Kerala's Development Experience: Its Implications for Finance Commissions

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ABSTRACT

This paper examines critically the awards of the recent Finance Commissions (FCs) in the specific context of the ongoing work of the Thirteenth Finance Commission (13FC). The Commission is currently engaged in determining the quantum and modes of financial transfers from the Centre to different states for the five-year period beginning from 2010-11. It is the transfers which are being decided now by the present Commission that are going to determine in the medium term the size and the shape of the budgets and the plans of not only the State government but also of its local bodies. Our review of State's finances shows that FC transfers account for about three-fifths of the total revenue transfers from the Centre to the State and about one-fifth of the State's total revenue. The paper highlights the pitfalls in the approach of the earlier Commissions which resulted in progressive decrease in the flow of Central funds to Kerala, thus aggravating its fiscal crisis.

The paper is divided into two sections. Section I presents an empirical study on how Kerala had fared in the matter of Statutory transfers in the past. It examines how different criteria adopted by different FCs affected Kerala. It also proposes some new criteria which may be of utmost relevance to the State but have not yet been considered by any of the FCs. Section II examines the implications to the State of two of the new terms of reference (ToRs) given to the 13FC. The paper finds that the very novel ToR on management of ecology, environment, climate change and sustainable development will be very helpful to the State in claiming substantial funds from the FC. The State's claim on the above grounds is quite strong in view of its limited use of energy, limited emission of Greenhouse gases and the large scale Carbon sequestration taking place not only in its tropical forests but also in its plantations and innumerable homegardens.

Key Words: Finance Commission, Statutory Transfers, Centre-State Transfers, Federal Finance, Kerala, India, State Finances.

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Despite the enactment of Fiscal Responsibility Act way back in 2003, the fiscal deficits and revenue deficits of Kerala continue to miss the targets under the Act. Kerala's position in respect of these deficits is worse than that of most other States in India. In fact, Kerala was one of the four states which still had revenue deficits in 2007-08. Its revenue deficit as a percentage of Gross State Domestic Product (3.1 percent) was the highest for all the states in India. Its ratio of Gross Fiscal Deficit to GSDP (8.0 percent) was the highest among the fifteen major states. What is more, the borrowings of Kerala to cover its Gross Fiscal Deficit (GFD) were utilized mostly for financing revenue deficits. As much as 70 percent of the GFD borrowings went to finance revenue deficits in Kerala. Only less than one-fourth went for financing capital outlay. The rest, about ten percent, went for net lending. Such a pattern of utilization of GFD borrowings prevails only in very few States.(Reserve Bank of India 2008)

Mismanagement of the finances by the State government is the reason most often highlighted during the current discussions on the State's fiscal crisis. The role of Central government, pivotal under the existing Centre-State financial relationship is mentioned more as an after thought. It is seldom mentioned that the share of Central government transfers in the total revenue of the State has been coming down almost steadily. Central Transfers now finance less than a quarter of the State's revenue expenditure. In all the years under the present review, the role of Central transfers in both Kerala's revenue and revenue expenditure was much smaller than the average for all states (Table 1).

In the Central revenue transfers to the State, the role of Finance Commissions is found to be more important than that of the Planning Commission and the Union Ministries. The Statutory transfers (transfers effected on the recommendations of the Finance Commissions) now account for about three-fifths of the aggregate revenue transfers to the states from the Centre(Table 2). They account for about 20 percent of the total revenue of the State. It is in view of the importance of this channel of transfers that this paper examines critically the role of the Finance Commissions (FCs), especially the last three Commissions, in contributing to the State's revenue deficit. Our examination is being made in the specific context of the ongoing work of the Thirteenth Finance Commission (13FC) which is engaged in determining the quantum and modes of the financial transfers from the Centre to the states for the five-year period beginning from 2010-11. It is these transfers which are now being decided by the FC that are going to determine the size and the shape of the budgets and the plans of both the states and their local bodies in the medium term. It is hoped that this paper will help the present FC to avoid the pitfalls in the approach of their predecessors which resulted in progressively reduced flow of funds to Kerala, thus aggravating its fiscal crisis.

The paper is divided into two sections. Section I presents an empirical study on how Kerala had fared in the matter of Statutory transfers in the past. It examines how different criteria adopted by different FCs affected Kerala. It also proposes some new criteria which may be very relevant to the State but have not yet been considered by any of the

FCs. Section II examines the implications to the State of two of the new terms of reference (ToRs) given to the Thirteenth Finance Commission.

SECTION I

Table 1 presents the share of different modes of Central transfers in the total revenue and revenue expenditure of the State from the nineties. The share of aggregate revenue transfers in the total revenue of Kerala came down from 35.5 per cent in 1990-91 to 29.8 per cent in 2007-08. There were wide year to year fluctuations in this share. In regard to the share of Central taxes in total revenue of the State, there was almost a steady decline over the years. In the share of grants from the Centre too, there was a sharp decrease from the mid-nineties. The Table also brings out the decreasing role of Central transfers in financing State's revenue expenditure. The share of these transfers in expenditure has been coming down rather steeply from the mid nineties. It came down from 30.2 per cent in 1990-91 to 24.5 per cent in 2007-08. In respect of the share of aggregate Central transfers in both the revenue and expenditure, Kerala lagged behind all states (AS).

The role of Central transfers particularly of Statutory transfers in the State's budget has been coming down on account of two reasons. Firstly, the share of States as a whole in the Central revenue, particularly in tax revenue has been coming down. Secondly, Kerala's share in the total amount transferred to all the states is coming down.

As for the first reason, the Twelfth Finance Commission (12FC), no doubt had stepped up the States' share in total Central tax revenue marginally to 30.5 per cent from the 29.5 per cent fixed by the Tenth and the Eleventh Finance Commissions. But the stipulated shares are not that of gross tax revenue but that of revenue after excluding Cesses and Surcharges and after deducting the cost of collection. Consequently, the share of States in total Central tax revenue fixed by these Commissions was reached only in one year (1997-98) during the entire eighteen-year period covered by their awards (Table 3). The gap between the actual ratios and the stipulated ratios has been widening in recent years. The exclusion of Cesses and Surcharges from the shareable pool of Central taxes and the increasing resort to these means by the Central government may be part of the reason for the gap. The 13FC should take some measures to arrest the increasing tendency of the Central government to keep a good portion of Central tax revenue out of the reach of the State governments as has been argued elsewhere. (George and Krishnakumar 2008)

Table 4 presents the share of Kerala under the awards of last three FCs. The Eleventh Finance Commission(11FC) had evoked strong criticism in the State as the share of Kerala in total transfers to states under its award had come down; from 3.4 percent under the award of the Tenth Finance Commission (10FC) to 2.8 percent. When the report of the 11FC came out, it was estimated that for the five-year period covered by its award (2000-2005), the State would get Rs.3664 Crore less than what it would have got as per the recommendations of the 10FC. The Twelfth Finance Commission reduced Kerala's share still further to 2.6 per cent. During the period, 2005-10 covered by the 12FC, it was found that Kerala will be getting Rs.2424 Crore less than what it would have got under the award of even the 11FC.

Table 5 presents the per capita devolution (share in Central tax revenue) and grants received by Kerala and all states during the awards of the last four FCs. Kerala received less Statutory transfers than the average for AS under the awards of all the four FCs. It was getting less both under tax sharing and grants. The only exceptions are the first two years of the 12FC (2005-06 and 2006-07), when Kerala received more grants per capita than AS. However, if the grants receivable for the entire five year period of the 12FC's award are taken , Kerala will be getting less than the average for AS.

The Criteria which affect Kerala Adversely

The reasons for the decline in the share of Kerala in total Statutory transfers have to be looked for in the criteria employed by the different Finance Commissions for their inter-state distribution of transfers under different modes particularly by way of tax sharing. The share in Central tax revenue is the most important component of Statutory transfers. Its share in transfers to Kerala was as high as 99 per cent during the period 1991-92 to 2000-01. During the next three years, the share of taxes decreased slightly, but it still ranged between 93 and 96 per cent. The 12FC, in tune with their general policy had reduced the share of Central tax revenue in its total transfers considerably; but it still accounted for 83 per cent. If Kerala is not getting larger share in Finance Commissions' transfers, the fault lies largely in the criteria used by them in their inter-state distribution of the Centre's tax revenue.

Kerala has not been getting larger share in Central taxes because of four reasons. (1) The use of criteria inappropriate for the State, (2) Use of inappropriate indicators for the criteria used (3) Inappropriate weights given for the different criteria and, (4) Failure to use criteria which are most relevant to the State. The criteria adopted by the Finance Commissions differed from Commission to Commission. They were a mix of population, per-capita income, area, contribution, revenue equalization, non-plan deficit, tax effort, fiscal efficiency, index of backwardness, index of infrastructure, index of deprivation and the poverty ratio.

The criterion of population was used by all the Finance Commissions right from the first. But the weight given to it varied. The 12FC stepped up the weight of population to 25 percent from 10 percent assigned by the 11FC. It had also assigned a weight of 40 per cent to population while distributing grants for local bodies.

All the recent Finance Commissions since 1971 had been enjoined under their terms of reference that "they shall adopt the population figures of 1971 in all cases where population is regarded as a factor for determination of devolution of taxes and duties and grants in aid". Accordingly, in giving weightage to the criterion of population for tax sharing, all Finance Commissions including the Twelfth used the 1971 population figures. But the 12FC had made a deviation from the past while allocating grants to local bodies amounting to Rs.25000 crores. The Commission for reasons which are not made clear, had used the 2001 Census population figures. This change affected a state like Kerala, which had been the most successful state in controlling population growth. (It reduced its decennial growth rate to single digit.) This change might have also affected states like Tamil Nadu, Andhra Pradesh, Goa, Tripura and Orissa which have good track records in controlling population.

The success of Kerala and these States in controlling population growth has hit them in an indirect way also. In calculating per capita income, it is the current population and not the 1971 population, which is being used by all the Finance Commissions. This tends to push up the relative position of these States in per capita income and thus reduces their entitlement as distance from average per capita income of all states is taken as a criterion with large weights by most FCs.

Per capita income is used by all FCs, no doubt, as a measure of economic development and fiscal capacity of a State. But the FCs had erred in taking per capita income as the sole indicator of a State's economic development status. The world over, national/regional development is measured in terms of not only per capita income but also of employment rates. But none of the Finance Commissions had used employment as an indicator and instead relied solely on per capita income. Data of major Indian States show that, there is no significant correlation between per capita State income and States' employment. The Finance Commissions, by not considering employment as an indicator of economic status hurt a state like Kerala with employment rate especially of women which is the lowest in the whole country (Table 6).

The indices of backwardness and infrastructure, due to the excessive weight to social indicators had been adversely affecting Kerala, which had been in the forefront of social development, despite having low levels of per capita income till recently. For the same reason, the index of deprivation too had been affecting Kerala badly.

Finance Commissions' Grants

Tables 4 and 5 show that Kerala had received much less grants than other States in the hands of the recent Finance Commissions. Kerala's share in total grants to the States was only 1.4 per cent under the 11FC and 2.3 percent under the 12FC. In per capita terms, Kerala received Rs.135 against the AS average of Rs.413 under the award of the 11FC. For the entire five-year period covered by the 12FC, Kerala is to receive in per capita terms Rs.1022 as against Rs.1404 for AS.

Of the different types of grants, the single most important grants were the ones meant for the local bodies. They constituted about 35 percent of the total grants to Kerala under the award of the 12FC. In these grants, Kerala's share was comparatively high. Next in importance were the Upgradation grants which constituted about one-fourth of the total. Grants for State specific needs constituted 15 percent. Deficit grants constituted another 15 percent. Grants for relief of natural calamities accounted for more than one-tenth.

Upgradation Grants

Table 7 presents the share of Kerala in the total grants meant for upgrading specific services. In such Upgradation grants, the share of Kerala was negligible. Many FCs including the 12FC provided no grant at all for upgrading the State's health or education services. Kerala's share in grants for upgradation of all social services put together was just 0.1 percent under the 12FC's award. The State obviously is being penalised for its success in attaining above average standards in social services like education and health care. While all FCs had taken cognizance of Kerala's major achievements in education, health and other social sectors, they had failed to appreciate that there are flip sides to Kerala's much lauded achievements. As seen already, Kerala's social development has deprived it of its share in Central tax revenue.

Grants for State Specific Needs (Special Problem Grants)

It is from the Eighth Finance Commission that the State specific/ special problems of individual States which may require capital investment to solve have started receiving the attention of the FCs. Among the recent Commissions, the 10FC provided Rs.52 crore as special problem grants- Rs.50 crore to tackle the problems of fishermen and Rs.2 crore for the conservation shola forests. What Kerala received was about Rs.50 crore less than what was received by Maharashtra. The 11FC provided just Rs.50 crore by way of special problem grants to Kerala. This amount was meant for preventing coastal sea erosion, the only special problem that it could identify. The 12FC granted comparatively more funds under this head to the States. Of the total Rs.500 crore granted to the states, Rs.225 crore was for development of inland waterways, Rs.175 crore for coastal zone management and Rs.100 crore for improvement of quality of school education. None of the FCs however have identified the real state-specific problems of Kerala whose genesis can be traced to the very success of the State's unique and much eulogized development experience.

It is often acclaimed that Kerala's achievements are comparable to those of developed countries. But these successes have also brought in its wake the problems of the developed countries. Unlike these countries, the State does not have the financial ability or the economic strength to tackle them all by itself. The Central agencies including the FCs had added to the financial debility of the State by denying it funds by way of Upgradation grants or special problem grants.

Since agencies like the Finance Commissions are preoccupied with the first generation problems in education, health care and social security in other parts of the country, Kerala's unique 'second-generation problems'(George 1999) resulting from its very success in attaining higher levels of social development receive scant attention. For instance, the lengthening life expectancy has resulted in the aging of population, which has tremendous implications on the State's budget.

Ageing of Population – A Special Problem of Kerala

Table 8 presents the share of elderly in the age group 60 and above in the population of both Kerala and India during the last three Census years. The table shows that the proportion of elderly to the total population was always higher in Kerala than in the country. While the proportion was increasing very fast in Kerala between the Census years, the same for the country was increasing only marginally. The number of elderly in Kerala stood at 25.61 lakhs in 2001.[1] The projection of the old age population in Kerala shows that the proportion of old people in the population is expected to reach 13.6 percent in 2011. The proportion of the old old(75+) will be 28 percent of the elderly in the State(Irudaya

[1] Census of India Reports

Rajan and Zachariah). The large greying population has several implications in relation to health needs, dependency rate, service pension requirements and social security system.

Kerala's success in extending life expectancy has been burdening the government with a high-volume of service pension payments. The problem is likely to be aggravated in future as death rates are likely to fall further among senior citizens in the State. Already, these pensions account for 17.8 percent of the State's non-plan revenue expenditure as against the average of 11.3 percent for all states. In respect of share of pension expenditure, Kerala's share was the highest.

The changing population profile is straining the State's social security system. The majority of the social security schemes in Kerala are targeted at its senior citizens. The burden of these schemes is likely to increase in view of the demographic changes taking place fast. Already, the State is unable to revise the rates of welfare payments in time to compensate for the increase in cost of living. Besides, these payments to the elderly are effected only after considerable time lags due to budget constraints.

The changing demographic profile is also likely to increase the demand for expenditure on health services. The increasing proportion of the aged in the State's population is changing the disease profile in the State (Panikar and Soman, 1985). A new category of diseases comprising degenerative and neo-plastic diseases like hyper-tension, cardio-vascular diseases and cancer have begun to emerge in the State. The proportion of these diseases which is already quite high is likely to increase further. These diseases of the old call for higher investment in diagnostic equipment, hospitalisation, treatment, recovery and rehabilitation. At a time when the expenditure requirements on health are rising, the State is finding it increasingly difficult to meet these requirements. As a result, the quality of services in the government health services has come down. Consequently, there has been an increase in the demand for private medical care services offered very often on commercial terms. This, in turn, has boosted the average private expenditure on medical care. Monthly per capita expenditure on medical care in rural Kerala was Rs.103 as against Rs.37 for India. In the urban areas, the expenditure was Rs.92 for Kerala and Rs.55 for India (NSS Report No.509, 2004-05). In this respect Kerala's position was the highest among the states. The State seems to be losing its gains on the health front.

It is necessary that the 13FC should consider ageing of population of Kerala as a special problem and provide Special Problem and Upgradation Grants to meet the manifold additional expenditure needs of the government for service pensions, social security and health.

Special Problems in Higher Education

In the field of higher education, Kerala lags behind other States not only in qualitative terms but also in quantitative terms. This is yet another success induced second generation problem of the State's social development. The demand for tertiary enrolment in absolute terms is much higher in Kerala due to large scale, almost universal enrolment in schools. But the State is not able to meet this demand due to financial constraints. As a result, the Gross

Enrolment Ratio in higher education is only 9.9 percent (Agarwal 2006). This ratio is quite low given the high ratio of enrolment in schools.

The 13FC should treat the problem of insufficient capacity in higher and technical education in the government owned/aided institutions of the State as a special problem arising out of the State's very success in attaining universal schooling.

Changing Profile of Employment Seekers

Yet another second generation problem of the State is the change in character of the unemployment in the State. Higher levels of education have changed the character of unemployment in the State to that of educated unemployed. Eighty four percent of the unemployed registered on the live registers of employment exchange are matriculates and above. This makes most of the Centrally Sponsored Schemes (CSSs) for employment inappropriate for the unemployed of the State.

Article 275 Grants

None of the Finance Commissions from the seventh had given any grant to Kerala under the substantive provisions of Article 275 of the Constitution meant for States "in need of assistance". The 12FC however was good enough to give Rs.470 crore as such grants, but restricted it to the first year, i.e., 2005-06. The State was not receiving Article 275 grants because the Finance Commissions in their normative estimates assumed surpluses in the non-plan revenue account of the State. But the State actually had continuous deficits in its non-plan account ever since 1985-86, even if we include all additional resources mobilised (meant for financing the plans) in the non-plan revenue account.[2]

Non-Plan deficits/surpluses assumed by the Sixth Finance Commission onwards and the actuals are given in Table 9 for Kerala and AS. The Table shows that when surpluses were assumed by the Finance Commissions, they turned out to be just mirages in the case of Kerala. There were variances between FC forecasts and actuals in the case of All States too. When deficits were assumed by the FC, the actuals turned out to be considerably higher than those assumed by the Finance Commissions. No doubt, the States cannot be totally absolved of their responsibilities for running into revenue deficits. But, at least part of the blame for non-plan deficits in excess of the FCs' forecasts may have to be borne by the unrealistic assumptions with which forecasts were made by the Finance Commissions.

An analysis of the variations between FC forecasts and actuals shows that there were variations in the projections of both revenue and non-plan expenditure.(Table 10) The variations were negative in the case of revenue while they were positive in the case of expenditure. It is also seen that the variations are more in the non-plan expenditure than in the revenue receipts. There were variations under all heads of expenditure. The largest variation however was in compensation and assignments for local bodies. Such large variations under this head occurred not only for Kerala but also for many other states. But the variance was the largest for Kerala. One explanation given by the State

[2] We are not able to segregate the additional revenue mobilized because the accounts data for revenue used by us from the RBI's State Finances studies do not give separate figures of ARM.

government is that the large amounts given to the local bodies were given as plan grants. But this is not wholly true. Even the General Purpose and the Maintenance grants given as per the recommendations of the Second State Finance Commission were not taken into account by the 12FC.[3] But the fault does not lie entirely with the FC as even the State government failed to include these non-plan grants in their projections. How such a serious mistake escaped the attention of the Finance Commission and even the State government is really baffling. This points out the need for the FC's making available their working sheets before making the actual allocations.

Finance Commission's Award and the State Plans

The present Finance Commission is enjoined by its TOR that the demands of the resources of the Central government, in particular on account of the <u>projected Gross Budgetary Support (GBS) to the Central and the State plan</u>s, expenditure on civil administration, defense, internal and border security, debt servicing and other committed expenditure and liabilities should be taken into account while recommending the quantum of transfers to the States (emphasis added). This ToR makes statutory transfers residuary. Liberal provision of GBS for the Central government if allowed by the FCs will give further scope for it to incur plan expenditure in the State through the back door of Central and Centrally Sponsored Schemes. The 13FC should not therefore leave GBS for State plans entirely to the Central government. Besides, it is very much in its own power to provide budgetary support to the States' plans directly. This can be done by leaving larger surpluses in the non-plan accounts of States which then can form the nucleus of plan funds for the States (balance on current revenue). Even at present, it is the policy of the Finance Commission with regard to tax sharing and grants that largely determine their surpluses in the non-plan account.

Kerala's share in the non-plan revenue surplus of all States after devolution of tax shares and all types of grants was 4.1 per cent under the 10FC's award. It came down to 3.2 per cent under the award of the 11FC. Kerala's share will go down steeply to 1.3 per cent under the award of the 12FC. As a result, the per capita non-plan revenue surplus of Kerala under the award of the Twelfth Finance Commission will be only Rs.2127 as against the all States average of Rs.4840 (Table 11). The State's per capita surplus will be much less than that of more developed states like Haryana, Gujarat and Maharashtra. Thus the State would face a major handicap with respect to its plan financing during the period, 2005-10 even if the surpluses assumed by the 12FC were realized. But the assumed surpluses of Kerala turned out to be deficits in both 2005-06 (Rs.1975 crore), 2006-07(Rs.2420 crore) and 2007-08 (Rs.4251 crore). Kerala was not alone in having a non-plan deficit and therefore negative balance in current account for plan financing. Many other states too faced the same situation. While the FCs are able to bring about some degree of progressiveness in their funds transfers, they have not yet been able to bring about such progressiveness in their final outcome viz., non-plan surpluses.

[3] Report of the Third State Finance Commission Kerala, 2005.

SECTION II

The Thirteenth Finance Commission has been saddled with seven ToRs. It is enjoined by the ToRs to have regard to 1) the objective of not only balancing the revenue budget of the States and the Centre but also generating surpluses for capital investments, 2) improve the tax-GSDP ratio of States, 3) to review the road map for fiscal adjustments and suggest a suitably revised road map with a view to maintaining the fiscal consolidation through 2010 to 2015. As has been pointed out elsewhere, these ToRs on fiscal discipline have become largely outdated with the recession gathering momentum (George and Krishnakumar 2008). In fact, they stand in the way of both the Central and the State governments providing fiscal stimulus to the economy.

While all States are affected by the recession, Kerala is likely to be affected much more. This is because the State is more closely integrated with the rest of India as also with the rest of the world. Kerala's integration with the world is not only through export of commodities but also through the export of man power. It was found that for every hundred households, there were 11.5 households with persons outside the State but within India. For every hundred households, there were 24.5 households with one or more emigrants residing outside India, mostly in the Gulf(Zachariah and Irudaya Rajan, 2007). The remittances from the non-resident Keralites(NRK) are equivalent to 20 percent of the NSDP of the State. In fact, the value of these remittances exceeds the value of income originating in State's the primary sector as well as in the manufacturing sector. The loanable funds of Kerala's banking system depend substantially on the NRI deposits which form 35 percent of the total deposits. Recession in the world particularly in the Gulf countries has been affecting the employment opportunities of non-resident Keralites. There are apprehensions about the large scale return of migrants to Kerala. This is particularly true about emigrants working in United Arab Emirates, the country most adversely affected by recession (42 percent of the NRKs are working in UAE. The share of West Asia in NRK population is 89 percent).

Kerala is also adversely affected by global recession as a good portion of the output and employment in the State depends on export of commodities spices, cashew nut, coir products, marine products, handloom and handicrafts. The affected sections of the people in these sectors are mostly poor even now. Decline in the prices of cash crops like rubber which dominate the agricultural sector is yet another reason why Kerala is going to be worst affected by recession. The decline in tourist arrival is another factor that may lead to unemployment of large number in service sectors. The recent estimates by the Centre for Development Studies (CDS) place the number of persons whose livelihood is likely to be affected due to income loss or job loss at 38 lakhs(CDS, 2008). The sector-wise details are presented in Table 12.

The recession is likely to upset the budgets of Kerala as of other states. There are already signs of deceleration in revenue growth while demands for fiscal stimulus are growing. The 13FC has therefore to disregard its ToR binding it to surplus budgets and accommodate the states' requirements of funds to counteract the growing recessionary trends.

Management of Ecology, Environment and Climate Change

For the first time, a Finance Commission has been asked to take into account "the need to manage ecology, environment and climate change consistent with sustainable development". We are not sure how the FC can do justice to such a complex topic given the limited and scattered nature of data available, the limited expertise of the Commission on the subject and above all the limited time available to it. All that can be hoped perhaps is for the Commission to make a beginning in this respect. It may be possible for the Commission to initiate a system of incentives and disincentives. It can perhaps think of a mechanism akin to Clean Development Mechanism (CDM) under Kyoto Protocol. All available data, scattered as they are suggest that Kerala's entitlement for carbon credit under any scheme akin to CDM can be quite large as the Carbon sequestration in the State is likely to be much more than its emission of Greenhouse Gases(GHG) on the following grounds.

1. The electrical energy used for unit of GSDP produced is comparatively quite low.
2. The State relies less on thermal sources for electricity generation. Much of the electricity generation is from hydel sources.
3. Emission of Carbon Dioxide, Methane and Nitrous Oxide from the State is quite low.
4. The Carbon Sequestration in the State is much more, not only due to its large forest cover but also due to other perennial tree crops grown not only as plantations but also as homegardens.

Energy Intensity in Production

The Table 13 presents the ratio of electrical energy consumption to GSDP in the four southern States. The Table shows that the electricity used for production in the State is comparatively very low in Kerala. This is because of the larger share of service sectors in GSDP. Besides, the manufacturing sector in Kerala is dominated by unregistered units belonging mostly to traditional industries like Coir, Cashew, Handloom and Beedi which are low energy intensive.

Table 14 gives the relative share of different sources of power generation capacity in December 2007. The hydro-electric capacity constituted as much as 70 percent in Kerala whereas it constituted only 28 percent in India. The share of thermal sources was only 30 percent in Kerala whereas its share for the country as a whole was as high as 69 percent. There is no nuclear reactor in the State, whereas, nuclear plants constitute 3.2 percent of the total generation capacity in India.

Emission of Greenhouse Gases and Carbon Sequestration

As for the issue of climate change included in the ToR, individual scientific studies reported in respectable scientific journals show that the emission of GHG from Kerala is one of the lowest among states in India. Table 15 presents the State level Carbon Dioxide emissions in India during the twenty year period between 1980 and 2000 based on their fuel usage pattern. In both the total emission and per capita emission, Kerala's rank among the fifteen major States was the second lowest (Tapas Ghosal and Ranajoy Bhattacharya, 2008).

Table 16 on the emission of Methane and Nitrous Oxide (the two major Greenhouse Gases) from livestock shows that Kerala's emission was the lowest among the fifteen major States. Kerala contributed less than one percent of the total emission in India (Swamy and Bhttacharya, 2006). Emission of Methane and Nitrous oxide from agricultural soil in major States given in Table 17 also brings out that global warming potential of Kerala was the lowest among major States(Bhatia *et. al*, 2004).

While the emission of GHG from the State is quite low, its Carbon sequestration potential is quite high. This is due to the large area under forests as well as under other tree crops. Table 18 shows that the proportion of recorded forest area to geographical area in Kerala was 29 percent as against 23.4 percent for the country. The above proportion for the State is the third largest among the fifteen major States (after Orissa and Madhya Pradesh). The forests in Kerala are better stocked than forests in other parts of India. The three types of forests viz., tropical wet ever green and semi ever green forests, tropical moist deciduous forests and tropical dry deciduous forests with larger potential for Carbon sequestration constitute 80 percent of the natural forest area.

In addition to forests spread over 11265 square kilometres, Kerala has rubber cultivation in area totalling 5027 sq.km. in 2006-07.[4] Kerala accounts for more than four-fifths of the area under rubber plantations in India which act as excellent terrestrial carbon sinks. Estimates place the total amount of carbon sequestered during the 21 years of growth of matured rubber plantation in central Kerala at 66.47 tonnes C/acre (16418 tonnes per sq.km). The mean annualized Carbon sequestration rate during the 21 year period comes to roughly 3.17 tonnes C/acre/year (783 tonnes C/sq.km./year) which is equivalent to 11.62 tonnes CO_2/acre/year (2870 tonnes CO_2/sq.km/year). The Carbon stock of a 21 year old rubber plantation is quite comparable with that of forest ecosystems especially in the above ground pool (James Jacob, 2006). Other studies have also reported that the biomass production potential of rubber plantations is comparable to forest ecosystems and in the untapped rubber plantations, the potential values of biomass are even higher than those of tropical forests (Tharian George, 2001).

Apart from rubber, Kerala has vast areas under tree crops such as coconut (870939 ha), arecanut(102078 ha), coffee (84571 ha), tea(35364 ha) and cashew (70461 ha) in 2006-07(State Planning Board, 2008). Some of these crops are grown as plantations and some others as homestead farms. These crops also act as carbon sink though data on their carbon sequestration ability are not readily available for all the crops.

A study in the Indonesian context has found that a twenty year life cycle of Coffee multi cropping systems is comparable to short rotation timber plantations and to forty-year life cycle of fruit trees such as mango, duku and durian (Kirsfianti Ginoga *et.al*, 2002).

[4] *Indian Rubber Statistics,* Rubber Board, Government of India.

A study in the terai zone of West Bengal showed that agroforestry systems, viz., tea garden and agri-horticulture contributed 24.24 percent and 9.09 percent Carbon respectively, when compared to the natural forest of *Shorea Robusta*(Divy Ninad Koul and Pankaj Panwar, 2008).

Kumar (2006) has found, based on available information, that tropical home gardens, the multi species production systems have a higher potential to sequester carbon than mono specific production systems. Besides, their costs are lower than emission reduction or sequestration by other means. According to him, the carbon sequestration potential of home gardens that mimic the structure and diversity of evergreen forest formation is comparable to that of such forest stands. He has estimated that Kerala has 4.32 million homegardens covering about 1.33 million ha of land.

Biodiversity

The tropical forests of Kerala are valuable not only for its Carbon sequestration ability but also for its water holding capacity. It is this capacity of the forest ecosystem which makes the flow of the 44 rivers of Kerala perennial. Water in these rivers is used not only by Kerala but also by neighbouring States like Tamil Nadu and Karnataka.

Kerala represents an epitome of the biodiversity profile of the Western Ghats in India. The State contains 95 percent of the flowering plants and 90 percent of the vertebrate fauna of the Western Ghats. Western Ghats in Kerala is one of the world's 34 hotspots of biodiversity. Kerala has three floristic hotspots viz., Agastyamala, Anamala and Silent Valley. The Western Ghats in Kerala have 4500 species of flowering plants. There are 145 species of mammals (of which 14 are endemic to Western Ghats), 169 species of fresh water species, 93 species of amphibians (of which 40 are endemic). There are also 486 species of birds (of which 16 are endemic to Western Ghats). This is in addition to innumerable micro flora and fauna. The State has two biosphere reserves- Nilgiri and Agastyamala (State Planning Board, 2008). The State has three out of twenty five wetlands of international importance included in the Ramsar list viz., Ashtamudi, Sasthamkotta and Vembanad-Kol land.

Costs of maintaining Forest Cover and Biodiversity

The Finance Commission has to consider the forest cover and biodiversity of the State as a public good, beneficial not only for the State but also for the country and the whole world. As the benefits are shared by the whole country and the world, it is only fair that the Central government and other countries share the costs, both financial and economic for its maintenance.

In addition to the financial costs in the form of revenue loss, the State in incurring huge opportunity costs in the form of loss of agricultural production particularly of food grains. Enormous pressures are being exerted on the successive governments of the State by an extremely land hungry population. (The density of population of the State is the second highest among the states in India. The average size of the operational holdings is just 0.24 ha as compared to 1.32 ha for the country. The size of the holdings in Kerala was the lowest.[5]) There are pressures exerted on the

[5] Agricultural Census Division, Ministry of Agriculture, 2000-01.

government for putting forest land for agricultural production particularly of food production. These pressures are difficult to withstand in a chronically food deficit State. The State's vulnerability on account of food deficit has been exposed recently when in times of food scarcity in the country, surplus states placed enormous restrictions for movement of food grains to Kerala. It was further exposed when the Central government reneged on an old undertaking to feed Kerala's population, who were once encouraged to specialize in cash crops production for national and international market.[6]

Keeping forest cover intact costs the State in a number of ways, both direct and indirect, both financial and economic. In purely financial terms, the State has been losing potential revenue from forests following the Forest Conservation Act 1980, Supreme Court decisions and the National Forest Policy 1988. The maximum annual net revenue(after meeting the revenue expenditure) earned from forests extending to 11265 sq.km. since 1980-81 was only Rs.89 crore (in 1995-96). In the recent period, net revenue was negative in three years.

The above discussion suggests that Kerala has a strong case to get rewarded financially for managing ecology, environment and climate change for the benefit of the whole country and the world. It is only fair that the State is compensated adequately by the Finance Commission for 1) revenue loss, 2) funds spent for maintenance of forests (the 12FC gave only Rs.25 crore to the State for maintenance of forests during the five year period) and 3) Compensation for acting as a net Carbon sequestration area of the country incurring opportunity cost of economic growth and food security at least in the short run.

Summing up

A review of the awards of the recent FCs especially the last three has shown that the share of Kerala in the total statutory transfers to states had been coming down under progressively under the awards of these Commissions. The share of Kerala has been coming down both modes of transfer viz., share in Central tax revenue and grants. An examination of the reasons for the decreasing share of Kerala shows that the FCs were relying on criteria which were mostly inappropriate for the State while ignoring criteria most relevant to the State. While achievements of Kerala , particularly in social development have been taken note of, the flipsides of these achievements have not been noticed at all. No attention has been given on the unique state-specific problems arising out of Kerala's very success in social development. In fact, the major achievement of Kerala in controlling its population ahead of other states has turned to its disadvantage.

One of the ToRs of the 13FC that it should take into account the need to manage ecology, environment and climate change consistent with sustainable development has opened up an opportunity for the State to claim substantial funds from the FC if it can be persuaded to work out a mechanism akin to the CDM. The State's claim on these accounts is quite strong, in view of its limited emission of Greenhouse gases and the large Carbon sequestration in its forests, plantations and homegardens.

[6] The State had to bring rice on its own from distant West Bengal using its political connections.

Table 1
Share of Revenue transferred from the Centre in States' Total Revenue and Expenditure

(Figures in Percentages)

Year	Share in Total Revenue						Share in Revenue Expenditure	
	Central Taxes Devolved		Grants from the Centre		Total Central Revenue Transfers			
	Kerala	All States+	Kerala	All States	Kerala	All States	Kerala	All States
1990-91	20.2	21.4	15.3	19.0	35.5	40.4	30.2	37.5
1991-92	20.2	20.9	12.9	18.9	33.1	39.8	29.3	37.2
1992-93	20.7	22.6	14.0	19.5	34.7	42.1	31.5	39.9
1993-94	19.2	21.2	12.8	20.1	32.0	41.3	29.2	39.8
1994-95	18.0	20.3	13.6	16.4	31.5	36.7	29.0	34.9
1995-96	19.1	21.2	8.6	15.3	27.8	36.6	25.8	34.5
1996-97	20.2	22.9	8.0	15.1	28.2	38.1	25.5	34.4
1997-98	17.9	23.7	11.1	14.2	29.0	38.0	25.1	34.6
1998-99	19.2	22.3	8.5	13.5	27.7	35.9	21.6	28.8
1999-2000	19.3	21.3	8.6	14.8	27.9	36.1	19.2	28.6
2000-01	18.2	21.3	7.1	15.9	25.2	37.2	18.5	30.4
2001-02	17.8	20.4	10.8	16.9	28.6	37.3	22.2	30.3
2002-03	16.1	20.2	8.8	16.3	25.0	36.5	18.0	30.5
2003-04	17.0	21.2	7.7	16.2	24.7	37.4	18.8	31.4
2004-05	17.8	21.1	9.7	15.3	27.5	36.4	21.7	33.1
2005-06	16.5	21.8	13.5	17.8	29.9	39.6	24.9	39.0
2006-07	17.7	22.7	11.5	17.8	29.2	40.5	25.5	42.5
2007-08*	18.6	23.6	11.3	19.8	29.8	43.4	24.5	45.0

+ All States referrred to in all tables all the states covered by the RBI Study on State Finances unless otherwsie stated.

* Revised Estimates

Source: 1. Computed from *State Finances*, Reserve Bank of India (RBI), for various years

2. For earlier years George K.K., *Limits to Kerala Model of Development,*Centre for Development Studies, Thiruvananthapuram, 1999.

Table 2

Share of Different types of Revenue Transfers in Total RevenueTransfers

(Figures in Percentages)

Year	Statutory Transfers(1)		Plan Grants(2)		Non-plan Non-statutory Grants(3)		Total Revenue Transfers	
	Kerala	All States	Kerala	All States	Kerala	Other States	Kerala	Other States
1990-91	64.4	61.3	28.7	34.9	6.9	3.9	100.0	100.0
1991-92	61.6	59.1	32.9	37.2	5.5	3.6	100.0	100.0
1992-93	60.1	59.2	35.8	37.5	4.1	3.2	100.0	100.0
1993-94	60.4	55.7	36.8	41.4	2.8	3.0	100.0	100.0
1994-95	57.4	59.5	40.3	38.8	2.3	1.6	100.0	100.0
1995-96	69.8	66.0	25.9	30.0	4.3	4.0	100.0	100.0
1996-97	72.5	66.4	25.8	30.8	1.7	2.8	100.0	100.0
1997-98	62.4	65.1	20.1	29.0	17.5	5.8	100.0	100.0
1998-99	70.2	64.5	26.0	32.2	3.8	3.3	100.0	100.0
1999-2000	69.8	61.7	22.6	32.8	7.6	5.5	100.0	100.0
2000-01	72.8	66.8	22.6	27.8	4.6	5.4	100.0	100.0
2001-02	64.9	64.8	30.8	30.7	4.3	4.4	100.0	100.0
2002-03	69.4	63.7	28.0	29.7	2.6	6.6	100.0	100.0
2003-04	73.4	63.3	23.9	31.3	2.8	5.4	100.0	100.0
2004-05	67.0	63.9	25.1	31.0	7.9	5.1	100.0	100.0
2005-06	70.5	65.6	17.5	26.1	12.1	8.2	100.0	100.0
2006-07	71.4	64.0	18.9	28.2	9.7	7.7	100.0	100.0
2007-08*	69.3	60.6	28.8	32.8	1.9	6.7	100.0	100.0

* Revised Estimates

Notes: 1. Effected by the Finance Commissions.

2. Effected by the Planning Commission. Includes transfers for financing State plans and Central and Centrally sponsored schemes

3. Effected by different Union Government ministries.

Source: *State Finaces for various years,* RBI, op.cit.

Table 3
Share of States in Central Government Revenue

(Figures in percentages)

Year	Share of Devolution to States in Gross Tax Revenue of Centre
1989-90	25.73
1990-91	25.35
1991-92	25.67
1992-93	27.50
1993-94	29.36
1994-95	26.91
1995-96	26.33
1996-97	27.23
1997-98	31.28
1998-99	27.22
1999-2000	25.32
2000-01	27.41
2001-02	28.25
2002-03	25.95
2003-04	25.86
2004-05	25.77
2005-06	25.78
2006-07	25.53

Source: 1. EPW Research Foundation, "Finances of Government of India", Economic and Political Weekly (EPW), Different Issues.
2. RBI Bulletin, Union Budget- Review and Assesment 2006-07, May 2006
3. RBI Bulletin, Union Budget- Review and Assesment 2007-08, May 2007

Table 4
Share of Kerala in the Total FC Transfers to States

(Rs. Crore)

		Tenth Finance Commission	Eleventh Finance Commission	Twelfth finance Commission
1. Share in Central Taxes and Duties		7217.00 (3.5)	11504.00 (3.1)	16353.21 (2.7)
2. Non-Plan Revenue Deficit Grants		0 (0.0)	0 (0.0)	470.37 (0.8)
3. Special Problem Grants		52.00(4.17)	50.00 (4.42)	500.00(7.04)
4. Upgradation Grants		29.83(2.19)	79.14(2.06)	795.82(2.11)
Grant to Local Bodies	5. Panchayat	178.81 (4.1)	330 (4.1)	985 (4.9)
	6. Municipalities	25.43 (2.5)	75 (3.8)	149 (3.0)
	7. Total	204.24 (3.8)	405 (4.0)	1134 (4.5)
8. Grants for Relief Expenditure		218.74 (4.6)	279 (3.4)	354.32 (2.2)
9. Total Grants (2+3+4+7+8)		504.81 (2.5)	813 (1.4)	3254.51 (2.3)
10. Total Transfers (1+9)		7721.81 (3.4)	12317 (2.8)	19607.72 (2.6)

Note: Figures in brackets indicate the percentage share in total Finance Commission transfers to States.

Source: Tenth, Eleventh and Twelfth Finance Commission's Reports.

Table 5
Per Capita Tax Share and Grants, 1995-2010

(Figures in Rupees)

Finance Commision-wise	Tax Share		Statutory Grants		Total Statutory Transfers	
	Kerala	All States	Kerala	All States	Kerala	All States
IX FC (1990-91- 1994-95)	1148	1187	30	125	1177	1312
X FC (1995-96 to 1999-2000)	2223	2253	25	156	2248	2410
XI FC (2000-01 to 2004-05)	2931	2980	135	413	3066	3393
XII FC (2005-06)	750	859	211	165	961	1023
XII FC (2006-07)	957	1098	172	162	1128	1260
XII FC (2007-08)*	1189	1353	135	154	1324	1507
XII FC (2005-06 to 2009-2010)$	5136	6013	1022	1404	6158	7417

* 2007-08 figures are revised estimates, all other figures are accounts figures.

$ Figures for the XII FC period 2005-06 to 2009-10 are drawn from the FC report.

Source: Computed from Reserve Bank of India(RBI), *State Finances*, for various years

Table 6
Unemployment Rates according to Usual Status (adjusted*) in Major States

(Number of persons unemployed per 1000 persons in the labour force)

State	Rural			Urban		
	Male	Female	Persons	Male	Female	Persons
Andhra Pradesh	10	4	7	36	38	36
Assam	24	31	26	69	91	72
Bihar	18	2	15	67	41	64
Gujarat	8	2	5	23	29	24
Haryana	28	10	22	32	75	40
Karnataka	7	8	7	19	57	28
Kerala	51	201	107	62	334	156
Madhya Pradesh	7	1	5	31	16	28
Maharashtra	15	3	10	35	41	36
Orissa	31	83	50	90	266	134
Punjab	33	49	38	29	140	50
Rajasthan	12	1	7	28	29	29
Tamil Nadu	12	11	12	29	48	35
Uttar Pradesh	7	3	6	35	25	33
West Bengal	22	33	25	56	84	62
All-India	16	18	17	38	69	45

* Usually unemployed excluding the subsidiary status workers.

Source: *NSS Report No.515: Employment and Unemployment Situation in India*, 2004-05

Table 7
Share of Kerala in Total Upgradation Grants

(Figures in percentages)

Service	Finance Commission						
	VII	VIII	IX (Interim Report)	IX (Final Report)	X	XI	XII
Police	2.6	1.4	1.9	2.4	3.5	4.5	
Jail	5.3		0.5	0.6	3.4	2.6	
Tribal Administration			0.5	0.1			
Judicial		0.5	5.3	5.3		2.2	
District & Revenue Administration	1.9	0.6	1.4	0.5	4.5		
Training			6.4	9.3			
Treasury Administration			1.8	1.1		5.5	
Other Administrative Services+						1.5	
Total Administrative Services	2.3	1.0	1.9	2.1	3.5	2.7	
Education$					0.7	0.9	0.0
Medical			2.7	0.4		2.1	0.0
Other Social Services*						1.6	4.0
Total Social Services			0.6	0.1	0.7	1.5	0.1
Maintenance of Roads & Bridges							4.3
Maintenance of Buildings							2.1
Maintenance of Forests							2.5
Total	0.8	1.0	1.4	1.3	2.2	2.1	2.1

* Other Social Services include Public libraries, Heritage protection &Augmentation of traditional Water Sources

+ Other Admin. Services include Fire Services

$ Education includes Elementary Education & Computer Training in XI FC

Source: 1. George K.K., *Limits to Kerala Model of Development,*op.cit.

2. Computed from *State Finances,*op.cit.

Table 8
Share of Elderly(60+ years) in Total Population

(Figures in Percentage)

Year	Kerala	India
1981	7.5	6.5
1991	8.8	6.7
2001	10.5	7.4

Source: *Census of India.*

Table 9
Non-Plan Revenue Surplus/Deficit of Kerala and All States (1978-2010)
Finance Commission's Forecasts and Actuals

(Rs.Crore)

Finance Commissions	Non-Plan Revenue Surplus(+)/Deficit(-) after devolution of tax shares							
	Kerala				All States			
	F.C.Est.	Actual	Variance	Variance(%)	F.C.Est.	Actual	Variance	Variance(%)
VI	-202.4	-73.7	128.7	-63.6	505.0	2734.7	2229.7	441.5
VII	235.1	379.1	144.0	61.3	12409.3	7264.0	-5145.3	-41.5
VIII	623.5	-426.8	-1050.3	-168.5	25261.7	1858.6	-23403.1	-92.6
IX (1989-90)	89.8	-117.0	-206.8	-230.3	6218.0	-455.8	-6673.8	-107.3
IX (1990-95)	2.3	-1506.1	-1508.4	-65582.6	32016.0	-22598.9	-54614.9	-170.6
X (1995-2000)	3482.5	-2762.9	-6245.3	-179.3	84017.5	-102683.6	-186701.1	-222.2
XI (2000-05)	7130.7	-9708.6	-16839.2	-236.2	211467.4	-251486.6	-462954.0	-218.9
XII (2005-06)	-470.4	-1974.6	-1504.2	319.8	27492.0	-14136.7	-41628.7	-151.4
XII (2006-07)	374.4	-2419.9	-2794.3	-746.4	52482.0	20594.7	-31887.3	-60.8
XII (2007-08)*	63.8	-4187.3	-4251.1	-6666.3	64060.0	24926.3	-39133.7	-61.1
XII (2008-09)+	1236.9	-2879.0	-4115.9	-332.8	100172.2	47884.9	-52287.4	-52.2
XII (2005-10)	3884.9				387474.4			

* Figures for 2007-08 are Revised Estimates and 2008-09 are Budget Estimates.

Source: 1. George K.K., *Limits to Kerala Model of Development,*op.cit.

2. Finance Commission Reports.

3. Reserve Bank of India (RBI), *State Finances*, for various years

Table 10

Finance Commission's Forecasts and Actuals (2005-08)- Kerala under Different Heads

(Rs.Crore)

Head	2005-2008			
	Forecast	Actual	Variation	Variation(%)
A. Own Revenue (1+2)	42213.95	38676.03	-3537.92	-8.38
1. Own Tax Revenue	38374.50	35717.74	-2656.76	-6.92
2. Own Non-tax Revenue	3839.45	2958.29	-881.16	-22.95
B. Non-Plan Revenue Expenditure(1 to 4)	50674.65	56980.06	6305.41	12.44
1. General Services (i+ii+iii)	26485.30	30334.47	3849.17	14.53
(i) Interest Payments	12322.41	13065.53	743.12	6.03
(ii) Pension	9325.12	10747.31	1422.19	15.25
(iii) Other General Services	4837.77	6521.63	1683.86	34.81
2.Social Services	17649.97	17130.12	-519.85	-2.95
3. Economic Services	4849.94	5502.06	652.12	13.45
4. Compensation and Assignment to Local Bodies	304.79	4013.41	3708.62	1216.78

* Revised Estimates

Source: 1. Report of the Twelfth Finance Commission.

2. Reserve Bank of India (RBI), *State Finances*, 2008-09

Table 11
Non-plan Revenue Surpluses after all Statutory Transfers by the 12FC

States	Post- Tax Devolution Non-Plan Revenue Surplus/ Deficit (Rs.crores)	Total Grants in Aid (Rs.crores)	Total Transfers(Rs. crore)	Percapita Surpluses (Rs.)
	1	2	3 (1+2)	
Andhra Pradesh	37779.30	5214.58	42993.88	5346
Assam	1866.72	4478.71	6345.43	2187
Bihar	21457.02	7975.79	29432.81	3240
Gujarat	35635.54	3708.28	39343.82	7178
Haryana	25379.85	1445.98	26825.83	11643
Karnataka	58910.94	4054.40	62965.34	11216
Kerala	3884.87	3254.51	7139.38	2127
MadhyaPradesh	33924.41	5141.37	39065.78	5848
Maharashtra	57979.91	5531.06	63510.97	6101
Orissa	2580.79	5273.30	7854.09	2011
Punjab	-1395.90	4913.59	3517.69	1354
Rajasthan	11748.87	4643.91	16392.78	2626
TamilNadu	42506.22	4135.39	46641.61	7147
UttarPradesh	60981.48	15262.00	76243.48	4147
WestBengal	9802.11	7573.37	17375.48	2026
All States	387474.37	142639.60	530113.97	4840

Source:Report of the 12 th Finance Commission 2005-10

Note: Population projection for 2006 by Census of India is used for percapita calculations.

Table 12
Number of Persons whose Livelyhood may be Affected by Recession in Kerala

Industry	Number of Persons
Small Farmers(doing only commercial crops)	4,99,667
Agricultural Labourers	8,24,581
Construction	9,70,405
Hotels and Restaurants	2,33,570
Cashew Processing Industry	2,10,000
Rubber Plantation and other related work	2,30,785
Coconut Plantation	1,34,349
Export Related Employment in Fishery	2,80,000
Tea Plantation	74,640
Coffee Plantation	32,326
Coir Industry	1,59,986
Handloom	1,75,000
Total	38,25,309

Source: *Report on the Global Financial Crisis and Kerala Economy: Impact and Mitigation Measures*, Centre for Development Studies, Thiruvananthapuram, December 2008

Table 13
Electrical Energy Consumption per unit of GSDP 2006-07

State	Electrical Energy Consumption(Million KWH	GSDP at current prices (Rs.crores)	Consumption per unit of GSDP(KWH/Rs.)
Kerala	11147	132739	0.0084
Tamil Nadu	46935	246266	0.0191
AP	45134	269173	0.0168
Karnataka*	26518	170741	0.0155

* 2005-06

Source: *Economic Review 2007*, State Planning Board, GOK.

Table 14
Share of Different Sources of Power(Monitored Capacity)(MW)
April-2007 to Dec 2007

(Figures in Percentage)

Source	India	Kerala
Thermal	69.12	29.71
Nuclear	3.17	0.00
Hydro	27.72	70.29
Total	100.00	100.00

Source: Energywise - Performance Status All India Dec, 2007
http://www.cea.nic.in/god/opm/Monthly_Generation_Report/18col_07_12.pdf

Table 15
State Level Carbon Dioxide Emissions

State	Estimated Emission (Mean 1980 to 2000)		Estimated Per Capita Emission (Mean 1980 to 2000)	
	'000 Metric Ton	Rank	'000 Metric Ton	Rank of Mean
Andhra Pradesh	17589.98	5	0.26	6
Assam	1035.28	15	0.05	15
Bihar	20325.76	4	0.27	5
Gujarat	14463.05	7	0.34	2
Haryana	3614.34	13	0.21	9
Karnataka	5139.1	11	0.11	12
Kerala	2012.6	14	0.07	14
Madhya Pradesh	24625.99	2	0.44	1
Maharastra	23236.87	3	0.29	4
Orissa	8539.78	9	0.26	7
Punjab	6791.85	10	0.33	3
Rajasthan	4998.03	12	0.11	13
Tamil Nadu	10290	8	0.18	11
Uttar Pradesh	26009.11	1	0.18	10
West Bengal	16354.76	6	0.24	8

Source:Ghosal Tapas and Bhattacharya Ranajoy, "State Level Carbon Dioxide Emissions", *Contemporary Issues and Ideas in Social Sciences*, April 2008

Table 16
Statewise Details of GHG Emission from Livestock- 1997

State	Methane (Gg/Yr)	Nitrous Oxide(Gg/yr)	Carbon Dioxide Equivalent (Gg/Yr)		
			Total (Gg/Yr)	Percapia (Kg/Yr)	Rank
Andhra Pradesh	654.95	0.1475	13799.68	188.11	9
Assam	223.41	0.0588	4709.75	186.30	10
Bihar	897.85	0.0638	18874.63	198.18	8
Gujarat	444.27	0.0189	9335.57	201.11	6
Haryana	268.29	0.0320	5644.09	296.75	3
Karnataka	476.75	0.0490	10026.86	199.38	7
Kerala	87.57	0.0611	1858.00	59.06	15
MadhyaPradesh	1052.86	0.0514	22126.08	291.09	4
Maharashtra	751.90	0.1015	15821.34	179.24	11
Orissa	418.64	0.0439	8804.99	251.93	5
Punjab	347.51	0.0512	7313.56	320.77	2
Rajasthan	784.73	0.0162	16484.25	322.97	1
TamilNadu	398.93	0.0734	8400.37	139.33	14
UttarPradesh	1331.83	0.0620	27987.69	174.18	12
WestBengal	539.09	0.0952	11350.30	149.07	13
India	9029.87	0.9997	189937.11	198.84	

Source: Mahadeswara Swamy and Suman Bhattacharya, "Budgeting anthropogenic greenhouse gas emission from Indian livestock using country-specific emission coefficients", *Current Science*, Vol.91, No.10, 25 November, 2006

Table 17
Emission of Methane, Nitrous Oxide and Total Global Warming Potential of Agricultural Soil in Major States during 1994-95

State	Methane(Gg)	Nitrous Oxide(Gg)	Global warming poetntial		
			Total (Gg CO2)	Percapia (Kg CO2)	Rank
Andhra Pradesh	528.70	9.50	14049.00	195.91	2
Assam	169.60	0.21	3625.00	147.30	5
Bihar	187.60	3.90	5148.00	54.24	10
Gujarat	63.80	4.49	2732.00	61.24	8
Haryana	71.10	4.38	2850.00	157.72	4
Karnataka	67.00	4.35	2756.00	57.36	9
Kerala	11.80	0.71	469.00	15.17	15
MadhyaPradesh	82.70	6.78	3838.00	53.20	11
Maharashtra	14.50	7.50	2631.00	30.63	13
Orissa	177.40	1.34	4141.00	120.83	7
Punjab	203.20	7.69	6652.00	307.96	1
Rajasthan	2.30	4.32	1386.00	28.76	14
TamilNadu	404.40	4.36	9845.00	168.90	3
UttarPradesh	120.20	15.53	7338.00	48.88	12
WestBengal	447.70	3.38	10448.00	142.60	6
India	2902.70	79.91	85729.00	93.59	

Source: Arti Bhatia, H.Pathak and P.K.Aggarwal, "Inventory of Methane and Nitrous Oxide emissions from agricultural soils of India and their global warming potential", *Current Science*, Vol.87, No.3, 10 August, 2004.

Table 18
State-wise Recorded Forest Area in Major States- 2005

State	Total Forest Area (Sq.Km)	% of Geographic Area
Andhra Pradesh	63821	23.2
Assam	26832	34.21
Bihar	6473	6.87
Gujarat	18962	9.67
Haryana	1559	3.53
Karnataka	38284	19.96
Kerala	11265	28.99
Madhya Pradesh	94689	30.72
Maharastra	61939	20.13
Orissa	58136	37.34
Punjab	3084	6.12
Rajasthan	32488	9.49
Tamil Nadu	22877	17.59
Uttar Pradesh	16796	6.97
West Bengal	11879	13.38
India	769626	23.41

Source: Ministry of Environment and Forest, Govt. of India

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