have been collected from the Directorate of Economics and Statistics, Orissa and Directorate of Agriculture and Food Production, Orissa for the period 1951-52 to 2001-02 i.e. from the beginning year of the 1st Plan to the end year of the 9th Plan. The simple average of area, production and yield of each plan were computed. The compound growth rates of area, production and yield of each plan were computed by using the equation $Y = A (1+r)^t$, where Y = Area/Production/Yield, A is a constant to be estimated, t = time in years, and r is the compound growth rate. The average growth rate for the entire period of 51 years i.e. from 1951-52 to 2001-02 was also computed. The production and yield figures mentioned throughout the paper are in terms of cleaned rice (rice without husk).

RESULTS AND DISCUSSION

Fluctuations in Area, Production and yield

There have been significant changes in the area, production and yield of foodgrains in Orissa since the 1st Plan. The area has increased about 1.5 times, production 2.7 times and yields by 1.8 times during the plan periods. The area has increased from 44.75 lakh ha to 65.40 lakh ha, production from 25.09 lakh tons to 67.46 lakh tons and yield from 561 kg/ha to 1030 kg/ha (Table 1). The production of foodgrains has fluctuated from 20 lakh tons in 1957-58 to 82.71 lakh tons in 1991-92, when individual years are considered. The fluctuation in production in mainly from two sources i.e. increase or decrease in area and yield. During these 51 years, the yield fluctuated between 442 kg/ha (1957-58) to 1233 kg/ha (2001-02) and area between 43.8 lakh ha (1951-52) to 73.2 lakh ha (1983-84). The wide fluctuation in area and yield from year to year is due to occurrence of natural calamities like drought, flood and cyclones (Table 2).

As rice covers major area (91%) under cereals, the fluctuation in rice area, production and yield also reflects in the fluctuation in area, production and yield of cereals. During these 51 years, the lowest production and yield of cereals and rice were observed during 1957-58 and the highest during 2001-02. The highest production and yield of cereals observed during 2001-02 were 75.4 lakh tons and 1526 kg/ha respectively. Similar figures for rice were 72.2 lakh tons and 1605 kg/ha respectively during 2001-02. The lowest area coverage during this period for cereals and rice were observed during 1960-61. The highest coverage for cereals (53.5 lakh ha) was observed during 1975-76 and for rice (47.3 lakh ha) during 1973-74.

The growth performance in yield of pulses was dismal during these periods. The highest yield (615 kg/ha), which was realised in 1955-56 has not been surpassed even after 47 years of planning. Whatever increase in pulse production has been realised is due to expansion in area. The highest area and production was observed during the year 1995-96.

GROWTH IN FOODGRAINS:

The average area, production and yield of foodgrains along with their growth rates during the plan periods are presented in Table 1. The maximum absolute area, production and yield were observed during 8th Plan, when average figures of all the plans were considered. The average growth rates of area, production and yield were observed to be 0.97, 2.18 and 1.21 per cent respectively during the entire 51 year period. On the average, the compound growth rate in population during 1951-2001 periods was 1.86% per annum. The production growth during 1st (0.25%), 3rd (-0.52%), 6th (1.08%) and 8th (-5.36%) plan was well below the population growth rate of 1.83%, 2.27%, 1.85% and 1.48% respectively. The maximum yield growth was obtained during 2nd plan (16.3%) followed by 5th plan (5.45%) and 7th plan (4.15%). The yield growth was negative in 3 plans i.e. 1st, 3rd and 8th, mainly due to erratic rainfall and occurrence of natural calamities like droughts and floods in those plans. Though the average yield of 8th plan was highest, but the growth performance was negative during that plan. The production growth was negative mainly due to negative yield growth. The production growth was negative during 3rd plan due to the same reasons also. The absolute figures of area, production and yield in the 9th plan were below the average figures of 8th plan, which is the major area of concern. The foodgrains area in the 9th plan has decreased from 69.66 lakh ha in 8th plan to 65.40 lakh ha mainly due to decrease in area under pulses. There was no growth in yield of foodgrains during 9th plan due to set back in yield growth of pulses also.

GROWTH IN CEREALS:

The average growth rates of cereals for area, production and yield were 0.46, 2.07 and 1.61 per cent respectively for the entire period (Table 3). Among all the plans, the 2nd plan performed best in production growth performance followed by 5th, 7th, 4th, 6th and 9th plans. During 3rd and 8th plans, the production growth was negative mainly due to negative yield growth, with has caused

due to drought years. The yield growth performance was best in the 2nd plan followed by 5th and 7th plans. The area expansion under cereals was observed upto 8th plan and has decreased in the 9th plan. The yield growth was negative during 1st, 3rd and 8th plans. This is due to occurrence of natural calamities like droughts and floods.

Growth in Pulses:

The average growth in production during the 51 year was 3.23% (Table 4). This is mainly due to expansion in area at the rate of 3.45% per annum. During this period, the yield growth was negative (-0.22%) indicating that there is no technological breakthrough in productivity of pulses. Among different plans, the production growth was best during 5th plan, which was mainly due to expansion in area (74%) and the rest due to increase in yield. The other plans which performed better in pulses production were 1st and 3rd. The worst performance was observed during 8th plan, where the growth rate was -11.3%, which was equally due to reduction in area and yield. This plan faced a severe drought year (1996-97), which is the main cause of reduction in area yield growth rates. The area, production and yield recorded in this year was 14.58 lakh ha, 5.69 lakh tons and 390 kh/ha respectively. The other plans, when the production growth was negative were 2nd, 6th and 9th, which was mainly due to negative growth in yields. The area growth was positive in all the plans except the last two plans i.e. 8th and 9th. The yield growth was negative in most of the except 1st, 5th and 7th. Most of the pulses are grown under rainfed conditions and therefore, the area, production and yield fluctuations are more than cereals.

Growth in Rice:

Rice is grown under various water depths and only one-third of rice area is irrigated. During the 51 years of planning, the growth in area, production and yield was 0.27, 1.89 and 1.62 per cent respectively (Table 5), which indicates that the production growth is mainly due to increase in yield. The production growths were well below the population growth (1.83%, 2.27%, 1.89% 1.48%) during 1st, 3rd, 4th and 8th plans. Except 1st and 8th plans, the growth in production was positive in other plans. The growth in production and yield was negative during the 8th plan due to occurrence of two drought years in that plan. The growth performance in production was best in 2nd plan (18.85%). This is mainly due to growth in yield (18.41%) in that plan. The growth rate in yield was negative during 1st, 3rd, 4th and 8th plans and less in 6th plan. These findings on rice before 7th plan corroborate the findings of earlier studies conducted by Desai (1984), Mishra (1983) and Reserve Bank of India (1984) that there is no or negative growth in yield of rice during 1970s and early 1980s.

SUMMARY AND CONCLUSION

The average growth in area, production and yield of foodgrains during 1951-52 to 2001-02 was computed to be 0.97, 2.18 and 1.21 per cent respectively.

The growth in yield of pulses was found negative (-0.22%) in the period indicating that there is no technological breakthrough in these group of crops. The area expansion of foodgrains was observed upto 8th plan and thereafter decreased. This is mainly due to decrease in area under pulses. Among all the plans, the 2nd plan was best in growth performance of production and yield of foodgrains, cereals and rice. The growth performance of pulses was found best in the 5th plan. The average area, production and yield have reached its peak in 8th plan for foodgrains, cereals and rice, while the highest area, production and yield of pulses was observed in the 7th plan. The year to year fluctuation in area, production and yield of foodgrains, cereals, pulses and rice was found mainly due to frequent occurrence of natural calamities.

The analysis showed that the area under foodgrains has contracted in recent years and in future the scope of further production growth from area expansion is limited. The growth in production in future will mainly come from yield increase. Presently, technologies are not available for different crops to sustain prolonged drought or submergence conditions. The yield increase in future will be mainly through development of better technologies, which will perform better during the years of occurrence of natural calamities and under rainfed conditions. Therefore, government should invest more funds on research to develop technologies for different foodgrain crops, which can sustain prolonged drought conditions. The yield of pulses was discouraging during the planning periods and priority should be given to develop technologies for better yield of pulses (Greengram, Blackgram and Arhar) under dryland conditions. Rich is the only option in lowlands during the monsoon season. Better varieties of rice need to be developed, which can tolerate prolonged submergence and drought situations and thus will perform better in flood and drought years.

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Table 1. Average Area, Production and yield of Foodgrains and Growth rates during different plan in Orissa.

Plan	Area		Production		Yield	
	in '000 ha	Growth rate in %	in '000 tons	Growth rate in%	in kg/ha	Growth rate in %
1st Plan (1951-56)	4475	0.40	2509	0.25	561	-0.15
2nd Plan (1956-61)	4573	0.97	3039	17.27	659	16.30
3rd Plan (1961-66)	5237	2.78	4354	-0.52	834	-3.30
4th Plan (1969-74)	5914	1.90	4816	2.20	814	0.30
5th Plan (1974-79)	6342	2.25	4988	7.70	783	5.45
6th Plan (1980-85)	6808	0.08	5762	1.08	843	1.00
7th Plan (1992-97)	6922	-0.42	6676	3.73	963	4.15
8th Plan (1992-97)	6966	-1.76	7274	-5.36	1039	-3.60
9th Plan (1997-2002)	6540	1.80	6746	1.96	1030	0.16
Average (1951-52 to 2001-02)	–	0.97	–	2.18	–	1.21

Table 2 : Occurrence of Natural Calamities in Orissa

Natural Calamity	Years of Occurrence
Drought	1954, 1962, 1965, 1966, 1972, 1974, 1976, 1979, 1980, 1981, 1982, 1989, 1987, 1992, 1996, 1998, 2000
Flood	1955, 1956, 1967, 1968, 1970, 1971, 1973, 1975, 1977, 1982, 1985, 1990, 1999
Cyclone	1967, 1968, 1971, 1999

Table 3 : Average Area, Production and Yield of Cereals and Growth rates during different plans in Orissa

Plan	Area		Production		Yield	
	in '000 ha	Growth rate in %	in '000 tons	Growth rate in%	in kg/ha	Growth rate in %
1st Plan	4036	0.30	2270	-0.24	562	-0.54
2nd Plan	4102	0.45	2793	18.63	679	18.18
3rd Plan	4407	1.92	3967	-0.70	902	-2.62
4th Plan	5013	1.77	4360	2.28	870	0.51
5th Plan	5135	0.11	4421	6.65	859	6.54
6th Plan	5026	0.10	4807	1.46	953	1.36
7th Plan	4928	-0.93	5599	4.25	1133	5.18
8th Plan	4985	-0.36	6256	-4.45	1254	-4.09
9th Plan	4941	-0.05	6109	1.28	1236	1.33
Average	--	0.46	--	20.7	--	1.61

Table 4 : Average Area, Production and Yield of Pulses and Growth rates during different plans in Orissa

Plan	Area		Production		Yield	
	in '000 ha	Growth rate in %	in '000 tons	Growth rate in%	in kg/ha	Growth rate in %
1st Plan	439	1.33	239	4.47	544	3.14
2nd Plan	495	0.29	245	-3.24	496	-3.53
3rd Plan	829	9.13	387	4.61	468	-4.52
4th Plan	901	2.56	456	1.12	507	-1.44
5th Plan	1208	11.41	567	15.49	463	4.08
6th Plan	1782	0.02	955	-0.72	537	-0.74
7th Plan	1993	0.85	1077	0.87	541	0.02
8th Plan	1980	-5.75	1018	-11.31	506	-5.56
9th Plan	1599	-0.35	637	-2.04	397	-1.69
Average	--	3.45	--	3.23	--	-0.22

Table 5 : Average Area, Production and Yield of Rice and Growth rates during different plans in Orissa

Plan	Area		Production		Yield	
	in '000 ha	Growth rate in %	in '000 tons	Growth rate in%	in kg/ha	Growth rate in %
1st Plan	3860	0.25	2198	-0.36	569	-0.61
2nd Plan	3950	0.44	2734	18.85	690	18.41
3rd Plan	4228	1.50	3963	0.04	938	-1.46
4th Plan	4547	1.46	4000	1.38	880	-0.08
5th Plan	4455	-0.88	3927	6.37	881	7.25
6th Plan	4224	1.23	4084	2.15	964	0.92
7th Plan	4304	-0.31	4903	7.01	1135	7.32
8th Plan	4490	0.05	5804	-4.40	1292	-4.45
9th Plan	4496	-0.02	5723	1.49	1273	1.51
Average	--	0.27	--	1.89	--	1.62

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Trend in Sectoral Contribution of State Income During Plan Periods

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The structural change in the composition of State & National Income by industrial origin is the consequence of the process of economic growth initiated during planning. Since the growth process involved a rapid expansion of manufacturing in the organised sector, the manufacturing is bound to indicate a relatively sharp increase in comparison to agricultural sector.

The Economic growth also supports the structural change in the composition of state & national income in favour of Industrial & Tertiary sectors. The distribution of gross domestic product in developed countries indicates a much higher share of industry services and relatively low share for agriculture. In all advanced countries, the contribution of agriculture to gross domestic product is below 10% In the U.S.A., which produced large agricultural surpulses, it is less than 2%. On the other hand the contribution of industry in advanced countries exceeds 30%. The disparity in per capita income between developed and underdeveloped countries is largely a reflection of the disparity in the structure of their economies. While the developed economies are predominantly industrial in their structure, developing economies like India are predominantly agricultural.

Hence a structural change in the composition of national income as well as state income is inevitable to increase the pace of economic development. This change should be in favour of industry & tertiary sectors as against agricultural sector.

This paper makes an attempt to study the structural composition of state domestic product of industrial origin of Orissa during plan periods. The change in the composition of Orissa is compared with that of the country to measure the pace of development in the state in comparison to the country,

Since the data regarding gross value added at market prices in different activities are not available, it is not possible to compute and examine the changing contribution of these sectors to the gross domestic product at market prices. However the available data pertain to only gross value added at factor cost. The structural change can there fore be studied only in terms of contribution of different activity sectors to the gross domestic product at factor cost.

The data regarding the gross value added at factors cost during the plan periods for the state as well as the country are collected from various issues of economic surveys of Orissa and India. The results and discussions are given below.

Results and Discussions

The difference in the growth rate in the economy of Orissa & India is shown in table 1. It is seen from the table that the annual growth rate of Orissa during 1951-52 to 1969--70 (at-70-71) prices was 2.71% as against 3.62% in the country, and the gap was 0.91%. During the period 70-71 to 79-80 it was 0.73% as against national average of 2.86% (at 70-71 prices). The gap was 2.13% which was more than double of the previous period. During 1980-81 to 89-90 the annual growth of state income was 4.76% as against 5.36% in the case of the country. (80-81 prices). The gap was 0.60%. But during the period 1990-91 to 96-97 this was 2.85% as against 5.59% in the country. The gap was 2.74% more than what it was in the first period. During 93-94 to 99-00 this was reduced to 1.63% at 93-94 prices.

The table also shows that the rate of growth of per capita income during the same period. It is seen that per capita income of Orissa increases at a lower rate than that of the country. The gap between per capita National and State income was 0.89%. During 1951-52 to 69-70 which increased to 1.76% during the period 1970-71 to 79-80. During the period 90-91 to 96-97 the gap was further widened to 2.86% and during the period 93-94 to 97-98 this was 1.67% This shows that gap between national and per capita income widens during the plan periods inspite of the efforts of the state to increase the pace of development.

Table II shows the gap between national per capita income and state per capita income at current and constant prices. It is seen from table that the gap between per capita national income and state income increases both at current and constant prices during the plan periods. In the current prices the gap increased to the extent of 72 times during 60-61 to 99-2000 where as in the constant prices the gap was widened to the extent of 21 times.

As it is already discussed, the cause of disparity between per capita state and national income may be due the disparity in the structural change of the economies during plan periods.

Table III presents the growth rate of different sectors of the economy during the period 1961-62 to 1973-74 and 1991 to 1997-98. It is seen that during the period 61-73 the agricultural sector of the state economy grows at a higher rate in comparison to the country. Whereas during the second period (1991-98) the percentage of growth is a little higher in the state than that of the country. On the other hand the percentage of growth of the manufacturing sector of the state lags behind in national average in both the above periods. The gap was widened in the second period in comparison to the first period. Same thing happens in the case of tertiary sector. This sector of the state lags behind the national average both in the first and second periods although in the first

period the power sector of the state increases at a little faster rate in comparison to national average. As a result of this the over all growth of the economy during the first period was higher than the national average but in the second period the state lags behind the national average rate of growth.

Table IV presents a comparative picture of the National and State domestic product of industrial origin at current and constant price. In 1960-61 agriculture contributed 50% of the National income but in 1999-2000 the contribution of agricultural has been reduced to 24.7% i.e. reduced to the extent of 50% during the period where as the agricultural sector which contributed 61% to the state income in 60-61 the share has been reduced to 46% 1999-2000 showing a reduction of only 15%. This shows that the State economy continues to be predominantly agricultural in spite of more than 50 years of planning.

The share of industry to the State income which constituted 14% in 60-61 has been reduced to 13% in 1999-2000 where as the share of this sector in the case of National income increased to the extent of 6%. The tertiary sector which contributed 28% to national income in 1960-61 increased its share 48% in 1999-2000 showing an increase of 20%. On the other hand in the State economy this sector contributed 24% in 1960-61 which increased to 40% in 1999-2000 showing an increase of 16% as against 20% in the case of National income.

At constant prices the share of agriculture in National income in 1960-61 was 50%. It was reduced to 26% in 1999-2000 showing a reduction of almost 50%. But in the case of State income the share of this sector was 61% in 1960-61, which was reduced to 44% in 1999-2000 showing a reduction of 15% only. The share of industry, which was 20% in 1960-61 in National income, has increased to 24% in 1999-2000 (4% increase only). But the share of industry that contributed 14% to the State income 1960-61 has become 11% in 1999-2000 showing a reduction of 3%. The tertiary sector, which contributed 28% to the National income, has increased the share to 41% in 1999-2000 showing an increased of 20%. In the case of State income the share of the sector was 24% in 1960-61, which increased to 43% showing an increase of 19% in 1999-2000 showing the same percentage of increase that of the Nation.

It is seen that the gap between the relative share of different sector at current and constant prices has been widened during the period 1960-61 and 1999-2000.

The following conclusions emerge from the study.

(I) The gap between National income and per capita income is widening during the period of study.

(II) The State continues to remain predominantly agricultural in spite of more than 50 years of planning. The share of the industrial sector of the State economy has reduced during the period of study. On the other hand the tertiary sector shows an increasing trend during the period. But growth of the industrial sector is not encouraging.

(III) Due to slow growth of industrial sector in the National economy and stagnant growth in the State economy, the per capita income of India is lower than the developed countries of the world and the State per capita income is still lower than the National per capita incoem. Unless the industrial sector of the State as well as National economy increases its share in total income the per capita income will continue to remain lower in the State than the National average and the National per capita income will also be lower in comparison to the developed countries of the world.

Table 1: Difference in growth rate of Economy of India and Orissa

Period	Total Income			Percapita Income		
	India	Orissa	Gap	India	Orissa	Gap
1951-52 to 1969-70 (at 70-71 Prices)	3.62	2.71	0.91	1.51	0.62	0.89
1970-71 to 1976-80 (at 70-71 Prices)	2.86	0.73	2.13	0.56	-1.20	-1.76
1980-81 to 1989-90 (at 80-81 Price)	5.38	4.76	0.62	3.16	2.90	0.26
1990-91 to 1996-97 (at 80-81 Price)	5.59	2.85	2.74	3.69	1.01	2.68
1993-94 to 1997-98 (at 93-94 Price)	6.8 (92-97)	4.3	2.5	4.60 (92-97)	2.93	1.67
1093-94 to 1999-00 (at 93-94 Prices)	5.6 (97-2002)	3.97	1.63	3.6	–	–

Source -

I) White paper on State Finances, 2001, Finance Dept., Govt. of Orissa

II) Economic Survey, Govt. of Orissa

Table 2 : Gap between National & State Per capita Income during plan periods

End of the Plan period		At current prices			At constant prices		
		India	Orissa	Gap	India	Orissa	Gap
	1951-52				468		
1st	55 - 56	235			507		
2nd	60-61	305	216	89	558	389	169
3rd	65-66	425	328	97	558	429	129
Ann	68-69	552	463	89	589	470	119

4th	73-74	873	699	174	626	482	144
5th	78-79	1251	872	379	714	527	187
6th	84-85	2504	1706	798	1811	1210	601
7th	89-90	4347	2964	1383	2157	1578	579
	91-92	5603	3616	1987	2175	1512	663
8th	96-97	11554	6401	5153	8987	4652	4345
	1999-2000	15625	9162	6463	10067	6411	3656

Note: (a) From 60-61 to 78-79 at 70-71 prices, (b) From 84-85 to 89-90 at 80-81 prices, (c) From 96-97- to 99-2000, at 93-94 prices

Source- Economic Survey, Govt. of Orissa

Table -3 : Sectoral Growth Rate (Compound)

	1961-62 to 1973-74			1991 to 1997-98		
	India	Orissa	Gap	India	Orissa	Gap
1. Agriculture & allied	2.07	3.81	(-) 1.74	3.0	3.27	(-)0.27
2. Industrial Sector	4.21	2.87	1.34	6.7	5.01	1.69
3. Power	9.90	10.73	(-)0.83			
4. Transport	5.16	4.37	0.79	6.8	6.16	0.64
5. Other Services	4.35	4.20	0.15			
6. All sectors	3.40	3.76	(-)0.36	5.6	4.78	0.82

Source- Economic Survey, Govt. of Orissa & India

Table - IV (A) : Sectoral composition of income during plan periods (at current prices)

	60-61			68-69			79-80			89-90			99-2000		
Sectors	Ind.	Ori.	Gap	Ind.	Ori.	Gap	Ind.	Ori.	Gap	Ind.	Ori.	Gap	Ind.	Ori.	Gap
1. Agriculture & others	51.2	61.3	(-)10.1	51.0	63.6	(-)12.6	39.0	56.9	(-)17.3	31.0	55.3	(-)24.3	24.7	46.88	(-)22.18
2. Industry & others	20.1	14.3	5.8	19.0	14.1	4.9	23.9	18.0	5.9	29.3	20.0	9.3	26.4	13.17	13.27
3. Transport	14.0	7.8	6.2	15.4	8.0	7.4	20.5	10.9	9.6						
4. Banking & ADM	14.7	16.6	(-)1.9	14.6	14.3	0.3	16.6	14.2	2.4	39.7	24.7	15.0	48.8	39.95	8.85
Total	100.0	100.0	-	100.0	100.0	-	100.0	100.0	-	100.0	100.0	-	100.0	100.0	-

Table IV (B) : At constant Prices

	60-61 prices			70-71 prices			70-71 prices			80-81 prices			93-94 prices		
Sectors	Ind.	Ori.	Gap	Ind.	Ori.	gap	Ind.	Ori.	Gap	Ind.	Ori.	Gap	Ind.	Ori.	Gap
1. Agriculture & others	51.52	61.31	(-)9.97	50.1	65.5	(-)15.4	40.8	57.0	(-)16.2	33.29	54.5	21.21	26.36	44.97	(-)18.6
2. Industry & others	20.11	14.32	5.79	19.73	12.2	7.5	22.2	16.2	6.0	27.57	21.0	6.57	24.30	11.95	12.3
3. Transport	14.2	7.76	6.26	15.8	11.1	4.7	18.8	11.4	7.4	17.81	8.0	9.81	22.27	19.11	3.16
4. Banking & Adm	14.63	16.59(-)	1.96	14.4	11.2	3.2	18.2	15.4	2.8	10.12 11.16	16.5	4.78	12.70 13.35	23.9	2.55
Total	100.0	100.0	-	100.0	100.0	-	100.0	100.0	-	100.0	100.0	-	100.0	100.0	-

Source- Economic Survey, Govt. of Orissa & India

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"Some Aspects of Economic Development in Orissa."

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1. Sources of data and the methodology:

Economic Time calculated the growth rate on N D P and S D P (for various states) in pre (1980-90) and post (since 1990) reform periods using C S O data and N H D Report, 2001. Using simple statistical tools like ratio, percentage, mean and standard deviation, E T I concluded the calculations. The results of this inquiry are indicative and unearths strength and weakness of states of the Indian Union. The data used in this paper are from C S O, Economic Survey Govt. of India, Economic Survey Govt. of Orissa, Central Budget, State Govt. Budgets, Annual Survey of Industries, U N D P Report and World Development Report. Data used in this article are secondary data. The major indicators of growth for the whole country as well as for some selected states have been examined. Some date gaps are there.

2. Growth Performance of the Indian economy and Orissan economy:

It is worth-wile to indicate Indias' economic performance over the years (since 1980) and compare them with the figures of some states in general and figures of our state in particular. It is seen that the national income grew on an average from 5.47% during 1980-1990 to 5.73 % over 1990. Per capita income from 3.47% to 3.8% for the same period of analysis. Even the growth rate of GNP at 1993-94 prices touched 8.2% for the year 1996-97. However, two measures of growth have been considered in the analysis. They are growth rate of national income and NSDP and secondly, per capita income for the whole country and percapita NSDP. Growth rate of NSDP for Orissa for the above period (1980-90 and over 90s) declined from 4% to close to 3% and per capita NSDP from 2.2% to 1.4% (close to 1.5%) for the same period (the above figures are compound growth rates). It is learnt that the figures for our state are lower than the All India figures and secondly, the national average shows a rise in post 90s compared to post 80s while the figures show a fall for Orissa state for the same period. For our reference and to assess the strength and weakness of our state economy, it is thought to throw some light on economic performance of some states. Over 90s the annual growth rate of percapita NSDP is 2.5% for Andhra Pradesh, 6.18% for Gujrat, 3.21% for Haryana, 6.0% for Karnatak, 4.60% for Maharashtra, 2.5% for Panjab, 5.9% for Tamilnadu, 4.77% for West Bengal, a little more than 1.5% for Bihar, 1.9% for UP. Taking

into account the growth rate of NSDP and growth rate of percapita NSDP of states, Indian states can be put under two categories. They are fast moving states and slow moving states. Further comparing two time periods i.e. pre and post reform periods we also find a trend. Some states have been better off in post 90s compared pre-reform period while some states have not done well over 90s compared to pre-reform period. It is seen that Orissa has grown slowly over 90s than during 1980-90. This trend is incompatible with All India trend of growth rate of national income and percapita income both in current and constant prices. We can safely conclude percapita income differential of states, differential growth rates of NSDP and percapita NSDP over the years and the economic performance of states in pre and post 90s. Two conflicting tendencies are found viz, some states have done well in post 90s compared to pre 90s while some states (like Orissa) have not done well in post 90s compared to pre 90s. Divergence among states are found relating to percapita income and growth rate of percapita income, growth rate of population and rate of growth of NSDP. Both the measures of growth show that we are below the national average and we have grown more slowly.

Further, undivided Bihar, undivided UP, undivided MP, Rajasthan constitute 40% of total population of our country while they contribute 24% to N D P and all coastal states excepting Orissa constitute 43% of total population of the country. Now we can go for a comparison using ratio and percentage, i.e. contribution to NDP to percentage of population to total population of the country.

Case - I	Undivided Bihar undivided UP + undivided MP + Rajasthan	:	24%/40% = 0.6

It means 1% population of such states contribute 0.6% to NDP.

Case - II	Costal states with Punjab & Haryana	:	1% population contributes 1.22% to NDP.
Case - III	All Coastal states excepting Orissa	:	1 % population contributes 1.17% to NDP.
Case - IV	For Orissa	:	1% population contributes 0.53% to NDP.

This is the lowest accounting efficiency. Another feature we find that in Orissa, the situation was better during 1990-95 and worsened after that and the year 1996-97 was incompatible with results of.All India and other states.

To explain the causes of low N S D P and percapita N S D P and slow growth of N S D P and percapita N S D P, some variables have been identified at the end. Prior to that a handful of explanations have been carried out. To do so, some hypotheses have been built and each of the hypothesis has been

tested true or false taking into account the available data relating to the field of enquiry. However, the total national income or state income comes from primary sector, secondary sector and service sector. The performance of each sector has been seen and compared on a regional basis (that is inter-state comparison). Low percapita NSDP and slow growth of percapita NSDP in Orissa lead to low levels of living and poverty. To ascertain the welfare level of the masses i.e. Inter-state disparity in levels of living, the differential growth rates in population of states have been examined.

3. Selected Variables.

It is a fact that the growth of N S D P and percapita N S D P have been more for some states and less for some states. Using the C S data, Times of India group has measured the standard deviation around the mean and concluded that standard deviation in the growth of N S D P was 2.22 in pre 90s while the standard deviation has increased to 3.13 in post 90s. This paper attempts to explain the trends of N S D P and percapita N S D P over the years for the state of Orissa. So some variables have been chosen and studied to go for the reasons for slow growth of N S D P and percapita N S D P. They are, availability of own resources, structure of output, productive efficiency of work force, loan burden and its servicing agricultural productivity, human development Index and availability of infrastructure, change in the composition of aggregate demand and corresponding change in productivity, both domestic and foreign investment, population growth rate, sectoral composition of both income and employment, budgetary policy and dichotomy between coastal and interior economy.

4. Analysis of Variables :

Without resorting to rigorous statistical methods, simple percentage, ratio and standard deviation may be used to study the variable relating to growth. It is a fact that there is a growth of states own resources. But at the same time interest payment and debt servicing increase continuously making an aggregate fiscal deficit of 10 per cent both for the centre states taken together. In late 90s, the total interest and capital repayment as a per cent to our state's own resources stands at 80.8% which was highest in the nation while it is 74.2% for Bihar, 30% for AP, 26.44% for Gujrat, 21.56% for Haryana, 22.16% for Karnatak, 30.38% for Kerala, 57.8% for West Bengal etc. In Orissa, a little is left for sectoral growth. There is a resource crunch and budgetary provision for developmental activities has been inadequate. The ratio between % change in N S D P and % change in developmental expenditure is less than one. It means change in N S D P is insensitive (inelastic) to change in developmental expenditure.

The reasons are obvious, the big-push approach to development is not followed due to resource crunch and secondly public expenditure has been proved to be unproductive on evaluation. In fact, fiscal policy has little dent on the growth of N S D P and percapita N S D P. It is seen from the Tenth Plan

Document that 68.9%, 9.10%, 21.9% are employed in primary, secondary and service sector respectively. Still there is a pressure of working force on land. Undivided MP, undivided Bihar and Orissa absorb the highest percentage of total working class in agriculture while lowest in Industries. Contribution of agriculture to NSDP in Orissa over 90s has been 44.97% while there is a worrying fall in the contribution of secondary sector from more than 16% to around 12%. The share of the primary sector in N S D P of Orissa has shown fall over the years. But the shift is not to secondary sector whose contribution is showing a fall over the years. So change in the sectoral composition of income and employment indicates a trend. The fall in the share of primary and secondary sector in N S D P indicates a powerful growth in transport, communication, banking, insurance, real estate, public administration etc. Employment in the service sector is marked in Orissa. At the same time the claim of public administration from the N S D P is also a worrying rise and cause of concern for many states. Widening revenue base and rationalising public expenditure will help keep better growth prospects.

Areas under cultivation of agricultural products over 90s show that area for cultivation of rice to total cultivable area has increased from 70.9% to 77.2%, wheat maintains at 0.1% area. The total food grain production including pulses covered an area of 91.1 % to total compared to 89.24% in early 90s. Area under cultivation of oilseeds, pulses, sugarcane, tobacco, potato, chillies, ginger etc. which are highly paying have been falling over the years. Rice production in Orissa is around 6.4% of total of total rice production of the country while cereals 0.5% and pulses 1.8% only. Total food grain production comprising rice, cereals and pulses accounts 2.9 % of total national production. All these combined with low efficiency of work force engaged in agriculture indicate marginal change in the outlook of the work force towards case crops and rice production still dominates and this does not guarantee an income protection to farmers. Market price floats and lies low. Yield rate of rice per hect. is 12.1 quintals compared to 16.3 quintal for Gujrat, 31.5 quintals for Punjab, 25.3 quintals for Karnatak, 34.4 quintals for Tamilnadu. Yield rate of food grains for Orissa is the lowest compared to Gujrat, Punjab, Kerala, Karnatak & Tamilnadu.

The percapita N S D P of Orissa is 58.87% of national average in the close of the century while it was 77.68% in 80s. It was also 51.42% of Punjabs N S D P in 80s and 39.76% in 1999-2000. The per capita income gap is widening over the years. The same is the case for N S D P.

The number of industries in the manufacturing sector in Orissa as a % to total factories of the country is 1.21% while it is 13.83 % for AP, 9.87% for Gujrat, 15.15% for Maharashtra, Invested capital for Orissa as % to total investment of the country is 3.22%. The number of workers in Orissa as % to total worker of the country in the manufacturing sectors is only 1.79 %. Value of output of Orissa (manufacturing sector) is 14404.7 cores at the close of the century which is 1.74% of total output of the country. The value of output is

56752.3 cores for AP, 91591.8 for Gujrat, 42690.7 core for Karnatak. Worrying result for manufacturing sector in Orissa. For all output taken together, the employment elasticity has been less than one and declined from .52 to .14 over the years. Only five states that is Maharashtra, Tamilnadu, Gujrat, West Bengal and AP possess 40 % of total industries, 55% of employment, 59 % of output. It means 40 % industries employ 55 % i.e. 55/40 = 1.37 while this ratio is 1.49 for Orissa. It means over employment with less contribution. Again for above five states 55% contribute 59% and the ratio 59/55 - 1.07 which is greater than one. On the other hand 1.79 % workers contribute 1.74 % and the ratio is 1.74/1.79 = 0.97 which is less than for the above states. It means productivity of the work force of Orissa employed in the secondary sector is much lower than the productivity of the work force of the above states. In Orissa more employment is desired without productivity gain. Employment of work force and out put gain have a remote connection in our state. Technology and productivity are to be hired or brought from outside for high-rate of growth. Claim for administered price or support price for agricultural products has nothing to do with growth. Government need not encourage to do with the price and its manipulation. Let market price float. But authority is to pursue policies for better interaction of trade and competition.

Human resource development enables people to understand the needs so that they can be a part of the mainstream and their meaningful participation through purposive socio-economic organisations will help create more output. But human development index of Kerala can be compared with that of Newyork but Kerala has a low percapita income compared to other Southern and South-West states. Infrastructure variation among the states may be studied to show disparity in percapita N S D P over the states. For Orissa the length of road per 1000 sq. km. has been 1687 KM. which is much higher than national average of 750 km. and this is even higher than many fast growing states. UP and Kerala have better railway route length compared to most of the fast growing states. But they do not enjoy high percapita income. Percentage of villages connected with all-weather roads for Orissa in the late 90s' have been 40 while it is 90 for Gujrat, 99 for Haryana, 100 for Kerala, 99 for Punjab, 47 for West Bengal. This does not reveal & symmetrical trend in the growth of N S D P or percapita N S D P. It may be concluded that beyond a relevant growth of infrastructure, further growth may help keep social development instead of growth of percapita income. The solution lies with opportunities and work availability.

Differential rates of growth of population may be seen because it has two sides- it may limit growth or foster it. The annual growth rate of population for Orissa is much less than that of the developed states excepting Tamilnadu. The annual growth rate of population for Kerala is less than one and for Tamilnadu it is more than one. Annual growth rate of population for Orissa is less than all-India average. So differential growth rates of population and growth rates of N S D P and are not intimately connected. Low growth rate of population does not necessarily imply high rate of growth of N S D P. The ratio of work force to total population maintains almost a constant ratio.

$$\frac{\text{State Income}}{\text{Population}} = \frac{\text{NSDP}}{\text{Population}} = \frac{\text{NSDP}}{\text{Workforce}} \cdot \frac{\text{Workforce}}{\text{Population}}$$

Workforce as a ratio to population is relatively stable.

So it is the quality / productivity of W F that improves N S D P.

5. Summary of Findings and Conclusion :

We examined the secondary sector and found that there is a worrying fall in the contribution of this sector to N S D P. Further, existing manufacturing sector show over employment without productivity gain. Work force employed in this sector contributes much less than the same percentage of workers engaged in this sector in most of the fast growing states. Poor performance of this sector does not establish confidence among the private investors. F D I during the reform period has been insignificant for all India. So neither domestic investment nor F D I is sufficiently flowing to this state. In Orissa, we have a two tier economic base - Coastal and interior. Development has been city-centricity growth while there is deprivation and destitution in interior areas. Often it draws the attention of the researchers that institutional arrangements lead to deprivation and people feel like excluded from the mainstream. Geographical divide has been so sharp that it leads to social exclusion of many. This exclusion ruptures the various strands of development. The appropriateness of the development strategy has been doubtful. Orissa has lower percapita income and higher poverty compared to other states. Extent of poverty reduction in the content of low percapita income indicates redistributive Justice or better distribution. But geographical divide has made poverty highly concentrated in deep interiors and among SC and ST. Variation in resource availability for development across states, debt repayment burden, no substantial change in the structure of agricultural output, concentration of investment - domestic and foreign in some regions, low productivity of the work force, two tier economy, ineffective fiscal policy are the reasons for slow growth of N S D P and percapita N S D P. These have brought little structural change in the sectoral composition of income and employment. This explains the trend in N S D P. Service sector has become the only saviour. Fall in the share of primary sector has not been compensated by the increase in the contribution of the secondary sector. The share of the secondary sector has fallen too. Whatever little is available for public expenditure, it is to be spent on assessment basis i.e. to rationalise the expenditure. Increase in employment in the service sector does not mean that we have stepped up to a higher level of growth. Non-farm services may be adjusted to counter poor agricultural performance- employment and income. Area of cultivation of food items for consumption has to change for production of non-food items. Area of cultivation for food production for domestic consumption has to change for exports, inter-state trade and for reducing dependance and drain of income.

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1987	Kendrapara College	Kendrapara	Prof.Benudhar Bhuyan
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