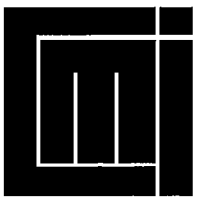
Macro-Economic Effects of Development Plan Expenditures

A Framework for Analysis, with Special Reference to Uganda

Per Granberg

WP 1993: 1



Working Paper
Chr. Michelsen Institute
Development Studies and Human Rights
Bergen Norway

ISSN 0804-3639

Macro-Economic Effects of Development Plan Expenditures

A Framework for Analysis, with Special Reference to Uganda

Per Granberg

WP 1993: 1

Bergen, July 1993

CHR. MICHELSEN INSTITUTE
Development Studies and Human Rights

Working Paper WP 1993: 1

Macro-Economic Effects of Development Plan Expenditures

A Framework for Analysis, with Special Reference to Uganda

Per Granberg

Bergen, July 1993. 51 pp.

Summary:

Development plans are mainly concerned with the financial aspects of development projects, while the economic aspects are often neglected. This paper constructs a methodology for converting the information given in development plans into data suitable for a real-economy model. The method deals with backward linkages in terms of the demands by the projects for products and services from the rest of the economy; and forward linkages in terms of benefits the project is expected to generate and its future demands on public budgets for operation and maintenance. The paper is focusing on Uganda as a case, while the overall aim is to illustrate general principles.

Sammendrag:

Utviklingsplanene i mange utviklingsland er i hovedsak opptatt av de finansielle sider ved utviklingsprosjekter, mens de økonomiske aspekter ofte blir neglisjert. Dette arbeidsnotatet utvikler en metode for å konvertere informasjon fra utviklingsplanene til data som passer inn i en modell for den totale realøkonomien. Metoden tar hensyn både til hvordan prosjektene skaper etterspørsel etter innsatsfaktorer fra resten av økonomien, og hvorvidt prosjektene vil generere produkter og tjenester og eventuelt legge beslag på offentlige budsjetter til drift og vedlikehold. Arbeidsnotatet bruker Uganda som konkret eksempel, men formålet er samtidig å illustrere noen generelle prinsipper.

Indexing terms:	Stikkord:
Development plans	Utviklingsplaner
Economic models	Økonomiske modeller
Development projects	Utviklingsprosjekter
Uganda	Uganda

To be ordered from Chr. Michelsen Institute, Fantoftvegen 38, N-5036 Fantoft, Bergen, Norway. Telephone:+47 5 574000. Telefax:+47 5 574166

Contents

Tables

Annexes

General introduction

Development plans have traditionally constituted important elements in the development efforts of LDC governments, as well as significant elements of their *total* economic activity. As such the development plan should provide an important input to any economy-wide planning framework related to these economies. However, the data presented in the development plan may not necessarily correspond to the data-needs of the economic framework. Often the plan may pay a great deal of attention to the *financial* aspects of the projects involved, whereas the framework may typically concentrate on the *economic* aspects. Thus, the plan may in great detail deal with the questions of how much the project will cost, and how these costs are to be financed (by donor etc.). This is understandable from an administrative point of view, funds are in most cases seen as the limiting factor; without them the project in question can not go ahead at all. And even if funds have been secured, annual disbursements remain a central concern, representing an important "tool" in the supervision of project implementation.

Factors such as these may of course be important also within the context of the planning framework, but the type of framework we presently have in mind will typically be in the form of a macro-economic model concentrating mainly on the so-called *real-side* of the economy. Thus, pertinent questions in respect of the development plan expenditures will for instance be: what kind of *products* are required for the project, and where may they be obtained?

In addition, the benefits that the projects are expected to produce in terms of future outputs will tend to be central to the model. These benefits reflect upon the basic nature and purpose of the projects in question, and as such they ought to be spelled out by the relevant project documentation. But even so, the information given may not satisfy the needs of the model. The information on these matters is often incomplete, verbal and general, representing for instance general statements of purpose rather than actual projections of results. Information of this kind is not specific enough for a modelling exercise, which typically will require quantitative estimates. And even when such estimates are given, they often leave something to be desired in terms of comparability, clarity and reliability. Hence, in many cases these documents tend to analyze the project concerned in isolation, presenting whatever micro-estimates that seems immediately appropriate or available, based on assumptions that are not always evident. The need to present a set of *comparable* estimates, based on common (and transparent) assumption about the rest of the economy, is seldom, if ever, observed in these documents, or, indeed, in the plan itself.

As often as not, the most concrete and solid data describing the projects are therefore confined to the financial variables. This can make the task of converting the information given in the development plan into data suitable for the real-

economy model quite a challenging one. Nevertheless, in view of the overall economic importance of the development plan, the challenge have to be faced if the model is to be "complete". In the present paper we shall present *one* attempt at meeting this challenge. In doing so, however, we shall move from the general to the specific, adopting the concrete case of Uganda as the basis for our analysis. Hence, while the overall aim of the paper is to illustrate general principles, the concrete analysis presented is highly specific, reflecting the chosen focus on the Ugandan situation.

The setting for the present analysis

Uganda has been through a difficult period during its recent past. Years of war and mismanagement had effectively crippled the economy by the second half of the 1980s. The Ugandan Rehabilitation and Development Plan (RDP) constitutes an important element in the current government's efforts to rebuild the national economy. Although these efforts are only part of a wider economic policy with emphasis on private sector participation, the RDP must be relied upon to account for a significant part of the national investments during the next few years. Given the present national setting, the implementation of the development plan will consequently have significant implications for the economy at large also in the specific case of Uganda, not only in terms of the expected increase in the future supply of public goods and services, but also in terms of the goods and services which are "today" consumed by the projects involved.

In the current paper we shall propose a way of analysing these aspects of the RDP, with a view to make it accessible for further analysis within the framework of an economy-wide macro-economic model. The existence of such a model consequently provides the basic rationale for the present exercise. Even so, a Ugandan model of this description does not as yet exist. It is intended, however, to build such an economy-wide model at a later stage; the present effort may be seen as the first step in this direction. This procedure may be justified on the grounds that the results of the present analysis, due to the importance of the RDP, will have important implications for the nature of the model that may eventually be constructed "around it". But the opposite is also true: the nature of the ultimate model will have important implications for the present analysis. This being the case, we shall have to assume or propose certain aspects of the future model, (limiting ourselves to those aspects which have a direct bearing on the present analysis of the RDP).

As already indicated above, the implementation of the RDP will have significant economic implications, not only in terms of stated project-objectives as such, but also in terms of its general effects upon the economy at large, ie: through its overall *linkages* to the various parts of the economy in general. Thus, questions of the following nature may be of typical relevance to a future macro-model:

- what kind of products will the RDP-projects demand, and from where,
- how will this demand affect the rest of the economy,
- what benefits will the projects produce in terms of future supply of goods and services,
- what demand will their make on future public budgets etc. (in terms of implied operation and maintenance costs).

In the next few sections of this paper we shall discuss how best to utilize the available RDP-data in terms of model-needs, with reference to above questions, as far as these can be addressed given the nature of the available data. For ease of reference we may refer to the first two questions as relating to the *backward* economic linkages, and the last two as relating to the *forward* economic linkages. Before we discuss these linkages, however, we shall describe the nature of the existing RDP-data, and introduce two initial classification concepts.

The nature of existing RDP-data

Data on anticipated/planned annual disbursements for all RDP-projects are regularly collected by the Ministry of Finance and Economic Planning (MFEP). The ministry store the data in a computerized database, from which they may be retrieved in the form of Project Profiles. The profiles are regularly published as part of the official RDP documentation.[1]

The project profiles contain the following cost categories (the definitions of the various cost categories etc are given in table 1):

- Assets
- Constructions & Buildings
- Machinery
- Roads
- Vehicle Purchase
- Trucks
- Cars
- Other
- Non-Capital Payments
- Forex Salaries & Wages
- Local Salaries & Wages
- Project Allowances
- Vehicle Operation & Maintenance
- Other expenditures

[1] Ref.: Rehabilitation and Development Plan 1991/92-1994/95, Volume II.

In addition , the project profile contain information about the origin of the cost elements, ie:

- Foreign (= Imported)
- Local (= Locally purchased)[2]

Comparing these categories to the introductory description of what type of information the plan *might* have contained, we can at once conclude that the RDP-data seems relatively well suited for an economic analysis. Hence, all costs associated with capital formation and labour are specified in great detail, both with respect to their type (roads, cars etc), and origin (foreign, local).

Assumedly, these costs represent the lion's share of the total RDP-costs. If so, the major demand-components arising from the RDP are detailed directly in the basic data in terms of the dimensions: origin and type. These dimensions will constitute important elements in the future economic model, reflecting the fact that the provision of different types of assets and inputs may have different effects in the economy. Thus: the use of locally made products will for instance not create the same Balance of Payment effects as the use of imports, the future costs of maintaining and operating vehicles will differ from those of clinics (both by value and type), etc.

Even so, it is a fact that the RDP-data only answer the first of the four question given in above chapter, and that their specification with respect to this question is not as complete as we ideally would have preferred for our present purpose. The task of converting available plan-data into relevant model-inputs consequently still have to be faced.

Two initial classification concepts

Project classification

The RDP-*projects* are sorted and presented by the MFEP according to a type of activity classification (see table 2). In order to avoid conflicting standards, unnecessary work and possible confusion, our analysis of these data should as far as possible adopt the standards, classifications etc. already established by the MFEP. Thus, in terms of *project*-classification we will adopt the classification of table 2 "as is" also for our purpose.

[2] Note that these describe the origin of the *commodities* in question. In earlier RDP-documents there seems to have been a tendency to confuse this with the financial question: are the funds paying for these commodities coming from local or foreign sources? It is not at present known if this is also the case for the most recent RDP-profiles.

Definition of production sectors

In order to analyze the implications of the RDP-expenditures within the framework of a wider macro-economic model, we need to define the economic sectors of this model. A proposal towards this end is made in table 3. As seen from the table we have as far as possible adopted the same sectors as used in the official GDP-tables published by the Statistics Department (SD). This reflects the basic principle that there should be as direct a correspondence as possible between the model-structure and its basic statistical sources. The rational of the proposal contained in table 3 is further discussed in Annex 1.

Backward linkages

Analysing the RDP-expenditures in term of their backward linkages implies asking the questions:

- what kind of products will the projects demand, and from where,
- how will this demand affect the rest of the economy.

For instance: Are we talking about transport equipment, pesticides or consultancy services? Will they be imported or supplied from local sources? In terms of the (future) macro-economic model these are important questions. Because: even if the Government of Uganda (GOU) should have no problem *financing the Shs-expenditures* in question, these expenditures reflect *"physical" demand for goods and services*; demand that have to be satisfied by either local producers or by imports. Hence, relevant questions for the macro-analysis will be:

- Can all demand for local products actually be satisfied, given existing or expected production capacities?
- Can all demand for imports be satisfied, given the availability of Forex?

Having answered these questions one way or the other, the analysis may then move on to questions relating to the economic effects of satisfying these demand components, ie: to the second of above questions. In general, however, this is seen as being outside the scope of project documents etc. For the purpose of the present paper, we shall consequently put this question aside, leaving it to the future model to deal with. Hence, at this stage we shall limit ourselves to the task of classifying the project expenditures by cost component and source of supply.

Classification by cost component

For our present purpose, the data on project expenditures given in the project profiles merely represent raw data which we will have to convert, split and merge in various ways in order to analyze their economic implications. As a first step towards this end we will classify the expenditures according to the type of cost components involved. A classification of this description is given in table 4.

The classification is seen to associate each cost component with a four-digit numerical code. It is in principle intended that the person(s) doing the analysis will scrutinize the original expenditure items as they appear in the RDP, allocating each one a relevant cost component code.[3]

However, except for the cost category "other expenditures", there is a "1-to-1" correspondence between the expenditure codes and the cost categories of the RDP. Provided that all RDP-data are correctly classified (ie: in accordance with the definitions set out in table 1), most of the expenditure coding may therefore be left to the computer. The relevant codes for MFEP's original cost items are given in table 5.

As already noted, no code(s) may be a priori specified for "other expenditures", this cost category containing a "mixed bag" of residual costs. These costs, moreover, may tend to be of a highly diverse nature in terms of specification; some may be specified in great detail while others are only very broadly described. If this is the case, cost component codes reflecting alternative degrees of specification will have to be accepted. Thus, in table 4 the degree of specification with respect to the secondary production factors varies considerably.[4]

Classification by source of supply

Next we will convert project expenditures into demand components defined in terms of their typical sources of supply. A practical way of doing this is proposed in table 6, based on the cost components defined above. The sources of supply classification is seen to embrace two dimensions, one describing the source of supply in terms of the *producing sector* (ie: the sector of origin), and a second describing the source of supply in terms of the *geographical origin* (ie: the foreign versus local origin).

The sector of origin is consequently the sector typically supplying the item in question, given the production sectors defined for the present exercise. As concerns the imports we may alternatively define the sector of origin as the sector that *would have* produced the item in question, *if it had been* produced in Uganda.

In some instances the correspondence between a cost component and its sector of origin is unique and obvious, but in many cases this is not so. In these cases we have to split the cost components between sectors of origin as best we can. It

[3] The cost component codes are essentially introduced for programming purposes, assuming that the subsequent analysis will (have to) be computerized.

[4] The classification proposed in table 4 reflects the cost-structure of RDP-projects, as published in 1990/91. Additional classification codes may be added, if needed, to accommodate the "present" cost-structure.

should be noted that the "splittings" proposed in table 6 are of a preliminary and tentative nature only, reflecting an analysis of the RDP-data available in 1990/91. It should be the concern of the person performing this analysis at any given time to scrutinize these and revise them whenever feasible. The same is true for the percentage ratios splitting the cost components into foreign versus local origin.

Having done so there should be no need for further intervention from the analyst at this stage, the conversions proposed in table 6 having been structured in such a way that the cost components translates directly into sectors of origin. The actual task of converting the former into the latter may therefore be left to the computer.

Forward linkages

Analysing the RDP-expenditures in term of their forward linkages implies asking the questions:

- what benefits will the projects produce in terms of future supply of goods and services,
- what demand will their make on future public budgets etc. (in terms of implied operation and maintenance costs).

Even though these questions relate to the net benefits of the projects, and thus reflect on their basic rationale, project documentation tend not to address them to the satisfaction of the macro-analyst. Hence, the benefits of each project tends to be described in its own specific way, based on special and sometimes unstated assumptions. This fact make it difficult to extract proper and comprehensive macro-estimates from them, reflecting a common and "agreed base-line scenario". Even so, we should of course take note of all relevant information on these effects that may be available. Foreseeing that this will probably turn out a "mixed bag" of data, and probably also a difficult one to handle analytically, we should in addition utilize the existing expenditure data "to the maximum", converting them into economic categories that may assist the model in estimating these effects. In essence, this may be achieved by analysing the project costs in terms of *how* and *where* in the production system they are used, ie. in terms of their end-use and purpose.

Classification by end-use and purpose

In this section the cost components are classified according to their assumed end-use and purpose, ie.:

- in terms of their productive function (i.e. whether they represent accumulation of capital assets, or direct, recurrent inputs into the production-process),
- in terms of their receiving sectors (i.e. which production sectors are the (direct) recipients of the assets and inputs in question)

For this purpose we first allocate the various cost components to four cost elements: labour, intermediates, fixed capital and stocks (see table 7.A). Next, we aggregate these four elements into two broad cost categories: recurrent and capital costs. All these allocations are either standardized or definitional, and may as such safely be left to the computer to perform automatically.

The costs will however also have to be broken down by recipient and function. Ie: they will have to be classified in terms the sector(s) receiving the project-inputs, and in terms of the productive functions: capital formation and production inputs. We propose to do this on the basis of above defined broad cost categories: recurrent and capital costs. Hence, rather than breaking down the full project-costs in "one go", or each cost component individually (in several "goes"), we prefer to break down the two project-totals (for recurrent and capital costs). No a priori given ratios apply for these breakdowns, which must be specified exogenously for each project by the analyst himself. The ratios should be specified in the format given in table 7.B.

As seen from table 7.B there are a total of (3*N) possible coefficients (for each project), where N is the number of production sectors allowed for the macro-model. This may seem a "tall order"; considering that we have proposed a total of 9 sectors at the aggregated level, and 27 at the disaggregated, (see table 3). However, only a very few of these possibilities will apply in each actual case. Thus, as a rough first approximation we might expect the receiving sector to be identified by the project's RDP-sector-classification, the capital formation to be given by the capital costs, and the production inputs to correspond to the recurrent costs. Unfortunately, this represents an over-simplification of the real situation, (although not a total distortion). Thus:

- The sector-classification of RDP-projects does not correspond to the classification of production sectors on a "1-to-1"-basis, the RDP-project may for instance cover more than one production sector.
- If the project "supplies" more than one sector, the distribution of capital by receiving sector may differ from that of inputs.
- Recurrent cost may occasionally be capitalized, in which case they should be allocated to capital formation rather than to production inputs[5].

The great choice of options given in table 7.B consequently reflects the fact that we need to be able to specify more than one receiving sector, that we need to be able to specify different distributions for different cost categories, and that we need to be able to allocate recurrent costs both to capital and inputs.

[5] Capitalization of recurrent cost elements is feasible when the costs in question represent the construction, installation, start up etc. of some physical capital item. See Annex 2 for a further discussion.

The way to handle the exogenous data requirements of table 7.B is consequently (for each project):

- First, to decide on the relevant receiving sector(s), (as spelled out in the supporting project documentation)
- Next, to allocate the capital costs to capital formation, breaking them down between receiving sectors by specifying the percentage ratios: C_i.
- Finally, to split the recurrent costs between the two productive functions (capital formation and productive inputs), and allocate each one to its relevant receiving sector, by specifying the percentage ratios: R_{1i} (for the recurrent costs allocated to capital formation), and: R_{2i} (for the recurrent costs allocated to production inputs).

Based on above data the actual allocation of cost elements by productive function and receiving sector may be done in a single operation (for each project). In order better to illustrate the steps involved, we have nevertheless split the operation into two (ref. table 7.C and 7.D).

First, in table 7.C, the cost category elements of table 7.A are allocated to the productive functions introduced in table 7.B, without reference to the receiving sectors. Ie. they are allocated to recurrent production inputs and capital formation, defined as follows:

- Recurrent production inputs are goods and services consumed in the production process. These inputs are further subdivided into primary and secondary inputs. The primary production inputs are the *services* provided by the primary production factors, which in principle include both labour and capital. In practise, however, only labour services (wages and salaries) are included in the RDP cost estimates. The secondary production inputs are the goods and services supplied by other production sectors, ie. the intermediate inputs.

- Capital formation is the aggregate of all products used to increase or maintain the total store of the primary production factor: capital. It is further subdivided into Gross Fixed Capital Formation (GFCF) and Stocks. Gross fixed capital formation represents investments into buildings, constructions, machinery and equipment (incl. roads, dams, vehicles etc.), while stocks represent the increase in livestock herds as well as stocks of inputs, supplies and own products held by the production sectors.

The allocation of the cost category elements is quite straight forward, as illustrated in table 7.C, except for the allocation of the capitalized recurrent costs which are broken down between GFCF and Stock in accordance with the value of the capital costs allocated to them.

Finally, the totals for the various production functions are broken down with respect to their receiving sectors, as demonstrated in table 7.D. The mathematical formulas by which the final results may be calculated directly from the basic data (of tables 7.A and 7.B) are also given.

Future results generated

Finally, we shall look at the future results that the project is expected to generate. Assumedly these will primarily be in the form of benefits. Nevertheless, when analysing the future implications of a project one should not overlook the fact that projects may also bring costs; invested capital may deteriorate rapidly unless maintained, production capacity created may quickly become idle in the absence of adequate operational funds. Thus, roads will need to be maintained, health clinics will need to be staffed etc. Even so, these costs may tend to be ignored in the project documents. As long as one look at each project in isolation this is perhaps understandable; most projects are relatively small, and so are the costs arising from them. Aggregated up to the macro-level they may however become quite substantial, representing a significant burden on future public budgets. Nevertheless, we shall have to leave out this aspect in the present analysis; the data contained in the RDP project profiles etc (assumedly) being too lacking in this respect.

Concentrating on the future *benefits*, we may in principle differentiate between direct and indirect ones. The direct (or primary) benefits are those arising as a direct result of a given project, *in* the sectors that are the direct "recipients" of the project. The indirect (or secondary) benefits represent the *additional* effects arising throughout the rest of the economy, as a result of the increased activity implied by the direct effects. For instance: the building of a sawmill will in the first instance have the direct effect of increasing the production in the sawmill industry itself. In addition it may boost the production of other industries through its supply to, and demand from, them. The indirect effects are often important, and may even constitute the basic rational of the project. Thus, the creation of transport facilities has been a priority of past RDPs. This is assumedly not because transport *in itself* is such a good thing, but rather because transport is essential to the effective operation of the rest of the economy.

But even so, the estimates of future benefits that we may hope to obtain from project documents with any degree of reliability, tend to be restricted to the direct effects. This is so because these relate most directly to the project environment itself, whereas the latter relates to the entire economic structure. For the present exercise we may consequently have to restrict ourselves to the direct effects, leaving the indirect ones to be calculated within the framework of the future economy-wide model.

Basically, the expectation of future benefits in terms of increased production or supply of various goods and services, represents the fundamental reason for carrying out a project. As such, one might perhaps have expected these benefits to be spelled out in quite concrete and detailed form in the relevant project documents. However, this is not always so, in practise the benefits are often described in rather vague and "non-numerical" terms. And even when the benefits are described in terms of numerical estimates, these are, as earlier pointed out, of a highly diverse nature. Thus, it is in general not possible at this stage to express the benefits of the various projects in term of a *common* variable, reflecting a *common and well defined* set of assumptions about the general economic setting. Instead we shall have to collect whatever information is available, leaving it to the future model to decide how to make the best possible use of this material.

This being the case, we will have to use a fairly open-ended coding-format for the specification of future project-results. In table 8 we have proposed such a format, allowing for a wide variation in the specification of the future benefits.

It may be noted that table 8 specifies a time-horizon of six years for the representation of future benefits. This horizon basically reflects the four years RDP-period, (plus two extra years added for technical reasons). From the point of view of future "returns" on the financial resources "invested" today and in the next few years, this may seem a short period. Normally, one must allow for a certain time-lag between "the sowing and the reaping". Hence, the benefits of the investments made during the current plan period may to a great extent be expected to materialized only *after* the end of that period. However, depending on the definite time-horizon built into the future planning-model, these late benefits may not be directly relevant to our current exercise. Thus, while it may be undeniable that the full benefits resulting from the present investment plan may only materialize after quite a few years, the actual data needs of the planning model may not extend that far into the future. Since the current exercise is undertaken to meet the data needs of the model, rather than to analyze the plan as such, the ruling principle should be to tailor the analysis of the plan-results according to the actual needs of the model. The six-years horizon adopted in table 8 reflects this principle, on the assumption that the planning horizon of the government is expressed by the four year RDP-period.[6]

The fact that a significant part of the future benefits arising from the implementation of the RDP will only materialize after the end of the model's time-horizon, may have its blessings. As already stated, the factual representation of these benefits given in the basic project-documents leave a lot to be desired. However, to the extent that these benefits fall outside the model's time-frame, their unsatisfactory representation are of no immediate and real concern to us.

[6] See annex 3 for a further discussion of the time-frame of the future model.

Instead, we may have to be concerned about the representation of today's benefit from past projects. This, however, falls outside the scope of the current paper.

Changing the basic scenario

Above we have discussed how to analyze the RDP-data in order to satisfy the assumed data-needs of a future planning model. Throughout this exercise we have focused our attention on the technical question of how to achieve this end, given the nature of the present RDP. The specific characteristics of the *present* plan are of course both a natural and important point of reference for any attempt at analysing the economic implications of Uganda's development efforts. It does not, however, constitute the *only* scenario relevant for our present purpose. Realising that the overall project-content of the RDP, as well as the characteristics of individual projects, may (and will) change over time, we should be prepared to analyze also alternative RDP scenarios. Hence, in this chapter we shall propose a "formula" allowing us to analyze various alternatives to the "present" RDP. Technically speaking, the specific characteristics of the "present" RDP will consequently only be treated as one among several possible scenarios. Even so, it will still represent a basic alternative in our analysis, to be used as a point of reference for the other scenarios.

Taking the basic scenario as a point of departure, we may introduce changes in a number of ways. For instance:

- A: By changing the content of the project-"bag" making up the scenario (within the limits of existing priority and reserve listed projects).
- B: By rephasing the annual implementation *volume* of projects included in the scenario.
- C: By changing the overall *price*-structure of projects included in the scenario.
- D: By changing the basic character of projects included in the scenario (ie: their basic "size, content and direction", in other ways than specified under B and C).
- E: By introducing entirely new projects.

In the following we shall propose a mechanism for handling scenario revisions with respect to A, B and C above, these types of revisions assumedly being the most relevant ones for our present purpose. Similar structures *could* be constructed for the type of changes specified under D and E. This is not done, however, because this may seem unduly restrictive and complicated,[7] especially if one accepts the view that these types of revision are rather less likely to occur than the other. If changes of this nature are to be introduced, it is therefore proposed that

[7] Such revisions would for instance have to be made by blowing up (or down) an already existing expenditure pattern, based on the average cost-structure of some "basic projects", or similar.

they be specified and entered in the form of "dummy" projects, (ie: by introducing new project profiles into the project menu, specifying the values of the relevant additions or revisions).

Returning to the changes summarised under A, B and C above, we may take note of the following facts:

- Changing the content of the project-"bag" may be done quite easily by excluding projects which are part of the basic scenario, (ie: which are on the RDP priority list), and/or including projects from the present RDP "reserve list" (ie: projects that are included in the MFEP database, but not yet "elevated" to the status of priority projects).

- Rephasing annual implementation volumes implies changing the speed with which the projects are implemented, but *not* their total budgeted costs. This is done by shifting the base-scenario volumes backwards or forwards in time. By nature, these base-scenario implementation volumes are however cost-estimates rather than physical volumes, (ie. they are expenditure-"volumes" measured in terms of the price-set defined for the basic scenario). Shifting these cost-"volumes" around in time will consequently also imply a shift in the underlying price-factor, unless all costs are all measured in the same (constant) price-set. Luckily, this is the case for the RDP data. Thus, the project profiles of RDP 1991/92-1994/95 are all measured in constant June 1992 prices (for 1992/93 onwards). For our purpose, these cost-estimates may consequently be interpreted as reflecting the "real" volumes of implementation.

- Changing the overall price-structure of projects implies changing the overall financial costs of the given implementation-volumes, (i.e. *without* changing the magnitude of the latter). Such annual price-changes may be relevant whenever we want to change our cost-estimates from one set of constant prices into another, or from constant to current prices. It may also be used to account for changes in relative prices, or correct for under- or over-pricing in the original cost estimates. Ideally, therefore, the price changes ought to be effected on each cost item of each project individually. However, this would make the process of revision unduly cumbersome. In practice we have therefore limited our options so that each project may be price-revised on an individual basis, while the cost items of the project concerned are all revised by the same factor.

In order to deal with these three types of scenario-changes, we propose to introduce a Project Scenario Register, detailing the various project specifications making up a given scenario. As seen from table 9 the register contains:

- Firstly: a Project Menu identifying *all* tentatively relevant RDP-projects; ie: all projects included in the MFEP project database, whether they are presently included in the priority list or not.[8]
- Secondly: a Project Selection Code specifying whether to include or exclude the project in question in the "current" scenario. (Ref. A above).
- Thirdly: a set of codes and coefficients detailing the changes to be made with respect to the phasing of project implementation volumes. (Ref. B above).
- Fourthly: a set of codes and coefficients detailing the changes to be made with respect to the price structure of the implemented volumes. (Ref. C above).

Revisions with respect to the volume- and price-dimension (ref. type B and C) consequently require the specification of a code defining the method of revision, and (depending on the method of revision specified) a set of revision coefficients. This "two-step" approach is adopted in order to allow for the possibility of both individual and aggregate treatment of the projects concerned. Assumedly, revisions may best be undertaken on an aggregate rather than an individual basis for a number of smaller projects. For instance: the most practical way of estimating the rephased implementation patterns of a multitude of health-projects, may be to rephase their combined annual disbursements, rather than those of each individual project. Hence, in this case we will specify the coefficients: k_{it} against the relevant subsector-heading in the scenario register.

In other cases however, we may want to utilize the option of individual treatment. This may for instance be the case as concern certain large or important projects. The programme consequently allows for this through the introduction of the relevant codes and coefficients.

The further technical aspects of constructing a mechanism allowing for the calculation of revised cost- and implementation-estimates, are discussed in Annex 4.

[8] Note that the tentative inclusion of the reserve-listed projects into our analysis, have implications also for the number of projects that need to be analyzed as described in previous chapters. Hence, all projects included in some scenario or other will have to be analyzed in terms of economic linkages etc.