




UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL




Distr.
GENERAL
E/CN.14/738
ECA/CONF/LDCs/3/Add.1
E/CN.14/PSD.1/8
28 January 1980
Original: ENGLISH

ECONOMIC COMMISSION FOR AFRICA

Conference on the Problems and
Prospects of the Least Developed
African Countries

Addis Ababa, 17-22 March 1980

ECONOMIC COMMISSION FOR AFRICA

First session of the Joint
Conference of African Planners,
Statisticians and Demographers

Addis Ababa, 24 March - 2 April 1980

ECONOMIC COMMISSION FOR AFRICA

First meeting of the Technical
Preparatory Committee of the Whole

Addis Ababa, 3-8 April 1980

ECONOMIC COMMISSION FOR AFRICA

Fifteenth session of the Commission
Sixth meeting of the Conference
of Ministers

Addis Ababa, 9-12 April 1980

COMPARATIVE ANALYSIS OF THE PROJECTIONS MADE FOR DEVELOPING
AFRICAN COUNTRIES BY VARIOUS UNITED NATIONS BODIES

The present study was prepared by the ECA secretariat with most of the tabular material provided by the UNCTAD secretariat which also made valuable comments before the paper was finalized.

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I. INTRODUCTION

1. Objective of the paper

1. The objective of this paper is briefly to review different projections made for developing African countries by various United Nations bodies and organizations. There are variations in types of models and data used and in the assumptions and scenarios made, all of which, naturally, affect in one way or another the conclusions. Projections made under different assumptions and for different purposes are useful in giving alternative scenarios for the elaboration of alternative policies. The present comparative analysis is designed to help policy makers in member States of developing Africa to derive maximum benefits from projections and to make it easy for these countries to harmonize their position in the various international and regional meetings.

2. Preparatory work for the new international development strategy

2. The International Development Strategy for the Second United Nations Development Decade set various targets for developing countries. These average annual growth targets should be 6 per cent for GDP, 4 per cent for agriculture, 8 per cent for manufacturing an annual increase of 0.5 percentage points yearly for the savings rate, a little more than 7 per cent for exports and a little less than 7 per cent for imports. In addition the Lima Declaration set a specific target for developing countries in order to raise their share in world manufacturing production to 25 per cent by the year 2000.

3. Since the beginning of the 1970s, various United Nations bodies have been involved in analysing quantitatively the economies of both developed and developing countries and particularly in assessing the development trends of various regions and the possibilities of achieving the above-mentioned targets.

4. Also, in assessing the implications of these targets, since 1975-1976, the United Nations bodies have been particularly engaged in assisting in the preparation of the International Development Strategy for the 1980s (i.e. the Third United Nations Development Decade).

5. In undertaking such preparatory work, the United Nations system addresses itself to such crucial issues as the problems of capital requirements of the developing countries and the transfer of resources from developed countries; the world food programme, particularly the strengthening of the agricultural production in developing countries; changes in trading arrangements including the necessity to stabilize raw materials prices and remove trade barriers especially those which constrain developing countries exports of manufactured or semi-processed goods to developed countries; and the improvement of health, education and employment in developing countries.

6. A Task Force on long-term development objectives was established in order to "advise the Administrative Committee on Co-ordination in its endeavour to provide technical support for, and analytical contributions to central inter-governmental bodies to facilitate their tasks of harmonizing the existing development objectives and targets" 1/. The Task Force is composed of representatives of the various regional commissions, United Nations specialized agencies and bodies, the World Bank and IMF. The primary responsibility of the Task Force is, "on the basis of the long range objectives and targets set by the International Development Strategy for the Second United Nations Development Decade, the sixth and seventh sessions of the General Assembly, major world conferences and other intergovernmental bodies, or agencies and programmes to (1) analyze the interrelationships of these objectives and targets, the extent to which they are convergent over time and could be made mutually supportive, and (2) assess the resources required for the purpose" 2/.

7. In order to provide more effective technical backstopping to the work of the Task Force on Long-Term Development Objectives, ACC has approved the establishment of an inter-agency Technical Working Group, acting under the guidance of the Task Force. The Technical Working Group's first task is to review the quantitative analytical work carried out within the United Nations system and to achieve consistency among the various projects.

8. The Task Force is expected, ~~thru~~ collaboration with the Committee for Development Planning, to advise the Preparatory Committee for the New International Development Strategy on the measures and targets which should be included in the strategy.

3. Quantitative studies and analyses under way in the United Nations system

9. In response to General Assembly resolution 3508 (XXX) of 15 December 1975 which called for the examination of long-term trends in the economic development of the world, various United Nations bodies are involved in quantitative work using econometric techniques, input-output techniques or optimization techniques. The work being carried out by the regional commissions is complementary to that done at Headquarters by the Department of International Economic and Social Affairs. It deals mainly with the long-term development trends of the regions taking into account national development plans and also their characteristics.

1/ Paragraphs 10, 11 and 12 of the background note on development objectives of the United Nations system submitted by the Secretary-General to the Joint ACC/CPC Meetings of 5, 6 and 7 July 1977.

2/ Ibid.

10. Other United Nations bodies such as UNCTAD are also involved in assessing capital requirements for developing countries using econometric models built by UNCTAD. The World Bank has also formulated a model which is used in the preparation of the annual world development report. The model is mainly used at the regional level and in some cases at the country level.

11. As a specialized agency, the Food and Agriculture Organization is involved in a project entitled "Agriculture toward 2000" which is based on an analysis of 90 individual developing countries and 27 agricultural commodities. This project aims mainly at assessing the level of self-sufficiency in cereal consumption at the world and regional levels and at analysing the relationships between self-sufficiency in food and other macro-variables such as gross domestic product and its expenditure components (e.g. consumption, investment, exports and imports) and also employment, particularly in the rural sector.

12. In order to benefit from the expertise of various specialized United Nations bodies, interagency projects have been established and are expected to contribute to the preparatory work for the new International Development Strategy. In this respect, a joint UNCTAD/UNIDO project is expected to study the interrelationships between growth patterns, trade configurations and industrial structures in order to illustrate at the national, subregional or regional level, the negative effects to be expected from a continuation of the old international economic order and the potential beneficial aspects to be expected from a new one.

13. The second main interagency project is the joint UNITAR/ILO/UNESCO project in which it is intended to explore alternative ways to eradicate poverty, improve income distribution, increase popular participation and broaden educational objectives. While most of the on-going exercises are growth-oriented, the joint UNITAR/ILO/UNESCO project focuses more on the determinants of development such as social and environmental factors.

14. Because of the specificity of some studies (e.g. interagency projects and agriculture: towards 2000) it is not possible to present, in simple words, the work done by all agencies on the African region. However, in order to enable general economists to understand how differences appear in projection results, it was felt that a comparative review of the methods used and the assumptions made, even if limited to a few organizations, would be useful. Also it gives the opportunity to present various structural and behavioural presentations of the economies of the developing African countries. Thus African planners and decision makers will be provided with some tools which can help in identifying the necessary structural changes at the country and regional levels and in elaborating at the national and regional levels the implementation plans for regional and international development strategies.

15. The studies selected for the present analysis are those of the Economic Commission for Africa (ECA), the United Nations Conference on Trade and Development (UNCTAD) and the Department of International Economic and Social Affairs.

16. These three bodies are carrying out country studies using macro-models with parameters computed from time series analyses. The data used in estimating the structural and behavioural parameters are more or less the same as are the variables analysed. The three bodies are interested in the assessment of both trend and targets scenarios. Hence, it would be interesting to analyse, through the models used, the assumptions made and the methods of projection, the differences that appear in the results. Further, beyond the figures presented in the results, it would be interesting to discuss some important implications derived from the studies.

II. OBJECTIVES OF THE STUDIES

1. Common objectives

17. There are at least three common objectives in carrying out quantitative analysis and projections. The first objective is the analysis of structural parameters through time series analysis using regression techniques. For example, in estimating the models, one might be interested in determining the incremental capital/output ratio, marginal propensities to consume and to import and elasticities of output with respect to labour, capital or land. The relationships between total exports of commodity groups and world export demand for these groups as well as the degree of dependence of imports or foreign exchange reserves are also very useful indicators for understanding some aspects of an economy. Thus, this objective, is "to provide a systematic way of studying the past and specifying the interrelationships of economic variables that have prevailed over the period for which the data are available" ^{3/}. However, models generally refer to a certain segment of the economy. Confronted with reality, which by its very nature includes a multitude of variables, the model builder has to extract a limited number of variables. Hence the more a model is disaggregated (i.e. contains a large number of endogenous and exogenous variables), the better it describes the way the economy is structured and the way it is behaving. The analyses carried out by the Department of International Economic and Social Affairs, UNCTAD and ECA are of course different in size depending on the purpose of each study and the availability of reliable data.

18. The second common objective of the projection studies is to use the descriptive and explanatory models as forecasting tools. This exercise is also known as the historical trend or forecast scenario. In general, all projection studies have such scenarios in which it is assumed that a model which explains the past will also explain at least the near future. This approach is not however realistic in the long run because of technological, institutional and behavioural changes that might occur in the future.

^{3/} Ball, R.J. Econometric Model Building, in "Mathematical Model Building in Economics and Industry", collected papers on a conference organized by C.E.I.R. Ltd., Giffin, London, 1968, pp. 23 and 24.

The historical trend or forecast scenario aims mainly at analysing the behaviour of historical parameters in the future. It should be noted that differences in the results given by various models run under historical trend scenarios relate to the specification of the model (i.e. the structure of each equation and the number of the equations) and also to the size of the time series used in estimating the structural parameters. Not only are the models used by the Department of International Economic and Social Affairs, UNCTAD and ECA based on the same time period, but also they differ by the number of observations, which is constrained by the availability of data. However in estimating their models, the three organs have tried to obtain as many observations as possible in order to improve the reliability of the estimated parameters.

19. The third common objective of the projection studies is to indicate how the economy would have to be managed so as to "function more in accordance with the stated wishes". ^{4/} This exercise is also called planned scenario analysis. It provides a framework within which policy alternatives are analysed. In the studies carried out by the Department of International Economic and Social Affairs, UNCTAD and ECA, the targets close to those set in the International Development Strategy for the Second United Nations Development Decade are analysed in order to assess their impacts on the global performance of the economies concerned in the 1980s. The Lima target is also analysed in the Department of International Economic and Social Affairs and UNCTAD studies. In analysing the planned target scenarios, it is necessary to modify the explanatory model (i.e. the model estimated with the complete set of historical parameters) in order to obtain a decision model. In this type of model the relations linking the objectives and the economic policy instruments are set exogenously. The values of the objectives (e.g. growth rates for agriculture, industry, or exports) are used to derive those of the instrument variables (e.g. investment, savings, etc.). Thus, in comparing various models run under the same planned or target scenario, the differences among the decision models used have to be borne in mind in addition to other differences mentioned above relating to the problem of specification and data used. It should be noted that none of the studies of the Department of International Economic and Social Affairs, UNCTAD and ECA uses an objective function in analysing planned scenarios as is used in methods like linear and non-linear programming, and dynamic programming. This latter approach seems not very successful since it is very difficult to formulate a macro-economic objective function. In analysing planned or target scenarios, the three studies concentrate on describing how the instruments and the objectives of economic policy are interrelated. The methods used will be briefly discussed in section III of this paper.

^{4/} Stone, R. "Mathematics in the Social Sciences and other Essays" Chapman and Hall Ltd., London 1966.

20. In conclusion, it should be noted that all the studies presented hereafter use the same models for the three objectives, i.e. for explanatory purposes, for forecasting and for policy purposes. According to Timbergen 5/, one can modify an explanatory and descriptive model into a decision model without too many problems.

2. Specific objectives

21. Apart from the common objectives described earlier, the Department of International Economic and Social Affairs, UNCTAD and ECA studies have specific objectives which reflect their main concerns.

22. For the Department of International Economic and Social Affairs, the study specifically aims at analysing employment and particularly productivity of labour. Thus special attention is given to the incremental capital/output ratio adjusted for labour which is estimated by regression analysis and used to derive gross domestic product.

23. The UNCTAD study is mainly interested in providing suitable linkages between domestic production of developing countries and their foreign trade by sector and by important commodities. The model used is designed to permit the analysis of debt servicing problems and foreign trade planning and the study of the international financial and monetary implications of alternative national development strategies. The UNCTAD study also deals with both domestic and export and import prices. For each country, an index of spot prices linked to the prices of the respective traded commodities was built by a weighting system. Thus, because of its relatively large scope, the UNCTAD model is also used for the periodic "World Economic Outlook" in which medium- and short-term issues are analysed together with balance of payments in both developed and developing countries.

24. As for ECA, a specific objective is to understand better the domestic structure of the economies of African countries. In other words the model used in the study focuses rather on domestic variables and policy issues for self-reliance and less on the external sector. In the absence of reliable data on intersectoral linkages, the study tries to catch, through empirical analysis using econometrics techniques, the main relationships among some sectors. It is believed that such an approach would help in testing policy alternatives and identifying desirable structural changes at the domestic level.

III. METHODS USED IN THE STUDIES

1. Models used: basic principles

25. As mentioned earlier, the models used in the studies carried out by the Department of International Economic and Social Affairs, UNCTAD and ECA cover the main elements of the macro-economy of individual countries.

5/ Timbergen, R, Economic Policy, Principles and Design, 1966.

However, depending on the specific objectives of each study and on the availability of reliable data, these models do not have the same number of variables nor the same number of relations. Ideally both for historical trends forecast and planned scenario analysis, there is need for a model large enough to make it possible to obtain detailed and useful information.

26. (a) The global econometric model of the Department of International Economic and Social Affairs. This model 6/ built by the Projections and Perspective Studies Branch, Office for Development Research and Policy Analysis, is a set of aggregative relationships including the following main endogenous variables: gross domestic product, private consumption, government consumption, net factor incomes and receipts from abroad, investment, exports and imports. The model also uses exogenous variables such as total labour force and total population. Gross domestic product is derived using the incremental capital/output ratio adjusted for labour. More precisely increment in gross domestic product per unit of labour is obtained by multiplying the incremental capital/output ratio adjusted for labour by the investment per unit of labour in the previous year. Both private and government per capita consumption are then derived using the traditional consumption function with per capita gross national product (i.e. the gross domestic product adjusted by net factor income or receipts from abroad) as explanatory variable. Investment is taken as a policy variable and is obtained as a certain share of gross domestic product. For the foreign trade sector imports are related to both gross domestic product and investment which are the two explanatory variables. Total exports are assumed to depend on gross domestic product and also on exports of goods and non-factor services of the region to which belongs the country. In other words, the export equation is constrained by both supply and demand variables. The increment in net factor income receipts at constant prices is obtained by multiplying the external reserves balance of the previous year (i.e. exports less net factor income receipts less imports) by the estimated real interest rate. There is no specific treatment for prices in the global econometric model of the Department of International Economic and Social Affairs. As it may be seen in the following sections the global econometric model is not as disaggregated as the UNCTAD model in regard to foreign trade. Nor is it as detailed as the ECA model in regard to gross domestic product by industrial origin. However, steps have been taken in order to include more sectors and to disaggregate the foreign trade relationships. For sectoral products the model utilizes a Cobb-Douglas type of production function with sectoral labour force and total gross domestic product per unit of labour force. Also the great advantage of the global econometric model is the inclusion of population and labour force as determining factors of development which are not specifically formulated in UNCTAD and ECA models. However, the model assumes that additional employment does not make any change in productivity, which might not be very realistic.

6/ See Prospectives growth rates and international resource transfer implications, (E/AC.54/L.100 and Add 1).

27. (b) The UNCTAD model. Since the 1960s ^{7/}, the UNCTAD secretariat has been involved in assessing capital requirements for developing countries. The UNCTAD standard model for developing countries includes the main macro-economic variables on both the supply and the demand sides. On the supply side, three sectors were distinguished namely the agricultural sector, the mining sector and the non-primary producing sectors taken as a whole. For both the agricultural and the mining sectors, trend equations were generally used to explain value added. However specific formulations were made for a few countries. For the agricultural sector, subject to the availability of suitable data, yield per acre was related to the relevant inputs and to exogenous factors such as rainfall, and acreage under cultivation was related to agricultural prices and other factors. For the mining sector, attempts have been made to estimate the production function using time series data on sectoral investment. As for the non-primary producing sectors, their aggregated value added is generally explained through a regression equation using cumulated gross fixed investment and the volume of imports of goods as explanatory variables.

28. Demand equations are more detailed, particularly for the foreign trade sector. Total consumption was split into private and public consumption, estimated using two regression equations. Private consumption was related to three explanatory variables: disposable income, consumption in the previous year and the ratio of prices in the non-agricultural and agricultural sectors respectively. The third explanatory variable, which is defined as the terms of trade between the non-agricultural and the agricultural sectors, is assumed to play an important role since a movement in the terms of trade in favour of the agricultural sector for a given level of income causes a redistribution of income from the urban to the rural sector which, consequently, is likely to bring a higher propensity to consume. Public consumption was in general related to gross domestic product or treated as an exogenous variable.

29. Gross fixed investment was generally related to the level of income (i.e. gross domestic product at market prices corrected for the terms of trade) and also to imports of capital goods on the assumption that shortage of foreign exchange may affect investment decisions in countries lacking a sizable capital goods sector.

30. The external trade sector includes exports and imports equations generally disaggregated into four commodity groups ^{8/}. Exports were generally related to the world export demand of the respective commodity groups. For imports, two variables were generally taken as explanatory variables, namely gross domestic product at market prices and the level of foreign exchange reserves. Exports and imports from the balance of payments are linked in the UNCTAD model and they are generally related to national accounts or customs values of exports and imports.

^{7/} "Trade prospects and capital needs of developing countries", study prepared by the UNCTAD secretariat, New York, 1968.

^{8/} SITC 0 + 1, 2 + 4, 3, and 5 to 9.

31. Unlike the two other models, the UNCTAD model has treated prices as endogenous with four price equations: two domestic and two external. The first relates to agriculture where agricultural supply and urban demand are the explanatory variables. For the non-agricultural price level, the specification of the equation depends on whether bottlenecks exist in the supply or demand. In the first case, the price is related to the supply of non-agricultural goods and to relative liquidity, while in the case of demand bottlenecks, the price is related to the cost, capacity utilization and the price of imports.

32. The two other price equations relate to the unit values of imports and exports respectively which are largely explained by an index of spot commodity prices, appropriately lagged. As mentioned earlier, these two indices of spot prices are built for each country using a weight of prices of the country's important trade commodities.

33. The great advantage of the UNCTAD model lies in its strength with respect to the external sector. It focuses on the role of individual countries at the international level and particularly linkages with the world economy. On the other hand, the model is relatively weak with respect to the domestic sector.

34. (c) The ECA model. The projection studies being carried out in ECA started in 1978 with the building of a standard projection model to be adapted to African developing countries. This standard model was applied on a trial basis to eight African countries including two oil-exporting countries and two least developed countries and was presented to the seventh session of the former Conference of African Planners. 9/

35. In the light of the criticisms and suggestions received from the Conference and other sources, the model was revised in order to take into account the differences among countries, the unreliability of some data and the necessity to concentrate more on domestic issues than on external factors in line with the African strategy for self-reliance and self-sustainability. Two models were then formulated for the least developed countries and for the non-least developed countries. In addition, depending on the specific characteristics of each individual country or group of countries (e.g. least developed mining countries, major-oil-exporting countries), these models were modified accordingly. The models are described in full elsewhere 10/ and what follows is a very brief summary.

9/ See The search for a strategy for the Third United Nations Development Decade and the work being undertaken in the ECA secretariat in that context (E/CN.14/CAP.7/3).

10/ Quantitative analysis of the problems and perspectives of the African least developed countries in the framework of the Third United Nations Development Decade (ECA/CONF/LDCs/3).

Perspectives of the African region in the 1980s and policy implications (E/CN.14/PSD.1/7).

36. The supply side of the model for African least developed countries is composed of three sectors, namely agriculture, industry and services. The industrial sector includes mining, manufacturing, energy, construction, transport and communications. Agricultural value added was related to labour force in rural area and acreage under cultivation using a Cobb-Douglas production function. In some cases, FAO country-specific major crop forecasts were used to estimate gross agricultural output and then the value added. Value added in the industrial sector is derived from the sectoral cumulated investment. In countries where some specific activities (e.g. mining) are very important, they are estimated separately as a single sector. Services are assumed to be related to activities in the other two sectors. The gross domestic product at factor cost is obtained by summation.

37. On the demand side, total consumption and private consumption were related to gross domestic product at market prices and government consumption is obtained as a residual. The export equation was related to current production and export prices, whereas imports were considered to be functions of gross domestic product and exports in the previous year. In most cases, investments are taken as a policy variable. However, in some cases induced investments are obtained in the model as a function of the level of income while autonomous investment - usually government development expenditure - is left as an exogenous policy variable.

38. The model for the non-least developed countries was built on the same conceptual basis as for the least developed countries with however a more detailed sectoral breakdown of the supply side. There are seven producing sectors in the model, namely agriculture, mining (including oil where applicable), manufacturing, energy (water and electricity), construction, transport and communications and services. Value added in agriculture was formulated as in the model for the least developed countries while values added in the mining and manufacturing sectors were related to cumulated investments in the respective sectors. For the major oil-producing countries, the oil sector was treated separately. Value added in the oil sector was estimated from gross output in that sector which is derived from an asymptotic exponential curve representing a likely production pattern of the country concerned. Value added in construction was related to total gross fixed capital formation on the assumption that in developing African countries each unit of investment has its construction component. Value added in energy was related to activities in the manufacturing and construction sectors and in some cases also in the mining sector. Activity in the transport and communications sector was assumed to be explained by those in the manufacturing, construction and energy sectors. As for the least developed countries, services were taken as residual dependent on the output in the primary and secondary sectors. Total gross domestic product is then obtained by summing up the values added in the seven sectors. The demand equations of the model for non-least developed countries are more or less the same as for the least developed countries. However, some additions have been made particularly for

export functions. For the major oil-exporting countries, exports were split into oil-exports and non-oil exports. The former was related to value added in the mining sector and to world demand for oil which is assumed exogenously while the non-oil exports were related to gross domestic product at factor cost.

39. The ECA models do not include variables related to prices and net factor income payments to abroad. Nor do they include variables related to balance of payments. Thus, their scope is relatively limited, compared to the UNCTAD model. However, as mentioned earlier, they focus on the domestic structure of the economies since they include more producing sectors than the other two models. They are therefore adapted to the analysis of shifting domestic production structure.

2. Data used

40. The data used in the three studies come more or less from the same sources. The main sources are the United Nations Statistical Office, the World Bank, the International Monetary Fund, FAO and the Statistics Division of ECA. Most of the data of the United Nations Statistical Office are computed from the series provided by the regional commissions and the countries concerned.

41. The problem of data in ECA is discussed in document E/CN.14/PSD.1/7. 11/ Generally data provided by ECA are computed from data at current prices published by the countries of the region. ECA then computes sectoral deflators which are used to derive data at constant prices. Country data are also those collected by the World Bank and the ECA secretariat during field missions. Since countries do not provide data at constant prices, the World Bank also uses its deflators in order to estimate data series at constant prices and makes them available to other agencies.

42. Except for the Department of International Economic and Social Affairs which uses data at 1974 constant prices, the time series data of UNCTAD and ECA are computed in 1970 constant prices. Therefore, the projected values of the Department of International Economic and Social Affairs on the other hand and those of UNCTAD and ECA on the other are not comparable. However, it should be noted that the variations (e.g. average annual growth rates) are more or less comparable. In addition, differences appearing in the results of the projections for data computed at the same constant prices may also arise from the fact that, in the absence of country data, some figures are estimated from socio-economic indicators or qualitative information.

11/ Perspectives of the African Region in the 1980s and policy implications.

3. Projection techniques

43. Since the data used in the three studies are generally consistent, the differences in the results of the projections are mainly due to model formulation and projection techniques particularly in the planned or target scenarios.

44. Projection techniques are generally based on iterative methods ^{12/} since the models are non-linear. Therefore the results are affected by the iteration process and particularly the convergence criteria.

45. The results also depend on the way the values of variables are computed. For the historical trend scenario (i.e. forecasting) the values are obtained outright from the way the model is formulated and the differences in the results are therefore related to model specifications and to the parameters estimated. For example, the UNCTAD historical trend scenario as well as its target scenario related to a specific methodology: commodity prices and assumptions regarding GDP growth and inflation in developed market and centrally planned economies as well as assumptions regarding growth in the volume and value of world trade are introduced as exogenous variables into the econometric models of developing countries.

46. For the planned or target scenarios the results are to some extent affected by the way the target values are introduced in the model. Generally there are two ways of introducing the target values. For example, in analysing the targets set in the International Development Strategy for the Second United Nations Development Decade, a GDP average annual growth rate of at least 6 per cent with a minimum of 3.5 per cent growth rate in per capita GDP was introduced in the UNCTAD model and the other variables including the values added in agricultural mining and non-primary sectors are then derived. A similar procedure was used for the planned scenario in the Department of International Economic and Social Affairs model. For the ECA model, however, the planned scenario analysis is effected by giving distinct and consistent growth targets to sectoral values added in agriculture and industry and, in some cases, exports.

47. In conclusion, in analysing planned scenarios the three studies use an adjustment process where different and consistent rates of growth are calculated for selected variables in order to achieve the required targets.

^{12/} All three studies use the Gauss-Serial Method of Iteration involving systems of non-linear equations.

IV. RESULTS

1. General remarks

48. Since the studies have different objectives and also use different variables, relations and sometimes different data, the results naturally do not give the same information. For example, the ECA and the Department of International Economic and Social Affairs studies concentrate mainly on national accounts and their main components, although ECA provides more information on the sectoral components of GDP. The UNCTAD study gives detailed information on balance-of-payments variables and therefore takes into account net factor incomes to abroad, net private transfer from abroad and changes in the level of foreign reserves.

49. Another difference to be noted is how different variables are expressed, either at constant or current prices. For most of the national accounts variables, data in ECA and UNCTAD projections are given in United States dollars at 1970 constant prices for groups of countries and in 1970 local currency for individual countries. The Department of International Economic and Social Affairs expresses the same data in United States dollars at 1974 constant prices for groups of countries as well as for individual countries.

50. Further, the three studies do not cover the same countries and it was not possible to make a complete country-by-country comparison for the three studies as the purpose of this paper is simply to underline how the structure of the models and above all the assumptions made in undertaking a projection exercise affect the results and more generally the economic policy implications derived from the projections. It was felt that global comparisons at the regional level could be useful. However, because of the specific problems and circumstances of least developed countries and because of the relative large share of Africa in this group of countries (20 out of 31), two sets of comparisons are presented one for the group of African least developed countries and the other for developing Africa as a whole.

51. Also, as mentioned earlier, the nature of variables and the different price base-year reduced the number of economic indicators on which the comparisons could be based. Therefore the following were taken for comparative purposes: average annual growth rates of gross domestic product and exports; import elasticity; incremental capital/output ratio, and the ratio of capital requirement to gross domestic product. These economic indicators could be considered as basic elements from which the assumed policies for economic growth can be derived. Moreover, they are not fundamentally distorted by the pricing system.

52. Finally, the comparison relates to three basic scenarios, namely a historical trend scenario, a target scenario and the Lima scenario. Although the starting point of the target scenarios is the scenario which was proposed for the International Development Strategy for the Second United Nations Development Decade, the final planned scenarios are in general more ambitious since the objective is to analyse possible targets for the 1980s.

The target scenarios are defined as "improved Second Development Decade" for UNCTAD, "planned scenario" for ECA and "towards faster industrialization" for the Department of International Economic and Social Affairs.

2. Results for the least developed countries as a group

53. Table 1 gives the values of the selected economic indicators for the historical trends forecast except for the Department of International Economic and Social Affairs study where only the GDP growth rate is given.

54. The growth rates of GDP and exports for ECA are very close to those of UNCTAD and the Department of International Economic and Social Affairs (for GDP alone) although the GDP growth rate given in the ECA forecast is slightly lower than those forecast in the two other studies.

55. In import elasticity the difference between the results given by UNCTAD and ECA is relatively large which might be essentially caused by the model specification. In the ECA study, imports are related mainly to income, while for UNCTAD, the import requirements are generally explained by GDP and the level of foreign exchange reserves. Therefore, because of the effect of external aid on the level of foreign exchange reserves in the least developed countries, imports are forecast to grow much faster than GDP in the UNCTAD study which points to a high import elasticity as compared with the import elasticity of unity (or one) forecasted by ECA.

56. Another important difference in the historical trend scenario relates to the ratio of external financial requirement to gross domestic product. First, the ratio given in the UNCTAD forecast is computed by taking the values in current United States dollars. Deflating the required flows of resources by an average unit value of imports for all least developed countries of about 6.5 in 1990 (1970 = 1) and using GDP at 1970 constant prices lead to a ratio of around 10 per cent of GDP at constant prices. This ratio is still higher than the 7.1 per cent forecast by ECA on the base of historical trends. Here the difference could be explained by the fact that the resource gap forecast by ECA does not include capital transfers such as net factor income to abroad or net private transfers from abroad. Consequently, the ratio of the capital requirements to GDP would have been higher than 7.1 and probably closer to the 10 per cent estimated for UNCTAD.

Table 1. Historical trends scenario for African least developed countries, (1980-1990)

	UNCTAD	ECA	Department of International Economic and Social Affairs
GDP growth rate	5.0	4.4	5.2
Exports growth rate	3.9	4.0	-
Import elasticity	1.6	1.0	-
Incremental capital/output ratio	3.8	3.5	-
External resources requirement as a percentage of GDP (1990)	20.4	a/ 7.1	-

a/ This figure is computed using data in current United States dollars. The equivalent figure using United States dollars at 1970 constant prices was estimated by ECA to around 10 per cent.

57. For the planned scenarios, as shown in table 2, the ECA projections are relatively more ambitious than the two others as they give relatively high growth rates for GDP and exports accompanied by low import elasticity, low incremental capital/output ratio and relatively low capital needs. The projected economic indicators in the ECA planned scenario are mainly based on the assumptions that the least developed countries would concentrate on policies of individual and regional collective self-reliance which imply inter alia (a) more efficient production particularly in the agricultural sector and in the choice of more labour-intensive techniques in manufacturing; (b) efficient export promotion policy especially by increasing intra-African trade and trade among developing countries; and (c) efficient control of the growth of imports which, because of the assumed higher growth in agricultural value added, could be limited mainly to imports of capital goods with a substantial reduction in the imports of food.

58. The Department of International Economic and Social Affairs planned scenario for faster industrialization entails a very high level of external capital flows since the scenario is based on the assumption that there would be no major change in the efficiency of capital (ICOR is projected at 3.8 in the 1980s) and, in order to achieve the average annual growth rate of 6.5 per cent of GDP in the 1980s, import elasticity would have to remain at its historical level of 1.6. It should be noted that the scenario "towards faster industrialization" is based on the objective of more than doubling the per capita income in low-income countries by the year 2000 as recommended by the Committee for Development Planning. This objective is taken into consideration also in the ECA projection with more appropriate domestic policies for self-reliance.

59. The UNCTAD planned scenario called the "Second Development Decade improved" is based on the assumption that growth in developed countries, particularly in the OECD countries would be about 4.5 per cent in the 1980s. In other words the improved scenario assumes a high degree of interdependence. Therefore, because of the structural linkage assumed by the UNCTAD model between growth in developing and developed countries, the different assumptions led to relatively faster economic growth in developing African countries (5.8 per cent yearly in the average), better capital efficiency (ICOR is projected to drop from its historical level of 3.5 to 2.9) and consequently lower import elasticity. With the projected growth of developed countries for the 1980s lowered substantially to around 3 per cent yearly the implied outcome would be much lower than the growth rates given in the UNCTAD improved scenario.

60. The Lima scenario was analyzed only by UNCTAD and the Department of International Economic and Social Affairs and the results are shown in table 3 below. The objective of this scenario is to analyze the implications for developing countries of raising their share in world manufacturing output to 25 per cent by 2000 which implies an average annual growth rate of manufacturing value added of 9 to 10 per cent for developing countries as a whole. As for the planned scenarios, the Department of International Economic and Social Affairs projections under the Lima scenario point to an enormous flow of external financing because of the high import elasticity coupled with a relatively high incremental capital/output ratio.

Table 2. Planned scenarios for African least developed countries (1980-1990)

	UNCTAD	ECA	Department of International Economic and Social Affairs
GDP growth rate	5.8	6.3	6.5
Exports growth rate	6.4	7.0	7.0
Import elasticity	1.2	1.1	1.6
Incremental Capital/output ratio	2.9	2.3	3.8
External resource requirement as a percentage of GDP (1990)	10.9 <u>a/</u>	5.7	17.2 <u>b/</u>

a/ This figure is computed using current values. The equivalent figure in 1970 constant prices was estimated by ECA at around 6 per cent.

b/ These figures are computed at 1974 constant prices. Thus this ratio would probably be lower if expressed in 1970 prices but higher than the ratios given by UNCTAD and ECA.

Table 3. The Lima scenarios for African least developed countries (1980-1990)

	UNCTAD	Department of International Economic and Social Affairs
GDP growth rate	6.6	6.5
Exports growth rate	6.4	7.1
Import elasticity	1.2	1.6
Incremental capital/output ratio	2.6	3.8
External resource requirement as a percentage of GDP (1990)	12.6 <u>a/</u>	18.1 <u>b/</u>

a/ This figure is computed using data in current United States dollars. The corresponding figure using 1970 constant prices was estimated by ECA at around 7 per cent.

b/ The data being computed at 1974 constant prices, this ratio would be probably lower if the data were expressed in 1970 constant prices.

3. Results for developing Africa as a whole

61½ Tables 4 to 6 give the values of the selected economic indicators for the forecast scenario, the planned scenario and the Lima scenario with, however, incomplete information for the scenario of the Department of International Economic and Social Affairs.

62. Both the trend scenario (table 4) and the planned scenario of ECA (table 5) point to very high ratios of external capital requirement to GDP, standing at 23.4 and 14.8 per cent respectively, while the ratios were relatively low for the least developed countries as compared to those given by UNCTAD and the Department of International Economic and Social Affairs (see table 2).

63. This big increase in the external resource gap of developing Africa as a whole is mainly due to oil-exporting countries in which the ratios of external resource gap to GDP in 1990 are projected to be 39.4 per cent and 20.6 per cent for the historical trend scenario and the planned scenario respectively. Therefore the ratios for non-oil-exporting countries alone would be much lower. In the ECA planned scenario the projected ratio of external resource requirement to GDP in 1990 for non-oil-exporting countries including the least developed countries is only 8.7 per cent, which implies a more self-reliant and self-sustaining growth since the other economic indicators are relatively ambitious. In addition the expected continuation of the favourable terms of trade in oil-exporting countries would actually reduce the ratio of capital requirement in GDP in these countries and consequently the ratio for developing Africa as a whole. The scenario envisaged by ECA is therefore ambitious as far as requirements for external financial assistance are concerned. For developing Africa as a whole, GDP and exports are projected to grow at 7 per cent and 7.5 per cent annually respectively with a relatively low import elasticity of around 1.1 as compared to the 1.6 of 1975. The incremental capital/output ratio is projected to drop from the level of 4.9 in 1975 to 4.4 in 1990. If in particular the African oil-exporting countries pursue more self-reliant policies especially in investment and consumption patterns, their GDP growth in real terms could accelerate with less need for foreign financial flows than was assumed in the ECA planned scenario. UNCTAD and the Department of International Economic and Social Affairs, unlike ECA, do not have projections for African developing countries classified by major oil- and non-oil-exporting countries and also for countries classified by income group.

64. The comments made concerning the least developed countries under the UNCTAD planned scenario are also valid for developing Africa as a whole. The projected 6.2 per cent average annual growth of GDP with an expansion of over 10 per cent yearly in real exports are based on very optimistic assumptions about the growth prospects of developed countries, particularly their demand for raw materials and other primary commodities from developing countries. The same remarks could also be applied to the planned scenario of the Department of International Economic and Social Affairs.

65. Finally, in the Lima scenario (table 6), the results again call for a high inflow of external resources to developing African countries so as to achieve a high growth rate of 7.3 yearly in the 1980s. With a relatively high ICOR, external aid would be needed for the imports of the necessary capital goods.

Table 4. Historical trend scenarios for developing Africa as a whole, (1980-1990)

	UNCTAD*	ECA	Department of International Economic and Social Affairs
GDP growth rate	5.7	5.1	6.2
Exports growth rate	5.3	4.0	-
Import elasticity	2.3	1.7	-
Incremental Capital/output ratio	3.8	4.0	-
External resource requirement as a percentage of GDP (1990)	17.3 <u>a/</u>	23.4 <u>b/</u>	-

a/ This figure is computed using data at current prices. The equivalent figure at 1970 constant prices was estimated by ECA at around 13.3 per cent.

b/ This high ratio is mainly due to the four major oil-exporting African countries. In 1975, the ratio of external resource gap to GDP was 27.7 in these countries.

* Oil-exporting countries are not included in UNCTAD projection.

Table 5. Planned scenarios for developing Africa as a whole (1980-1990)

	UNCTAD*	ECA	Department of International Economic and Social Affairs
GDP growth rate	6.2	7.0	6.6
Exports growth rate	12.3	7.5	5.5
Import elasticity	1.0	1.1	1.2
Incremental capital/output ratio	2.4	4.4	3.2
External resource requirement as a percentage of GDP (1990)	8.25 <u>a/</u>	14.8 <u>b/</u>	6.4 <u>c/</u>

a/ Figure computed using data at current prices. The equivalent figure at 1970 constant prices was estimated by ECA at around 5.2 per cent.

b/ This high ratio is due to the ratio for the major oil-exporting countries which was projected at 20.6 in 1990. This figure might be lower.

c/ The data from the Department of International Economic and Social Affairs are given at 1974 prices and this figure would have been lower if it was computed using data at 1970 constant prices.

* Oil-exporting countries are not included in UNCTAD projection.

Table 6. The Lima scenario for developing Africa as a whole (1980-1990)

	UNCTAD*	Department of International Economic and Social Affairs
GDP growth rate	7.3	7.3
Export growth rate	6.6	6.3
Import elasticity	1.0	1.2
Incremental capital/output ratio	2.3	3.5
External resource requirement as a percentage of GDP (1990)	10.24 <u>a/</u>	11.81 <u>b/</u>

a/ Figure computed using current prices. The equivalent figure at 1970 constant prices was estimated by ECA at around 6.6

b/ The data from the Department of International Economic and Social Affairs are given at 1974 prices and this figure would have been lower if it was computed using data at 1970 constant prices.

* Oil-exporting countries are not included in UNCTAD projection.

V. CONCLUSION

66. The studies discussed are part of the on-going activities in the work programme of ECA and other United Nations Organizations and agencies. They aimed at appraising economic trends and analysing prospects in different regions of the world. In this respect they are not final and they form a continuous process and should be reviewed periodically to take into account various changes in the world and regional economic situations. More specifically, the Committee for Development Planning at its sixteenth session held in January 1980 set a number of targets for over-all growth in developing countries in the 1980s, their export and import growth rates, their investment and savings rates, financial flows to developing countries and other socio-economic indicators. ECA projections and forecasts are in line with the major targets and objectives laid down by the Committee for Development Planning at its sixteenth session. As far as the projections of foreign capital requirements are concerned, ECA projections are modest, being directed towards more self-sustained growth. However, the projections work would be reviewed periodically to take into consideration changing circumstances. For example, slower growth in exports than envisaged would lead to larger foreign capital requirements than suggested in the ECA study.

67. In spite of their temporary nature, the comparison between such studies is useful as it permits a kind of sensitivity analysis on basic questions such as the need of external resource for development, the importance of the terms of trade and therefore the problem of price stabilization.

The comparison has shown that the great uncertainty related to the problem of capital requirements is closely linked to the efficiency of capital and to the export performance. The lower the incremental capital/output ratio and the higher the export performance, the more a given country or region is self-reliant and independent of external financial sources. Assumptions on the type of production in each sector and export prospects at the subregional, regional and international levels are therefore basic to any type of analytical exercise. In spite of their different formulation and scope, it was found that the results are more related to the basic assumptions of the scenarios than they are to their structure.

68. For the 1980s, policy makers in the African region are confronted with the basic question of how to achieve fast economic growth without embarking on the difficult problem of seeking massive external financing. Since all the studies, even those with as optimistic an assumption as in ECA's, point to the need for increased external aid, and since the ODA flow for concessional financing is still limited (0.33 per cent of developed countries' GNP), most of the countries would have to use non-concessional financing which, of course, is impossible for many low- and middle-income countries because of their already high indebtedness.

69. There is therefore a need for efficient planning in order (a) to maintain the indebtedness within reasonable limits, (b) to improve capital efficiency through more labour-intensive activities in agriculture, industry and infrastructure, and (c) to expand exports.

70. More generally, the achievement by African countries of high growth rates in output accompanied by relatively good performance in exports and limited external capital requirements depend on the strengthening of regional co-operation through preferential trade areas, international commodity stabilization schemes, technical co-operation among developing regions, particularly in the field of non-capital-intensive technologies, regional payment arrangements and regional investment projects. In the absence of such domestic and international measures, the international community should establish new mechanisms for mobilizing additional financial resources and channelling them to developing countries without increasing unduly their already heavy debt service burden. Such mechanisms would make it possible to provide developing countries with the required additional external flows indicated in various scenarios of the United Nations projections.