The Relationship Between Operating and Investment Expenditures: A Problem of Planning and Budgeting

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I. Introduction

Many governments throughout the Third World are experiencing severe financial difficulties in their attempts to reach stated economic objectives. In most cases, these goals are articulated, in the first instance, through a Development Plan and, then, through the annual expenditure budget. The funding of the construction and operating stages of individual projects takes place through the Development and Recurrent Budgets, respectively.

Heller,[1] in his pioneering study of the 1970-74 Kenyan Development Plan, found that the set of goals outlined in the Plan could not be attained, given the available fundng; that is, the 1970-74 Development Plan[2] was financially inconsistent. He stated that one of the primary factors responsible for the inherent financial difficulties was the failure, by development planners, to take into ac-

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1 Heller (1974), pp. 251-277.
2 Republic of Kenya (1969).

count the interrelationships between the Development and the Recurrent Budgets. It is the purpose of this paper to explore this issue and to suggest ways in which the severity of the problem may be alleviated.

The general issues are exceedingly simple, yet frequently ignored. Almost all Development expenditures are incurred on the construction of physical assets such as roads, schools, hospitals and irrigation schemes. However, before the desired benefit stream begins to be produced, funds must be advanced from the Treasury for the purchase of the necessary non-capital inputs such as labour, utilities and raw materials. As suggested above, these funds are provided through the Recurrent Budget; therefore, it is obvious that if a development plan is to be successfully implemented, attention must be paid not only to the capital financing stage, but also to the provision of on-going funding.

The approval of a development project carries with it a contingent the liability against the Recurrent Budgets of future periods; without the expenditure of these funds, the anticpated output will not be attained.[3] This statement may appear to be rather obvious, but is often the source of controversy between implementing agencies and the government expenditure control agency. A quick perusal of the Development Plans of most less developed countries (LDC's) will substantiate the assertion. Development planning is synonymous with new project initiation, with little mention being made of the adequacy of the required operating funds.

References to the output gains that could be made by operating on-going projects at increased activity levels are exceedingly rare. Yet, it is apparent to most of the actors involved that numerous public projects are operating at well below planned activity levels; some projects remain unused for a considerable period of time after completion of the construction stage, and many physical assets are allowed to deteriorate at an inordinate rate.[4] The situation that we have outlined, which is denoted here as 'the over-expansion problem', is not new, and, yet, it is only recently that some countries have explicitly recognized the problem, and have initiated remedial action.[5]

3 For a discussion of this issue see Heller (1974), pp. 251-2; Tebiba (1967), pp. 175-200; and Walker (1962), pp. 6-9.

4 It must be stressed that a policy of deliberate under-funding may be consistent with an optimal resource allocation strategy; for an interesting discussion of such an approach see Heller (1971).

5 See Walker (1962), pp. 7-8, for a discussion of this issue.

In the next section of this paper we will attempt to outline, in detail, several of the factors that contribute to the financial inconsistencies inherent in most Developmtnt Plans. This will be followed by a technical expositon of the over-expansion issue and an attempt to estimate the magnitude of the problem in a country such as Kenya. The paper concludes with a summary of the discussion, and a presentation of recommendations for alleviation of the obvious planning and budgeting problem.

II. Background Issues

There are a number of administrative and institutional factors which are primarily responsible for the presence of the 'over-expansion' problem. (These factors operate with varying degrees of severity in different countries.) First, the administrative structure employed tends to reinforce the idea that the investment and operating phases of a project can be considered independently of one another. The budget and planning functions tend to be assigned to distinct operating units with only a weak linking mechanism functioning between these units. This phenomenon can be illustrated by considering the situation in Kenya.

Two key elements in the public expenditure framework are the preparation of a five-year development plan, and the formulation of the annual expenditure budget as embodied in the Estimates. Up to the current Development Plan exercise, the formulation of the development strategy, the project content, and most other key elements, were undertaken by Planning Department officials, in consultation with their counterparts in operating Ministries; the role of the Finance officers was minimal. However, the situation was reversed in the annual Estimates cycle with the Treasury officials exercising substantial power. Although planning officials played an active part in the Development expenditure discussions, they were usually much less involved in the Recurrent Budget setting exercise.

The second underlying fact that contributes to the 'over-expansion' phenomenon may be called the Accounting definition problem. This problem stems from the fact that the terms Development Expenditure and Recurrent Expenditure do not correspnd precisely to the economist s notion of investment and operating and maintenance cost, respectively. Development expenditure primarily reflects the expenditure required to bring a facility from the planning to the operational stage. The funds required to provide the necessary non-capital inputs are disbursed through the Recurrent Budget. There are two inter-related aspects to the Accounting definition problem.

First, it is often the case that a large chunk of the Recurrent Budget is usurped by activities such as Health and Education. This allocation often ends up in leaving too little remaining recurrent resources to cater for the operating and maintenance needs of other activities. From the economist's point of view, much of the expenditure on education and health can be regarded as investment in human capital and should be regarded as investment or development expenditure. If all or part of this expenditure were properly shifted to the development side, a much clearer picture would emerge for real recurrent needs. This is very much related to the second point, which is that the definitional distinction between recurrent and development costs is frequently very unclear and poorly thought out. The resulting allocation of resources between Recurrent and Development is out of balance, with too much being directed to one area or the other and the built-in inertia of the budgeting expenditure system making it very difficult to rectify the problem.[6]

The definitional issue takes on much greater importance when viewed in conjunction with the "Development Fixation" phenomenon--the third factor to be described as a potentially important determinant of the 'over-expansion' problem. We use the term "development fixation" to describe the politician's view of economic and social development.

Throughout much of the Third World, pubic expectations with respect to income and opportunity have been substantially raised beyond pre-independence days. Politicians seem to believe that these expectations can best be met by, first, the announcement of physically identifiable projects and, second, the construction of such projects. The operational phase tends to take place several years after the announcement stage, and given the high rate of time preference exhibited by most politicians, it is not surprising that limited attention has been paid to the source of operational funding.

Clearly, the self-help or Harambee Movement in Kenya is a good example of the issue under discussion: concentration on the construction stage, without adequate consideration of the longer-term, financial matters. This situation ultimately leads to a severe

6 Walker (1962), pp. 8.

political, as well as financial problem.

A fourth factor, and probably the most important leading to "development over-expansion," is the behaviour of external aid agencies--both bilateral and multi-lateral. In a manner analogous to that of the domestic politician, aid agencies tend to favour physically identifiable projects. In many instances, tied aid requirements may influence the design in such as way that total project cost, primarily through the recurrent budget, may be significantly above the least-cost design. In addition, until very recently, donors have tended to be quite unreceptive to picking up even a portion of the recurrent costs inherent in their projects.

Through the use of tied grants and loans, external aid agencies alter relative project prices in favour of aidable activities. Although there is obviously a welfare loss to the recipient from such conditional grants, the major problem appears to be the uncritical acceptance by developing nations of such tied aid. Frequently the value of the gift component, in both an absolute sense and a proportion of the project's life-cycle cost, is exceedingly small. Yet, because of the myopic focus on the construction stage of development, and the absence of thorough financial analysis, the apparently generous aid offer is accepted without realization of the future consequences.

To sum up, we have identified the "over-expansion" problem as existing when development expenditure is allowed to proceed at a pace too fast relative to the resources made available to support the resulting recurrent costs of operation and maintenance. This problem was real factor affecting the operation of development projects in Kenya during the 1974-78 Development Plan. Four causal factors have been identified as contributing to the existence of the "over-expansion" problem in varying degrees: the division of administrative responsibility in planning development projects and allocating resources in their recurrent costs; the accounting definition problem whereby the division of spending into development and current categories does not match up well with true investment and operation and maintenance activities; the "Development Fixation" phenomenon where politicans and others favour the construction of identifiable physical structures as signs of development progress; and, finally, the "cheap external aid" phenomenon where external aid donors exhibit a development fixation on easily identified projects and the recipient country expands its development budget to take advantage of the apparently cheap money. These four factors operate simultaneously, and tend to reinforce one another in producing the resource misallocation problem that is of concern here. We wish now, to turn a more technical discussion of the "over-expansion" problem and to suggest a simple means of coping with it before things become too serious.

III. Technical Discussion

In the prior section, we suggested that there is need for more quantitative work if the "over-expansion" problem is to be detected at an early stage. In fact, the technical analysis should be performed at both project and plan levels. First, let us explore some of the elementary tools that may be useful in evaluating the relationship of development to recurrent expenditures for a given project.

There are three basic pieces of information that should be calculated for each project P(i) under consideration: the present value of life-cycle cost PVLC(i); the present value of recurrent costs PVRC(i); and the present value of external aid PVEA(i). First, let us consider PVLC(i).

We shall derive a project's life-cycle cost PVLC(i) on a cash-flow basis. The cash-flow concept is used because this is the cost that is of relevance to the individual government department or bureau. We adopt this approach because we feel that a government project implementation unit will view itself not as a social welfare maximizing agent but as a private decision-making unit concerned with cash-flow problems.

To calculate PVLC(i), one should, first, discount the expected net cash requirements in each year of the project's life, and then sum these terms to obtain the present value of the life-cycle costs engendered in that project. More formally,

$$PVLC(i) = \sum_{t=0}^{T} NCOF\ (i,t) \cdot (1+d)^{-t} \tag{1}$$

where

NCOF = net cash outflow required by the ith project in year t.

d = social discount rate.

Net cash outflow consists of several constituent parts, all of which should be examined and estimated. Let us write NCOF (i,t) as follows:

$$NCOF(i,t) = GDE(i,t) - DRV(i,t) + OPE(i,t) + DS(i,t) - AIA(i,t) \tag{2}$$

where

GDE(i,t)	= gross development expenditure on the ith project in year t.
DRV(i,t)	= development revenue generated by the ith project in year t.[7]
OPE(i,t)	= operating expenditure on the ith project in year t.
DS(i,t)	= debt servicing requirements (principal repayments and interest) on the ith project in year t.
AIA(i,t)	= appropriations-in-aid (user charge revenue) generated by the ith project in year t.

By substituting equation (2) in equation (1), one obtains:

$$\begin{aligned} PVLC(i,T) &= \sum_{t=0}^{T} [GDE(i,t) - DRV(i,t) + OPE(i,t) + DS(i,t) - AIA(i,t)] \quad (1+d)^{-t} \\ &= (GDE(i,0) - DRV(i,0)) + \sum_{t=1}^{T} [GDE(i,t) - DRV(i,t) + OPE(i,t) + DS(i,t) - AIA(i,t)] \cdot (1+d)^{-t} \end{aligned} \qquad (3)$$

Performance of this calculation by the appropriate planning officials generates a useful estimate of the total financial obligations being placed upon the Government, but it also ensures that all relevent cost parameters are subject to examination.

The remaining present value calculations can be readily obtained by appropriate manipulation of equation (3). The required estimate of the present value of the recurrent cost stream is obtained by deleting the development budget terms as follows:

$$\begin{aligned} PVRC(i,T) &= \sum_{t=1}^{T} RC(i,t) \cdot (1+d)^{-t} \\ &= \sum_{t=1}^{T} [(OPE(i,T) + DS(i,t) - AIA(i,t)] \\ &\quad (1+d)^{-t} \end{aligned} \qquad (4)$$

where

RC(i,t)	= recurrent expenditure generated by the ith project in year t.

7 This may be internal or external receipts to the Government specifically related to the ith project.

This calculation provides the decision-maker with an extremely beneficial insight into the nature of the project. The planner may find that the present value of recurrent expenditure is exceedingly large, and, therefore, he or she should explore the likelihood of such funding being made available. In addition, if numerous projects are being considered, each with a high PVRC(i)/PVLC(i) ratio, the need to explore the on-going issue should become readily apparent.

In Section II we discussed the influence of external aid on the over-expansion phenomena, and we suggested that, in part, the problem could be attributable to a lack of knowledge of the "true" value of the aid to the Government. For projects with an equivalent benefit stream, the "true value" of rejecting the aid offer (either a grant or a soft loan) is the discounted additional cost of using domestic finance.[8] The mechanics of the calculation are straightforward: one merely calculates the present value of life-cycle costs under two sets of cost data--one for domestic and another for externally aided financing. Letting superscript D refer to the situation where project i (internally financed) replaces project j and superscript E refers to the case where projects i and j both proceed, with i externally financed. The present value of external aid PVEA may then be derived as follows:

$$PVEA(i) = PVLC^{D}(i) - PVLC^{E}(i) \qquad (5)$$

If one substitutes the complete set of terms for each of $PVLC^{D}$ and $PLVC^{E}$, as presented in equation (3), one ultimately obtains:

$$PVEA(i) = (DRV^{E}(i,0) - DRV^{D}(i,0)) + \sum_{t=1}^{T} [(DRV^{E}(i,t) - DRV^{D}(i,t) + DS^{D}(i,t) - DS^{E}(i,t)] \cdot (1+d)^{-t} \qquad (6)$$

Therefore, one can either calculate the present value of the external aid offer directly from the relevant PVLC calculations, or by a direct comparison of the development revenue and debt servicing costs associated with the domestically and externally aided project.

Now that we have derived the means to calculate PVLC(i), PVRC(i) and PVEA(i), we will present a few examples for illustration purposes. Assume that the relevant time span is twenty-five years ($T=25$); the gross development expenditure, at $t=0$, is K£1,000, i.e., $GDE^{D}(i,0) = GDE^{E}(i,0) = 1,000$; appropriations-

8 By domestic financial sources, we mean the funds available through pre-planned revenue. Therefore, funds for the project are diverted from an activity at the margin; hence, the cost of the transferred funds, in present value terms, can be readily calculated by discounting the annual cash allotment by the social opportunity cost of government funds.

in-aid (AIA(i,t)) are zero in each time period; and that OPE(i,t), d and DS(i,t) take on a number of specified values.

First, we shall estimate $PVLC^D(i)$, the present value of lfe-cycle costs when the development funds are domestically derived. By this we mean that a Development Budget has been established and funds are diverted from alternative projects. Given that we are conducting a cash-flow analysis, the gross development expenditure will be K£1,000 and the resulting additional development revenue to the Government is zero; therefore, the net development cost is 1,000 at $t=0$, and zero for all other time periods. Debt servicing costs, from a cash-flow perspective, are calculated assuming domestically borrowed funds at 10 percent, with a 25 year payback period.[9] The results of this calculation are displayed in Table 1. Note that the total project cost estimates vary from K£1,053.3 to

Table 1

PRESENT VALUE OF PROJECT LIFE-CYCLE COSTS: DEVELOPMENT EXP. FINANCED BY K£1,000 DOMESTIC SOURCES LOAN AT 10% PER ANNUM

	Social Discount Rate (In percent)		
Annual Operating Expenditure	5	10	15
50	2,257.4	1,452.4	1,053.3
100	2,962.1	1,906.2	1,375.5
250	5,075.7	3,267.8	2,346.2
400	7,190.3	4,629.5	3,315.8

Notes:

a) Time period equals 25 years

b) Salvage value of investment, at $t=25$, equals zero.

c) Loan repaid over 25 years.

9 As discussed in footnote 8, we arbitrarily assume that the funding is obtained, in totality, at the expense of other previously acceptable projects; the cost of the transaction is treated in cash flow terms only. Although there is an obvious opportunity cost for using the funds in this manner, only incremental cash-flows to cover debt servicing are taken into account.

K£7190.3; these estimates being obtained when OPE (i,t) and d take on values of 50 and 0.15, and 400 and 0.05, respectively. Clearly, the Government's total project costs can be substantially higher than the project's construction cost.

Let us now assume that a donor offers to build the project for the Government, i.e., provides a grant of K£1,000. Obviously, K£1,000 received at $t=0$, has a discounted value of K£1,000. Therefore, the present value life-cycle cost of the ith project is just the present value of the future stream of operating expenditures for the project life. This value ranges from a low of K£323.2 to a high of K£5637.6, when OPE(i,t) and d take on values of 50 and 0.15, and 400 and 0.05, respectively. Clearly life-cycle cost reduction is substantial in the former case, but much less so in the latter.

In the above examples, we have considered polar cases: a project financed by domestic funding was compared to one in which the Development costs were provided by an external grant. However, the strength of our proposed technique can be more clearly observed, if we consider a situation in which the development costs are covered by a "soft" loan: interest at 3% per annum; and principal amortized over 25 years. The results are displayed in Table 2. Note that for any level of annual recurrent expenditure

Table 2

PRESENT VALUE OF PROJECT LIFE-CYCLE COST: DEVELOPMENT EXP. FINANCED BY K£1,000 EXTERNAL LOAN AT 3% PER ANNUM

	Social Discount Rate (in percent)		
Annual Operating Expenditure	5	10	15
50	1,513.7	974.9	694.2
100	2,218.4	1,428.8	1,017.5
250	4,332.5	2,790.3	1,987.1
400	6,446.6	4,151.8	2,956.7

Notes:

a) Time period equals 25 years.

b) Salvage value of investment, at $t=25$, equals zero.

OPE(i,t) $PVLC^D(i)$ exceeds $PVLC^E(i)$ by K£744,476 and 359, at social discount rates of 5, 10 and 15 per cent, respectively. That is, the "true value" of a soft loan is a decreasing function of the Government's social discount rate; and the "true value" of a soft loan will decrease as the spread between the internal and the external (soft loan) interest rates decreases. For any social discount, if the interest rate spread is low, the soft loan will be of inconsequential value. The higher the social discount rate, the less importance should be attached to soft external loans. In other words, planners should not be enticed by the external aid offer just because it appears to be cheap money. The alternative internal finance may be only slightly more expensive, while permitting greater flexibility of action in both the present and the future.

Given the information presented above, we can readily determine the present value of recurrent costs. By definition:

$$PVRC(i) = PVLC(i) - PVDC(i)$$

Since, by definition, PVDC(i) = 1,000, then we can write PVRC(i) as follows:

$$PVRC(i) = PVLC(i) - 1{,}000$$

Hence, by subtracting 1,000 from each element of Table 1, we obtain the present value of recurrent expenditures for the project assumption set.

Throughout this paper, we have stressed the importance of utilizing a present value estimate of recurrent expenditure in the decision-making process. This statement is reinforced by a purusal of Table 3, wherein are presented the ratios of recurrent to total project cost, i.e., PVRC(i)/PVLC(i). Recurrent costs are observed to vary from 5% to 86% of the total project costs, for the set of assumptions characterizing our basic example. As one would expect, for any given level of annual operating expenditure, PVRC(i) is inversely related to the social discount rate; and, alternatively, for a given social discount rate, they are directly related to the ratio of annual operating to total Development expenditures.

In order to explore further the importance of the recurrent cost-development cost relationship, we will construct a simple aggregate model.[10] The model will be used to generate the growth rate of real recurrent expenditure required to operate all on-going

10 Our model is, to some extent, based on the unpublished work of Ved P. Gandhi when he was with the World Bank. More complex versions of the model can be found in Heller (1974), and Anderson and Pinfold (1978).

projects, as well as new activities ready to commence operations during the period under evaluation. The details of the model are presented below.

Table 3

RATIO OF OPERATING TO TOTAL PROJECT EXPENDITURE -- IN PRESENT VALUE TERMS

	Social Discount Rate (in percent)		
Annual Operating Expenditure	5	10	15
50	0.557	0.312	0.050
100	0.662	0.475	0.272
250	0.803	0.694	0.574
400	0.860	0.784	0.698

Note:

For purposes of this calculation, it is assumed that: total development expenditure is 1,000; the project's life is 25 years; and that at t = 25, the physical assets are of no commercial value.

Let total recurrent and development budget expenditure, in year t, be represented by TRE(t) and TDE(t), respectively. Given that we are attempting to estimate the required growth rate of recurrent expenditure RGRE(t), we should decompose recurrent expenditure into its constituent elements and discuss the expected growth rate of each component. First, one must estimate the expenditure requirements, over time, of all base-year activities, denoted as TGE(0). Let us assume that TGE(0) grows by 9% per annum, where g represents a normal escalation of recurrent expenditures due to such factors as "wage creep" and "quality improvement". Thus TRBA(t), total recurrent expenditure in year t, required to operate base-year activities, can be represented as follows:

$$TRBA(t) = TRE(0)\,(1+g)^t \tag{7}$$

The second element of recurrent expenditure is denoted as

TIRC(t), the total increase in recurrent costs attributable to projects commencing operation during the study period. We can break TIRC(t) down into two further components: the funds required to operate the project and the funds required to service the related debt. As a further simplification, assume that investment projects undertken in year t-1 are ready to commence operations at time t. Hence we can write

$$\begin{aligned} TIRC(t) &= IOPE(t) + IDS(t) \\ &= \bar{r}(t-1)\ TDE(t-1) + \bar{s}(t-1)\ TDE(t-1) \end{aligned} \quad (8)$$

where

IOPE(t) = Incremental Operating expenditure attributable to new projects commencing operating.

IDS(t) = Incremental debt servicing cost attributable to projects commencing operation.

$\bar{r}(t)$ = weighted average ratio of operating expenditures to total development expenditures associated with projects commencing construction in year t.

$\bar{s}(t)$ = weighted average ratio of debt servicing costs to total development costs of projects commencing construction in year t.

Since we have presented all of the required components of the model, we can now present the complete recurrent expenditure model.

Given that

$$TRE(t) = TRBA(t) + TIRC(t);$$

by appropriate substitution from equation 7 and equation 8, we readily obtain

$$\begin{aligned} TRE(t) &= TRE(O)\ (1+g)^t + \bar{r}(t+1)\ TDE(t-1) \\ &\quad \bar{s}(t-1)\ TDE(t-1) \end{aligned} \quad (9)$$

For expositional ease, let us restrict the analysis to a two period world 0, 1. Hence, we can rewrite equation 9 as

$$\begin{aligned} TRE(1) &= TRE(0)\ (1+g) + \bar{r}(0)\ TDE(0) + \\ &\quad \bar{s}(0)\ TDE\ (0) \end{aligned} \quad (10)$$

Dividing through by TRE(0), followed by algebraic manipulation one can quickly generate RGRE(1), the required growth rate of recurrent expenditure,

$$RGRE(t) = \frac{TRE(1) - TRE(0)}{TRE(0)} = (\bar{r}(0) + \bar{s}(0)) \frac{TDE(0)}{TRE(0)} + g \quad (11)$$

From a perusal of equation 11, it is apparent that RGRE(t) is directly related to three factors: (a) operating and debt service cost per K£ of prior period development expenditure; (b) the ratio of base-period recurrent to development expenditure; and (c) the anticipated normal growth of rate of the recurrent costs associated with base-period activity.

In order to test our simple model we need to specify reasonable values for the four parameters in equation 11. Estimates of TDE(0)/TRE(0) are readily obtainable from past Development Plans, Appropriations Accounts and Annual Estimates. The data covering the 1965/66 to 1977/78 period is presented in Table 4; note that the ratio of TDE(t) to TRE(t) increased substantially over time. In the early years after Independence, TDE(t)/TRE(t) = 0.25, whereas the more recent past has been corresponding ratios of approximately 0.50; this figure would appear to be a valid estimate to TDE(t)/TRE(t) for testing purposes.

Unfortunately, it is much more difficult to generate reasonable estimates of $\bar{r}(t)$ since there is a paucity of published material on the subject. Fortunately, the only major study located, on the recurrent/development issue, is Kenyan based. In this study, Peter Heller[11] attempted to estimate $\bar{r}(t)$ for each year of the 1970-74 Development Plan. He found that $\bar{r}(t) = 0.15$ throughout the Plan period; that is, for every K£100 expended on development activities, K£15 would be added to the Recurrent Budget of subsequent years.

In addition to Heller's work, references to the magnitude of the impact of the development on the recurrent budget were found in several sources. Two of these studies were prepared by the Government of Kenya: Sessional Paper No. 10 of 1965,[12] and the 1970-74 Development Plan[13] contained statements indicating that $\bar{r}(t)$ was thought to be approximately 0.25 and 0.33, respectively. The other published estimates are substantially lower. Tebiba, in his study of public expenditures in Western Nigeria, refers to a government of Nigeria study where the ratio of recurrent to development expenditures was estimated as 1:13 ($\bar{r}(t) \simeq 0.077$).[14]

11 Heller (1974).
12 Republic of Kenya (1965), pp. 34.
13 Republic of Kenya (1969), pp. 503.
14 Tebiba (1967), p. 199.

Table 4

Ratio of Total Development Expenditure to Total Recurrent Expenditure: Kenya, 1965-1978 (K£ 000,000)

	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73
Development Expenditure	a) 14.3	a) 16.3	a) 19.6	a) 24.5	a) 30.3	a) 45.4	a) 51.6	a) 63.7
Recurrent Expenditure	63.3	68.5	74.9	80.5	91.1	111.3	128.7	140.6
Ratio of Development to Recurrent Expenditure	0.226	0.238	0.262	0.304	0.333	0.408	0.401	

	1973/74	1974/75	1975/76	1976/77	1977/78
Development Expenditure	b) 67.6	b) 87.9	b) 101.7	b) 105.7	b) 107.0
Recurrent Expenditure	154.6	176.9	193.9	206.3	236.8
Ratio of Development to Recurrent Expenditure	0.437	0.497	0.525	0.512	0.452

NOTES: a) 1965/66-1972/73 data is presented in current prices--sources: Republic of Kenya, *Development Plan 1974-78*, p. 45.
b) 1973/74-1977/78 data are planned figures and are in 1972 prices--source: Republic of Kenya, *Development Plan 1974-78*, pp. 174 and 1976.

In another Nigerian based analysis, Hansen reports that:

"It was established that a Nigerian Pound (N£) invested in economic, social, and administrative sector projects generated two, four and six shillings respectively of recurrent expenditures each year thereafter."[15]

Walker explicitly considered the division of recurrent expenditure into its operating and debt servicing components; he summarized his discussion of the impact of the development budget on recurrent costs as follows:

"But from my own experience in Africa I think there is good reason for taking a figure of 10% as being a reasonable figure for a capital programme in which some 70% of the expenditures consist of expeditures on schools, hospitals and dispensaries, major and minor roads, and government buildings. Thus a £100 of capital expenditure adds £10 a year to the recurrent budget, excluding interest and amortization payments. ...If the money for capital expenditures is borrowed, then at present "hard" lending terms an allowance of at least 8 1/2% per annum is probably required in interest and repayment charges. Thus, in such conditions, for every hundred pounds that is borrowed and spent on capital items, about 18.5 a year of permanent recurrent commitments is incurred."[16]

A final reference comes, implicitly, from the 1970-75 Botswana National Development Plan.[17] This plan presents the operating cost implications for each development project listed in the Plan; on average, $\bar{r}(t) \simeq 0.075$.

In summary, we find that estimates of $\bar{r}(t)$ vary from 0.075 to 0.33. On a consistnet, operating cost only basis, the best guess range would appear to be from 0.075 to 0.20. In fact, given that Heller's study is not only Kenyan based, but also the most thorough of those reviewed, there is no reason to reject his estimate of $\bar{r}(t) \simeq 0.15$ as our best-guesstimate.

Two other parameters remain to be specified: $\bar{s}(t)$ and g. First, consider $\bar{s}(t)$, the annual, weighted average cost of servicing K£1 of debt incurred to finance a given set of development projects. Given time and space considerations, we shall not undertake a thorough study of this potentially important cost component. Let us assume, for illustration purposes, that the annual cost of interest payments and principal amortization is 5% of the total investment in the project. Similarly, we shall specify, without detailed documentation, that the "normal increase" in recurrent expenditure, represented by g, is approximately 2% per annum.

15 Hansen (1970), pp. 195.
16 Walker (1962), pp. 7-8.
17 Republic of Botswana (1970), pp. 149.

Since we have discussed, or specified, appropriate values for all of the parameters of our simple model, we can proceed to estimate RGRE (t), the growth rate of recurrent expenditure required to opeate old and new development projects at their planned activity levels. The relevant estimates are presented in Table 5. We have set g and $\bar{s}(t)$ at 0.02 and 0.05, respectively, and then let $\bar{r}(t)$ and TDE(t)/TRE(t) take on values between 0.05 and 0.40, and 0.30 and 0.60, respectively.

From Table 5, it can readily be observed that the required growth rates, in real recurrent expenditure, are exceedingly high for most economies to absorb. For example, if r(t) = 0.05 and TDE(t)/TGE(t) = 0.30, a very conservative set of assumptions, then RGRE(t) = 5%; similarly, if $\bar{r}(t)$ = 0.40 and TDE(t)/TRE(t) = 0.60, the most onerous set of assumptions, then the required growth rate of real recurrent expenditure is 29% per annum. In the previous discussion, the best-guess values of $\bar{r}(t)$ and TDE(t)/TRE(t) were stated to be 0.15 and 0.50, respectively. If these values apply, recurrent expenditures must escalate by 12.0% per annum in real terms. This is virtually an impossible load for any

Table 5

REQUIRED GROWTH RATE OF REAL RECURRENT EXPENDITURES (IN PERCENTAGE POINTS)

TDE(t)/TRE(t)	$\bar{r}(t)$ 0.05	0.10	0.15	0.20	0.30	0.40
0.30	5.0	6.5	8.0	9.5	12.5	15.5
0.40	6.0	8.0	10.0	12.0	16.0	20.0
0.50	7.0	9.5	12.0	14.5	19.5	24.5
0.60	8.0	11.0	14.0	17.0	23.0	29.0

developing country to bear. If we assume a tax bouyancy factor of 1.1, it is obvious that real GDP must grow by 10.9 percent per annum, if the recurrent budget share of total government revenue is to remain fixed at its prior year's level.

Given that a real growth rate of GDP of 5-7 percent per annum is a reasonable target, one would expect real tax revenues of increase by 5.5 to 7.7 percent per year. If we further assume that recurrent expenditures are constrained to increase no more rapidly than the rate of increase in government tax revcenues, it seems clear that the current or recently past situation in Kenya would call for some reexamination of development strategy.[18] A review of Table 5 and equation 11 indicates that a major impact on the over-expansion phenomenon can be best obtained by severely reducing the magnitude of the development plan, i.e., reducing TDE(t)/TRE(t); by changing the Plan's project mix to reduce the associated $\bar{r}(t)$; or by some combination of the above options.

Minor improvements can be achieved by reducing "g" and $\bar{s}(t)$. However, the extent to which g can be pushed below 0.02 is subject to serious question; similarly, a reduction in $\bar{s}(t)$ can most directly be attained by convincing donors to increase the grant or soft-loan portion of their aid. This objective is not likely to be easily attained given the current environment affecting external aid.

Let us return to the major variables affecting RGRE(t) - $\bar{r}(t)$ and TDE(t)/TRE(t). There is some evidence to suggest that $\bar{r}(t)$ is declining over time. The emphasis on activity with a high recurrent obligation, such as health and educational services is subsiding; instead, economic infrastructure and aid for self-help has been increasing in importance, which carries with it relatively limited on-going expenses. Alternatively, the recent emphasis on rural development and appropriate technology may cary with it a higher than average recurrent expenditure commitments. For example, roads constructed by labour intensive techniques may deteriorate more rapidly than those built by traditional techniques. In summary, it is apparent that substantial research is needed on the recurrent implications of various types of development activities.

The magnitude of a development plan is obviously subject to bureaucratic control but, as suggersted previously, political attitudes must change before substantial progress can be made in this area. Hopefully, through the use of techniques similar to those above and, of course, technically sound project evaluation and macro-planning methods, the planner will be able to clearly illustrate the nature and magnitude of the "over-expansion" problem.

IV. Conclusion

Throughout this paper we have attempted to stress the manner

18 For a further discussion of this subject see Anderson and Pinfold (1978).

in which the development budget interacts with recurrent expenditures. Development projects were shown to generate a contingent liability on the Recurrent Budget of subsequent time periods and, thus, to reduce the amount of funding available for future development activities. Hopefully, through the numerous numerical examples presented, the reader was able to grasp the magnitude of the "over-expansion" argument. Although all of the examples employed are based on hypothetical data, it is the authors' belief that the assumptions and data utilized in the analysis are reasonable representations of the current Kenyan environment.

If one accepts our preliminary findings, then one must search for a solution. A direct assault on the problem can be made through a reduction in the magnitude of the annual investment package, and by the selection of more projects with a lower recurrent component. The most realistic approach would appear to be some combination of the above options.

In order to verify the existence of the "over-expansion" problem and, given its verification, to plan an appropriate course of action, one must employ the relevant set of tools. We have attempted to outline a few simple procedures that could be readily undertaken at both the micro and aggregate level. As sugested previously, a thorough planner must be cognizant of the total cost of the project under consideration; and the expenditure required at each stage of the process; the "true" value of external aid and, perhaps most importantly, the aggregate impact of all the projects being proposed for inclusion in a given development package.

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