Reprioritisation of Public Expenditure for Human Development

Tapas K. Sen
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Introduction

The human development sectors, overlapping substantially with the social services, are primarily in the domain of the states in terms of the constitutional assignment of functions in India. In the urgent and substantial task of raising the level of human development of their citizens, the basic challenge faced by most of the states of India is to break the 'vicious circle' of poverty, low human development and low income. Low levels of income across the population also limit the ability of the state governments to finance human development through their own resources. This is clearly indicated by the strong association between public expenditures and per capita incomes often noticed by researchers, both across states and over time. Moreover, within the framework of fiscal responsibility legislation which has been enacted by the centre as also several states (after the strong support it got from the Twelfth Finance Commission), it is not feasible to vigorously push for public expenditures financed by deficits, and consequent borrowings.

Over and above this constraint, for most of the states a large part of budgetary expenditure consists of committed expenditure of some sort or the other (salaries, interest payments, loan repayments and other contractual payments). Given that in the short and even in

[*] Senior Fellow, National Institute of Public Finance and Policy, New Delhi Email: tapas@nipfp.org.in
[**] Junior Project Associate, National Institute of Public Finance and Policy, New Delhi krishanu_karmakar@yahoo.co.in;krishanu@nipfp.org.in

the medium term most of these expenditures cannot be reduced drastically and that the macroeconomic performance cannot be suddenly improved through action at the state level alone, an important method of managing resources to finance consistent and balanced human development lies in the reprioritisation of current expenditure in accordance with the urgent needs and shortfalls in particular areas. Such reprioritisation should also lead the states to a better macroeconomic future, through improvements in key areas. The key issue then is: what scope is there for reallocating public expenditures at the state level to finance increased attention to human development? To provide some empirical content to this discussion, we try to develop an objective method for reprioritisation of public expenditure in this paper. The suggested framework may be taken to yield a benchmark for any prescription for expenditure reallocation. As we shall see below, the method is particularly suitable for analysis of sub-national expenditure, although it can conceivably be used to analyse public expenditures of a group of governmental units at any level.

II. Reallocation of Expenditures: Conceptual Framework

In most studies of government expenditure, policy priorities are either assumed to be given, or are part of the recommendations based on subjective assessments and/or perceived shortfalls in specific areas. Moreover, revealed priorities for various sectors are not easily discernible from their shares in total expenditure, since the expenditure patterns are determined both by the quantity of the service supplied and its unit cost.[1] Thus, revealed priorities in terms of expenditure shares can differ substantially from priorities in terms of units supplied of the concerned service. Further, there is no strong reason to prefer one over the other. Thus, there are two major stumbling blocks to an assessment of public expenditure patterns *vis-à-vis* policy priorities: (a) a definitive or objectively determined pattern of priorities is not available; and (b) even if it was available, there is no unique method of assessing public expenditure patterns against the given priorities. The standard consumer theory solves a similar problem through the maximisation of the utility function in which various commodities and their prices enter as arguments, subject to a budget constraint. In this case, it is the utility function of the government that is missing.

The basic assumption that is made here is that each state in the country compares itself with the other states and strives to achieve the best that has been attained by any other state in each sector.[2] The corollary of this is that the further the state is from the best in any sector, the greater is the priority placed on that sector. Clearly then, the priority placed on any one sector by any state at any point in time is inversely related to the achievement of that state. The comparison is made in terms of available physical performance indicators in each sector, which we denote, by P_{ij} where *i* indicates sectors and *j* is indicative of states. An absence of the state subscript represents the state under consideration. The best (and thus the target) is indicated by an asterisk, so that, P_{ij}^{*} indicates the best performance among all the states. As per our assumption, the priorities for each sector, denoted by W_i are given by

$$W_i = (P_{ij}^{*} - P_i) / P_i \qquad (1.1)$$

As an example, let us consider the case of Urban Development. Here the indicator that we have considered is headcount ratio of the urban poor (percentage of urban population living below the poverty line). In the following table we show the calculation of *Wi*'s.

Table 1: Calculation of *Wi*'s from Indicators

States	urb_pov	min_urb_pov	Wi
Andhra Pradesh	27.99055	3.2997	-0.8821
Assam	3.29973	3.2997	0.0000
Bihar	34.64444	3.2997	-0.9048
Gujarat	13.03368	3.2997	-0.7468
Haryana	15.06436	3.2997	-0.7810
Karnataka	32.56947	3.2997	-0.8987
Kerala	20.18239	3.2997	-0.8365
Madhya Pradesh	42.13874	3.2997	-0.9217
Maharashtra	32.24326	3.2997	-0.8977
Orissa	44.30679	3.2997	-0.9255
Punjab	7.07187	3.2997	-0.5334
Rajasthan	32.94099	3.2997	-0.8998
Tamil Nadu	22.19905	3.2997	-0.8514
Uttar Pradesh	30.63707	3.2997	-0.8923
West Bengal	14.79947	3.2997	-0.7770

***Note*: urb_pov:** HCR of **Note:** Urban Poor in 2004-05; **min_urb_pov:** Minimum of urb_pov; **Wi:** Wi's pertaining to 2004-05;

This essentially amounts to asserting that the weight for each sector is given by the percentage change that would be required in the sectoral indicator to reach the best performance level by any state. It should be noted here that the nature of the indicators used are such that while for some a higher value is desirable, for others the lower the value of the indicator, the better the performance is (e.g., Urban Development, Rural Development). This however, does not pose a major problem since only the positive values of the computed W_i-s (which denotes the change required to reach the best level – highest or lowest as the case may be) need to be considered for subsequent computations.

Denoting unit costs for the state, under consideration for each of the services by C_i, the normative allocation for each sector should then satisfy,

$$\Delta TEXP = k\sum W_i C_i \,, \qquad (1.2)$$

where TEXP is total public expenditure of the state, and k is a constant multiple that is determined each year by the overall expenditure envelope that is available. So,

$$k = \frac{TEXP_t - TEXP_{t-1}}{\sum W_i C_i}, \qquad (1.3)$$

where $TEXP_t$ is the actual expenditure of the current year and $TEXP_{t-1}$ is that of the previous year. This is simply saying that the normative proportions of incremental public expenditure for each service are given by the cost of reaching best performance levels for each sector.

This simple model allows us to construct a pattern of priorities and assess the allocation of public expenditures against the priorities thus derived. Further, it allows us to recommend changes in the allocation of total public expenditure on an objective basis.

Suppose for any service *i*, the initial value of indicator for a state is given by $P_{i,0}$ and the same for the latest year is given by $P_{i,t}$. Then our estimate of unit cost is given by,

$$C_i = \sum PEXP_i / (P_{i,t} - P_{i,0}), \qquad (1.4)$$

where the summation is defined over the period 0 to t in constant prices (So *PEXP* is public expenditure in real terms). We should hasten to add that although this method apparently ascribes all changes in the performance indicator to government expenditures alone, that is not our contention. The unit costs estimated in this manner are used for the limited purpose of obtaining a rough estimate of (implicitly) necessary government expenditure for each of the services to reach the goal, *assuming no major change in the covariability in the pattern of other variables that determine the value of the indicator.* In other words, the change in the indicator over the reference period is associated with a certain amount of government expenditure in real terms, and we hypothesise that while prioritising government expenditures, the same association is believed to continue unless there is a substantial change in the other determinants of the indicator value.

The above method of computing unit costs, however, breaks down in case the indicator does not improve over a period of time or shows deterioration. In such cases (which may be rare, but cannot be ruled out), the entire logic of government expenditures resulting in some improvement in terms of the indicators falls apart, as we are faced with a situation of substantial cumulative government expenditures being divided by zero or negative change in the indicator. This may or may not reflect on the efficiency of the public expenditures; it is conceptually possible that the hypothetical indicator value would have been worse than the actual observed in the final year in the absence of such expenditure, but there is nothing in our model to test it and allow for it. In such cases, we have to fall back on the inferior method of maintaining average annual expenditure in real terms so that in such cases

$$W_iC_i = \sum PEXP_i / n, \qquad (1.5)$$

where *n* represents the number of years over which public expenditure in that area in real terms is cumulated.

III. Physical Performance Indicators

Public expenditure may be reallocated to different sectors on the basis of the requirements and shortfalls of the particular sectors. To compute the shortfalls in achievements of the sectors, we need some measure of the performance of each sector. In this section we discuss the different performance indicators that we use to measure these shortfalls for each of the sectors under our consideration. Table 2 below contains a summary glance at the indicators and the data used to compute them.

Table 2: Details of the Indicators and the Data used

Indicator	Formulae	Components	Period of Data Used
1. Education	The simple average of literacy rate of the states and inverse of the drop out rate has been taken	Literacy rate of the states	1991 and 2001
		Drop out rate in classes I-V	1992-93 and 2001-02
2. Health	The simple average of (1000- Infant mortality rate)/10, percentage of children vaccinated against all diseases and life expectancy at birth	Infant mortality rate	1992-93 and 1998-99
		Total number of children vaccinated against all Diseases	1992-93 and 1998-99
		Life expectancy at birth	1991-95 and 1993-97 (the computed data)
3. Water supply	Percentage of households having safe drinking water facilities	Percentage of households having safe drinking water facilities	1991 and 2001
4. Housing	The weighted average of percentage of households living in *pucca*/permanent (75% weight) and semi-*pucca*/semi-permanent (25%) houses	Percentage of households living in *pucca*/permanent houses	1991 and 2001
		Percentage of households living in semi-*pucca*/ semi-permanent houses	1991 and 2001
5. Urban development	Percentage of urban population living below the poverty line (head count ratio)	Head count ratio of urban poor	1993-94 and 2004-05
6. Rural development	Percentage of rural population living below the poverty line (head count ratio)	Head count ratio of rural poor	1993-94 and 2004-05
7. Labour and unemployment	Ratio of total estimated employment (in man days) and total population	Total estimated employment (in man days)	1991 and 2001
		Total population	1991 and 2001

Table 2: Details of the Indicators and the Data used (contd.)

Indicator	Formulae	Components	Period of Data Used
8. Agriculture and allied	Ratio of agricultural GSDP (agriculture minus mining and quarrying) and gross cropped area	Agricultural GSDP (agriculture minus mining and quarrying) in Rs lacs	1993-94 and 1999-2000
		Gross cropped Area ('000 hectares)	1993-94 and 1999-00
9. Irrigation and flood control	Ratio of total irrigated area and gross cropped area	Total Irrigated area ('000 hectares)	1993-94 and 1999-00
		Gross cropped area ('000 hectares)	1993-94 and 1999-00
10. Energy	Per capita power consumption ('000 kwh)	Total electricity consumption by final consumers of all types	1996-97 and 2002-03
		Projected population	1996-97 and 2002-03
11. Industry and minerals	Per capita industrial GSDP (in Rs)	Industrial GSDP (GSDP attributable to manufacturing plus mining and quarrying)	1993-94 and 1999-2000
		Projected population	1993-94 and 1999-2000
12. Transport	Ratio of total road length (national highways and state highways) to total geographical area of the state	Total road length (national highways and state highways) in km.	1996 and 2000
		Area of the state (sq. km.)	1991

Note: For the purpose of cross-state comparisons, indicator values for only the latest possible year have been used. Values for two points of time are needed only for those state(s), the expenditure priorities of which are being analysed to estimate per unit costs.

The first column in the above table lists the twelve sectors that we have considered for our reprioritisation exercise. The next two columns give the formulae and components thereof (if the indicator used is a composite one) that have been used to estimate the

physical performance indicator for different sectors. Finally, in the last column we note the period of data used for each component. We note that except for housing, whenever we have used more than one component in the formula, we have taken a simple average of the two component parts. For example, the indicator for education consists of two parts, the literacy rate of the state (according to census of 1991 and 2001) and the dropout rate in classes one through five (for the years 1992-93 and 2001-02). The composite indicator for education for each state is the simple average of the two component parts – literacy rate and dropout rate.

The indicator for health has three parts, (i) infant mortality rate (IMR), (ii) percentage of children vaccinated against all vaccine preventable diseases and (iii) life expectancy at birth. However, the infant mortality rate could not be used directly into calculation of the indicator value because of two reasons. First, it actually indicates the "underachievement" of the states and second, it is given in units of per thousand live births. To convert it into an indicator of "achievement", we deduct the value of IMR from 1000 and to change it to percentage terms divide it by 10. This way the resulting indicator for IMR gives us the percentage of live births that do "not die". Now to calculate the composite indicator for the health sector we take, again, a simple average of the new IMR indicator calculated by us, and, the other two components, namely, percentage of vaccinated children and life expectancy at birth.

However, as noted already, the composite indicator for housing is not a simple average of its component parts, *viz*., percentage or households living in *pucca*/permanent houses and percentage of households living in semi-*pucca*/semi-permanent houses. Rather, we have taken a weighted average of the two with the former accounting for 75 percent of the weight. This is simply because we view *pucca*/permanent housing for all as the ultimate goal. Hence, this weighting rewards those states that have a higher percentage of people living in that type of houses than others.

Two other sectoral indicators that require special explanation are that of urban development and rural development. These are very wide areas with several facets, for each of which we should ideally use one indicator. Essentially, partly to simplify as also because of a dearth of suitable indicators that are available for the required two points of time, we have taken urban and rural poverty levels i.e. the

head count ratio (HCR) of the urban/rural poor as the indicator of the urban/rural development. Obviously, the lower the value of this indicator, the higher is the achievement of the state in the sector.[3]

The sources of data used for the purpose of arriving at the indicators are listed in the annexure.

All the other indicators in the table are self-explanatory.[4] However, it may be noted that the general services have been kept out of the analysis, primarily because it is difficult to think of an indicator for this purpose. Also, the general services are overwhelmingly either contractual payments (interest and salaries) or on goods and services that are in the nature of 'overheads of the government'. We have also excluded some other sectors where the expenditures are primarily in the nature of transfer payments and associated administrative costs.

IV. Application of the Methodology on a few States

We now apply the above methodology to illustrate calculation of reprioritised expenditures of four states – Madhya Pradesh, Orissa, Tamil Nadu, and West Bengal – for the years 2003-04 and 2004-05 (it may be reiterated that this method is applied to the *change* in the overall expenditure envelope). The states whose performances are taken into consideration for the comparisons include the non-special categories excluding the new states of Jharkhand and Chhattisgarh (primarily because of data problems) and include the special-category state of Assam. We estimate the expenditure pattern that would have resulted in 2004-05 from the application of this methodology, as against the actual pattern. The results for each of the four states are reported below.

Table 3: Actual and Estimated Expenditures on Selected Services in Madhya Pradesh

(Rs. lakh)

Sectors	Actual Expenditure 2004-05	Estimated Expenditure 2004-05
Education	257598.44	237577.78
Health	89809.32	79923.16
Water supply	46538.26	46403.51
Housing	8587.68	7109.68
Urban development	16333.71	28010.43
Rural development	100826.54	83252.61
Labour and employment	5750.78	5747.98
Agriculture and allied	130270.59	119825.67
Irrigation and flood control	199873.18	135427.16
Energy	321298.50	428264.10
Industry & minerals	8767.17	7455.64
Transport	68719.97	75376.40
Total of the above	1254374.14	1254374.14

It can easily be seen that the estimated allocation pattern is not drastically different from the actual. Of course, this is partly because of the fact that we are using the normative method of allocation only at the margin, that is, on the *change* from the previous year. However, it may be noticed that the estimated allocation (a) shifts expenditures from rural development to urban development to a considerable extent; (b) provides substantially larger funds for power and transport sector, with substantial reduction in irrigation and flood control; and (c) reduces total allocation for human development sector considerably, as it reduces allocations to all human development sectors except urban development. The broad interpretation is that given relative achievements of the State in the listed sectors, it needs to pay more attention to physical infrastructure, particularly power, and that it is already spending a little more than what would be recommended on the basis of the method used here in the area of human development. The lesson, of course, is that we may not expect any substantial reallocation in favour of human development sectors, although the same *within* the human development sectors is possible.

Table 4: Actual and Estimated Expenditures on Selected Services in Orissa

(Rs. lakh)

Sectors	Actual Expenditure 2004-05	Estimated Expenditure 2004-05
Education	199740.48	189993.57
Health	63089.83	31142.43
Water supply	27550.23	25819.25
Housing	7814.31	5786.03
Urban development	3732.23	4867.30
Rural development	46770.78	45930.43
Labour and employment	2301.71	17023.37
Agriculture and allied	59003.35	69938.38
Irrigation and flood control	69413.04	73733.81
Energy	8034.98	4946.65
Industry & minerals	4629.69	4998.36
Transport	50443.25	68344.29
Total of the above	542523.88	542523.88

In the case of Orissa, the most noticeable feature in a comparison of the two relevant columns is the substantial reallocation into labour and employment and, to a smaller extent, the reduction in health expenditures in the estimated allocation. These essentially reflect a relatively low rate of employment and a very small increase in employment between 1991 and 2001 causing C_i to be large for labour and employment, and the fact that there has been a substantial step-up in health expenditures in 2004-05 compared to the previous years. Broadly, there is a reallocation from human development sectors to almost all physical infrastructure sectors (barring energy) in the estimated figures, possibly reflecting a *bias* in the actual allocation pattern in favour of the former, as also the relatively greater gaps with respect to physical infrastructure from the best achieved by other states.

Table 5: Actual and Estimated Expenditures on Selected Services in Tamil Nadu

(Rs. lakh)

Sectors	Actual Expenditure 2004-05	Estimated Expenditure 2004-05
Education	469666.27	426321.59
Health	135194.90	126892.16
Water supply	153142.34	69481.05
Housing	41128.49	15297.64
Urban development	66392.07	99110.60
Rural development	96049.57	90888.91
Labour and employment	10250.48	43802.36
Agriculture and allied	139102.25	120007.69
Irrigation and flood control	84730.09	115360.25
Energy	114941.07	64048.24
Industry & minerals	24562.86	22425.63
Transport	148052.26	289576.53
Total of the above	1483212.65	1483212.65

The estimates for Tamil Nadu narrates a completely different and peculiar story. On the one hand, it prescribes a large reduction in expenditure on water supply (not surprisingly, as over 85 percent of the population already have access to safe drinking water) and on the other, a large increase in expenditure on labour and employment. There is also a massive shift in expenditure from energy in favour of the transport sector (the indicator value is almost half of the best performer and has not improved much over the entire period of consideration). The other expenditures are left more or less unchanged, one noticeable change being in the urban development sector; our estimates require a doubling of the actual allocation of funds in this sector.

Table 6: Actual and Estimated Expenditures on Selected Services in West Bengal

(Rs. lakh)

Sectors	Actual Expenditure 2004-05	Estimated Expenditure 2004-05
Education	498389.31	452396.15
Health	141594.13	140373.17
Water supply	31188.61	35308.12
Housing	7125.96	5940.38
Urban development	67852.79	72271.14
Rural development	85442.99	73664.31
Labour and employment	5318.65	5269.66
Agriculture and allied	76586.56	74635.84
Irrigation and flood control	64137.57	59965.59
Energy	40861.40	14821.74
Industry & minerals	104383.89	18125.42
Transport	103272.96	273383.29
Total of the above	1226154.82	1226154.82

In the case of West Bengal, human development expenditures are left more or less unchanged in the estimates, with some reallocation from education to water supply, and from rural development to urban. However, in the physical infrastructure and economic services, there is a marked increase in expenditure on the transport sector, coupled with a major reduction in the industries and minerals sector, a substantial reduction in the energy sector and smaller reductions in all other economic services considered. Given the values of the indicator for the transport sector,[5] the large reallocation prescribed by our estimates in its favour is not surprising; but the large reduction in the expenditure on industries and minerals sector does indicate a need for closer look at this sector in the state. While we do not attempt such an exploration here, it may be worthwhile noting that the state did spend an unusually (in comparison to other states) high amount on this sector.

Conspicuously, the unifying characteristic of all the states under consideration is that the estimates ask for greater expenditure on basically three heads: (i) labour and employment; (ii) transport;

and (iii) urban development, but there is no uniformity in the sectors as far as lowering of expenditure is concerned. The exception is the persistent requirement of reducing expenditure on rural development in favour of urban development. This, however, could merely be a result of the method of reallocation, which only considers the poverty ratios in rural and urban areas without weighting them with the relevant population shares that must be important for the actual allocation process. Such a possibility points to further refinements possible in the indicators used.

Another important characteristic of the reprioritised expenditures is that for all the four states the total expenditure for human development sectors is either left more or less unchanged or is reduced in the reallocation process. This indicates that in a broad sense, states do give due importance to the human development sectors in practice or even favour it somewhat. Most studies of long-term trends in government expenditures also find that social sectors together usually hold or improve their share in total expenditure over the long run. This could partly be explained by the fact that social services together have a much higher wage component in the total expenditures than economic services, including infrastructure, the latter actually requiring greater capital and maintenance expenditures. It is well-known that wages being contractual in nature are difficult to reduce; even holding the wage bill steady may be difficult in India because of the periodical Pay Commission recommended increases. This phenomenon keeps raising the unit costs even when the weight does not increase, resulting in progressively higher share of social services in the total expenditures. In contrast, the capital expenditures and maintenance costs are 'fair-weather' components of total expenditure given the nod only when state finances are relatively comfortable.

At this juncture, it may be pertinent to note that it would be a mistake to consider that each of the sectors is independent of the other, although by assuming that changes in the indicator(s) for one sector are related to expenditures in that sector only, we are implicitly assuming so. Commonsense tells us, and there is plenty of research output to show that there are complementarities between sectors, even between social services like health and physical infrastructure like, power. To understand the synergy in a micro sense, one just needs to think about an X-ray machine, which cannot be operated without power. Our implicit assumption can thus be defended only as

a simplifying one and not necessarily reflecting the reality. The methodology can, however, be broadened to include cross effects if estimates of the parameters representing such effects can be estimated reliably.

V. Conclusion

While the methodology used in the above analyses appears simple, its application is not, mainly because of data limitations and difficulties in identifying suitable indicator(s) for each sector. Thus, the estimations presented above can at best be called illustrative. Even when suitable indicators are available, estimation of unit costs for various services can pose problems, since the actual costs are not necessarily efficient. However, our admittedly crude method can nevertheless be used for this purpose provided no major in determinants other than public expenditure relevant for each of the indicators takes place that may affect the unit costs substantially. These are areas where further research may be called for. On the positive side, this represents at the least a more objective method of assessing the allocation of government expenditures than mere assertions or judgments. Although there are large parts of government expenditure, primarily in general services, for which it is difficult to identify a performance indicator, one advantage of this construct is that if one believes that certain parts of the public expenditure are non-negotiable or pre-determined, then the method can be applied to a total expenditure net of those parts. This can alternatively be viewed as a method of appropriate allocation of a sub-total within the total government expenditures.

End Notes

[1] This observation was originally made by Kaushik Basu while discussing a paper on trends in government expenditure in Indian states.

[2] Such a hypothesis, known as 'yardstick competition' in the fiscal federalism literature, was first put forward by Salmon (1987). It has been empirically tested by Besley and Case (1995).

[3] Alternatively, we could have taken either the inverse of this ratio or 100 minus this ratio as the indicator value.

[4] Although our computations of the *Wi*-s have been based on the method described in the previous section, the weight used for the transport sector is different than the others. Instead of taking the highest value of the indicator among all states (which is of Kerala) as the target level, we have taken the average of the first and second largest values (the second being that of Maharashtra). This is primarily because the value for Kerala is clearly an outlier and if taken alone, it tends to greatly overestimate the required expenditure in this sector for all other states.

[5] There may be a problem with the data here; since our transport sector indicator includes only national and state highways, any state that relies more on lower levels of governments, say *Zila Parishads*, or other public agencies for significant parts of the road network may have a lower indicator value than warranted. We actually tried different definitions of the status of road network, but several anomalies in the available data forced us to adopt the definition that has been used by us here.

References

Salmon, Pierre 1987. “Decentralisation as an Incentive Scheme,” *Oxford Review of Economic Policy,* 3(2):24-43.

Besley, Timothy and Ann Case, 1995. “Incumbent Behavior: Vote-seeking, Tax-setting, and Yardstick Competition,” *American Economic Review,* 85(1):25-45.

Annexure

Indicators and the Data Sources

Indicator for Sector	Data Sources Used
Education	Census of India, 1991 and 2001. All India Educational Survey, Education in India, Department of Education, MHRD, Annual Reports, various years, Department of Education, MHRD. Selected Education Statistics, 2002-03.
Health	Compendium of India's Fertility and Mortality Indicators 1971-1997, Registrar General, India, 1999, SRS Statistical Report and SRS Bulletin. National Family Health Survey, 1992-93, 1998-99.
Water Supply & Housing	Census of India, 1991 and 2001
Urban Development & Rural Development	Planning Commission
Labour and Unemployment, Irrigation and Flood Control, Energy & Transport	Statistical Abstract India, various years, CSO, Ministry of Statistics and Programme Implementation, Government of India.
Agriculture and Allied, and Industry and Minerals	Detailed Estimates of GSDP, Central Statistical Organisation.