

## Chapter 3

### Economic Planning in Tanzania - Framework and Possibilities

#### 1. Introduction

After independence in 1964, the United Republic of Tanzania consisting of the mainland and Zanzibar had separate plans for the two upto 1981. The Tanzania Mainland implemented three medium term development plans: the first one from 1964-65 to 1968-69, the second one from 1969-70 to 1973-74 and the third one from 1976-77 to 1980-81. These three plans were part of the first long term perspective plan (1964-65 to 1980-81). The annual plans implemented during the period were a means to achieve the objectives and targets set for the medium term (five year) plans and thereby the perspective plan. Zanzibar on the other hand did not have a long term perspective plan nor medium term plans during this period. Thus, not only that both these major constituents of the United Republic prepared and implemented their plans separately but their planning organizational procedures were also different. However, the overall planning objective in both the cases was the same viz. improvement of the people's lives. Ever since the promulgation of the Arusha Declaration in February 1967, the guiding principles in the pursuance of this objective have been the ones of socialism and self-reliance.

The policy of socialism and self-reliance stresses the following:<sup>1</sup>

- (a) Participatory decision making to give people effective voice in matters affecting their socio-economic development.
- (b) Public control over major means of production and exchange (land, financial institutions, industries, big estates, import-export trade, etc.)
- (c) Broad-based rural development, as most Tanzanians live in rural areas. The first step towards this objective has been villagisation, that is, grouping traditionally scattered peasants, households into organized settlements. This strategy offered the only quick approach to the provision of basic economic and social services to the majority of the population.
- (d) Self-reliance in national and local development efforts - to the greatest extent possible. External assistance (finance, expertise, etc.) in the implementation of projects deemed necessary for self-reliant growth in later years is not inconsistent.
- (e) Economic growth as essential for improving people's lives.
- (f) Equitable income distribution between worker and peasants as well as between other socio-economic groups.

Based on these principles, the first long term perspective plan involving both parts of the United Republic of Tanzania (Mainland and Zanzibar) was launched on 1st July 1981. Two medium term (five year) plans have been implemented so far. The first Plan was from 1981-82 to 1985-86. The Second Plan started from 1988-89 and would end in 1992-93. It is important to note that on 5th February 1977, the two political parties, viz. AFRO-SHIRAZI in the islands and TANU in the Mainland merged to form a single party - CHAMA CHA MAPINDUZI. The merger was prompted

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<sup>1</sup> Reproduced from P.1 of *Long-Term Perspective Plan 1981-2000*, United Republic of Tanzania (1981).

by a serious consideration of the political situation and the realization that presence of two separate political parties dissipated efforts in the struggle for socialism and self-reliance.

In the present paper, we propose to examine the existing framework for economic planning and the possibilities for improving the planning practices in Tanzania. In the next section we outline briefly some of the well recognized weaknesses in the past planning approach and institutional framework existing in Tanzania which weakened the role of planning as a tool for effective management of the national economy. We, then, discuss in the third section, the role, functions and the structure of the Planning Commission which became operational in Tanzania with effect from July 1, 1989. In the fourth section, we briefly describe the planning process in Tanzania. The methodology followed so far in the preparation of plans is discussed in the fifth section. In the last two sections of the present paper, we discuss the possibilities of using input-output statistics to improve the planning practices in Tanzania.

## 2. Limitations of the Past Planning System

The planning system in Tanzania before July 1989 was not very well conceived in terms of its role, functions and linkages with the overall management of the economy. More precisely, the well recognized weaknesses of the planning system in Tanzania before July 1989<sup>2</sup> can be described as following:

- (a) The development plans mainly took the form of compilation of projects proposed at different levels in the regions and ministries submitted to the planning ministry for allocation of the government funds for implementation. As a result, the plan formulation and monitoring procedures emphasized only the monetary expenditures rather than the physical target component.
- (b) In the plan formulation and implementation, contributions of the implementing agencies and/or people themselves were not adequately harnessed.
- (c) Previously, the whole approach was isolationist in that each individual institution was concerned with soliciting the government funds for its own projects. This led to several inconsistencies and operational problems since vital inter-sectoral linkages could not be adequately taken into account.
- (d) The planning system defined its role only in terms of focussing on new investment projects. The management of already existing economic activity was not considered a subject of planning. As a result, there were no plan-based strategies for tackling such economic problems as shortages of foreign exchange, underutilization of capacity in industries, crop haulage problems, etc. which used to be ultimately handled through the 'crisis management' approach.
- (e) The system gave almost exclusive attention to projects at the pre-operational stage rather than at the operational stage also. The procedures for rationalizing development expenditures and operational costs were, therefore, not adequately developed.
- (f) On account of inappropriate planning methodology and processes, number of investment projects depending on the government funding increased tremendously in Tanzania which also led to thin spread of scarce resources over a wide range of projects resulting in poor performance and impact.
- (g) Mobilization of external investment resources was not systematic. Donor preferences rather than national priorities dictated the location and design of the projects. Appropriate planning centres properly guided by approved national plan were hardly consulted in the selection of projects for funding by external donors. This led to departures from national plan priorities and sometimes to the problems in management of external debt.

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<sup>2</sup> See for instance, *Profile of the Planning Commission of the Union Government, United Republic of Tanzania, July 1989.*

### 3. Planning Commission

With a view to giving a new impetus to economic planning and to correcting the abovementioned weaknesses in the system, the Planning Commission was established by Act No.11 of 1989 passed by the Union Parliament in April 1989 in Tanzania. The Commission became operational from July 1, 1989. It is expected to make changes in the current planning and implementation system and bring about a more effective planning approach.

3.1 Functions of the Commission: The Planning Commission in Tanzania is made responsible for the management of the national economy and for supervising the planning process as well as monitoring the implementation of approved plans. More precisely, the functions of the Commission include:<sup>3</sup>

- (a) to assess the state of the nation's investment resources and advise the Government on their most efficient allocation and utilization. Those resources include: all foreign exchange resources; domestic finance and credit; Government Budget; external loans, grants and technical assistance; parastatal surpluses as well as physical and human resources.
- (b) to analyze trends in key economic variables, including balance of payments, money supply and prices, and advise the Government accordingly.
- (c) to analyze various existing policies, with a view to strengthening their implementation and to propose new policies where necessary and in the national interest;
- (d) to monitor the day-to-day performance of the various sectors of the economy and ensure that appropriate measures are taken to solve any operational problems that may have been identified in those sectors;
- (e) to issue guidelines on economic relations with other countries and international organizations;
- (f) to issue guidelines concerning the formulation of national plans particularly on the preparation of long term, medium-term and annual plans;
- (g) to oversee the implementation of plans for the purpose of achieving the most effective and balanced utilization of national resources;
- (h) to monitor the implementation of plans and take such measures as are necessary to ensure their successful implementation;
- (i) to advise the Government on changes that may be necessary in approved plans;
- (j) to monitor the implementation of Government decisions relating to planning and management of the economy;
- (k) to devise appropriate strategies for the development of science and technology in the country;
- (l) to analyze current social and economic problems with a view to recommending to the Government appropriate policies and measures to be taken in order to deal with such problems;
- (m) to develop national planning methodology as well as to ensure that planning units in ministries, regions and other public institutions are established and adequately staffed with qualified planning personnel.

3.2 Position and Powers of the Commission: The Planning Commission in Tanzania is placed directly under the office of the President as an independent department of the government. It is answerable to the Cabinet which, in turn, is answerable to the Parliament and the Party. However, all the ministries and the regions are required to report to the Commission. The Commission is the highest advisory body to the government. Thus, the Commission has the power.<sup>4</sup>

- (a) to give ministries, regions and districts any directive relating to planning and management of the economy as approved by the government;

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<sup>3</sup> As given on p.2 and p.3 of *The Profile of the Planning Commission of the Union Government, The United Republic of Tanzania, July 1989.*

<sup>4</sup> Ibid.; p.4.

- (b) to direct and specify, in accordance with government decisions, priority activities in which investments may be made;
- (c) to approve changes in the implementation of plans;
- (d) to call for, from any institution, any information or statistics relating to planning and economic management generally;
- (e) to prescribe, as appropriate, national planning procedures.<sup>5</sup>

3.3 Structure of the Commission: The Commission consists of eight members, including the President who is the Chairman of the Commission. The other seven members appointed by the President include (i) the Vice-Chairman who is a full time member; (ii) three other full time members, and (iii) three part-time members including the Ministers for Finance of the Union Government. The Commission is aided by the Planning Commission Secretariat headed by the Secretary to the Commission. He is assisted by two Deputy Secretaries - one in charge of (a) Macro Planning Division, (b) External Sector Division and (c) Human Resource Planning Division; and the other in charge of (d) Regional Planning and Rural Development Division, (e) Agriculture and Natural Resources Division, (f) Industry and Minerals Division, (g) Economic Services Division, and (h) Social Services Division. The ninth division of Plan coordination and Monitoring Division is directly under the Secretary to the Commission. Moreover, there are two units viz. Planning Unit and Finance and Administration Unit in the Commission Secretariat to look after the compilation, analysis and storage of statistical data and the regular administrative chores of the Commission Secretariat.

Moreover, the following institutions are placed under the direct supervision of the Planning Commission in Tanzania: (a) Bureau of Statistics, (b) Price Commission, (c) National Productivity Council, (d) National Science and Technology Commission, (e) Rufiji Basin Development Authority, and (f) National Radiation Commission. There are several other institutions which provide important technical support to the Commission with close working relations. The commission can also develop contacts and consultations with various local and international organizations for harnessing useful expertise and experience in the field of planning. With such a major institutional change, it should be possible to make far-reaching significant changes in the national planning system in terms of methodology, processes and monitoring of economic development efforts in Tanzania.

#### 4. Planning Process

As it is already noted, Tanzania has a single party democracy. Basic ideological differences among political leaders or the representatives of people on the decision making bodies at different levels do not exist in such a set up. The entire planning process in Tanzania to this extent is simplified by the existing political system. Before the Planning Commission was established, the approach to national planning in Tanzania was mainly sectoral. Since the Planning Commission has been established only recently, the approach and processes have remained more or less the same so far. The planning process effectively utilizes the existing politico-administrative structure at the regional levels. Every sectoral department/ ministry has vertical links at the regional and sub-regional levels. Such links are not sectorally interdependent but are sectorally independent. Moreover, in every ministry/department, planning entities/cells exist. At the regional and sub-regional levels, planning officers in different departments are in charge of planning the activities of their departments at the appropriate regional levels. However, at different regional and sub-regional levels, Tanzania has an elaborate political structure which is also utilized in the planning process through establishment of regional/sub-regional development councils which consider the proposals from planning officers in various departments working in the regions and consolidate them into a plan proposal at the respective regional levels. Such regional/sub-regional plan proposals are then sent to higher regional levels for their incorporation in their plans. Thus, plan proposals emanate from below in the planning process in Tanzania. People's participation is also seen to be taken into account through the development councils at

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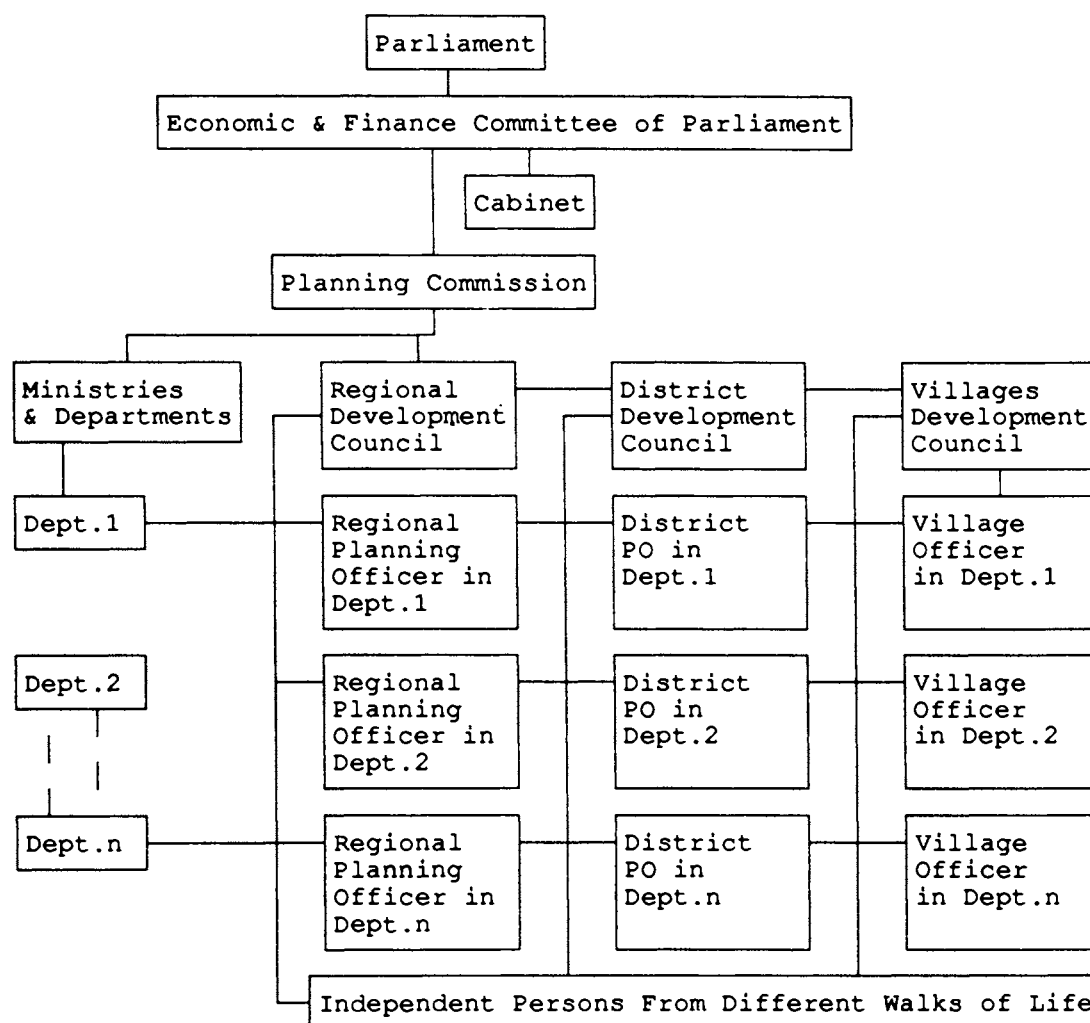
<sup>5</sup> It may be noted here that so far (i.e. Oct.1990) the Planning Manual has not been prepared in Tanzania.

different levels. Schematically, the Planning machinery in Tanzania can be represented as in Chart 1.

At the national level, the planning process consists of the following steps. With the establishment of the Planning Commission, it prepares a tentative budget frame indicating financial priorities assigned to various sectors within the overall macroeconomic framework considering the estimates of some crucial parameters and constraints at the national level. This exercise is very similar to preparing an 'approach paper' for the plan. This budget frame is then put before the Cabinet for modification and approval. The Cabinet sends such a proposal after approval to the Ministry of Finance for raising adequate resources and to the Planning Commission for working out the details of the plan. At this stage, the Planning Commission gets the inputs from the regional and sub-regional units which are all put together to work out the details of the plan. After the details are worked out, the plan proposal is sent back to the Cabinet for its final approval. It is, then, referred to the Economic and Finance Committee of the Parliament for modifications and approval. The Committee then, sends it to the Parliament through the Finance Bill for specific financial allocation to different Ministries. The financial allocations are suggested by scheme and regions in different departments. Thus, the financial allocations are suggested by scheme and regions in different plan becomes a statutory document to be incorporated in the Finance Bill or the Budget. The Parliament is the final authority in the sense that it can amend or even reject an expenditure item in the proposed plan. Once the Parliament approves the plan, it gets implemented through various Ministries. The Planning Commission monitors the implementation generally by six monthly reports from every Ministry incorporating both the financial and physical components. The Planning Commission, however, does not enjoy any legal power to sanction against any particular department or ministry. Only the Economic and Finance Committee of the Parliament has such legal powers. The Planning Commission, therefore, relies heavily on this Committee for exercising its control.

At this stage, it is natural to inquire as to how overall macro constraints in terms of financial and physical resources could be considered in the planning process. In other words, if some overall consistency has to be observed in the national planning exercise, what mechanisms are provided in the process. This is a question pertaining more to the methodology of planning which we discuss in the next section.

**Chart 1: Planning Machinery in Tanzania**



## 5. Methodology of Planning

In the detailed discussions held with several officials in the Secretariat of the Planning Commission in Dar-es-Salaam, it was repeatedly emphasized rather apologetically that the planning methodology followed in Tanzania so far has not been very sophisticated. No systematic macro model of planning is followed. The broad methodology had tended to be based on learning from recent past experience. Thus, half yearly review of performance primarily meant for monitoring the implementation of the approved plan serves almost as a guide for future planning. Considering the discrepancies between the financial and physical achievements of the targets originally set, inquiring about the possible causes thereof, probing into the future prospects perceived and based on all these considerations trying to look ahead is the basic method of planning followed at the regional/sub-regional department levels. A list of physical projects proposals in each department at the appropriate geographical area unit level is formed which, then, gets prioritized through critical scrutiny and detailed discussions in the respective area development councils. Such a prioritized list of aggregate sectoral projects is then sent to the higher level of the geographical unit for its incorporation in the proposal of that geographical unit. As already noted above, the questions of overall consistency and recognition of macro constraints assume importance at this stage.

It can be seen from the above discussion that the process described so far is the 'bottom-up flow' which is mainly in the physical projects form. The macro-economic constraints and consistency requirements, on the other hand, are largely in the form of financial and physical resources. The Planning Commission passes on the idea about such constraints through tentative ceilings on financial resource availability in the form of guidelines to be followed to the regional/sub-regional levels. These are essentially 'top-down flows' in the planning process. These two flows have to be matched at different levels by dove-tailing the financial and physical components of the proposed plan of activities. In the process, the tentative financial resource ceiling prescribed earlier are adjusted considering the physical component of the plan of various geographical units and the stated national objectives and priorities. There is, thus, some degree of 'back and forth' exercise involved in the planning process. It is estimated that such an exercise takes about 6 to 8 months time. However, at the end of such an exercise a reasonably good sectoral allocation of resources based on decentralized decision making emerges.

The only substantial methodological questions that still remain are about the way of linking targets of overall growth with the availability of resources over time and about the criteria to allocate funds to different regions. The estimates of the resource availability - both external as well as internal - are worked out by individual components in the Treasury, Bank of Tanzania (BOT), Planning Commission and various financial institutions. Based on these estimates, an overall investment rate is estimated which presently works out to about 25% in Tanzania. The linkage of this estimate to the desired/target rate of growth of the economy over the plan period is basically a weak link in the whole exercise because, the estimates of incremental capital output ratio (ICOR) are considered so wild and unrealistic that they have been abandoned for planning purposes under the present circumstances. The link between the investment resource availability and the growth target in the economy over the plan period is based on some idealistic considerations based on distant past rather than current experience. The overall consistency of the macro plan, therefore, is not formally established. Intersectoral consistencies of plan targets are also not formally or even informally considered although some reasonably good estimates of a detailed Input-output Table (73 x 73 sectors) are available for Tanzanian economy for the year 1976. Although formally the employment generation aspect of the plan is not explicitly incorporated in the exercise, some aggregative estimates of labour productivity by broad sectors are considered but without any estimates of the labour and capital intensity of the activities.

Regarding the regional allocation of funds the methodology is again not very elaborate. Some broad criteria of regional weightage in terms of area, population and regional backwardness as revealed by the per capita regional incomes are considered for allocation of funds. Table 1 presents one such effort to use these indicators for actually allocating the funds to different regions. These criteria are only proposed and not yet accepted. They are meant to generate internal debate and discussion on the relevance and appropriateness of such a methodology so as to ultimately form a part of the Planning Manual. It is obviously recognized that several other considerations like preparedness of the region, nature of the proposed programme, donor's preference and counterpart fund considerations, etc. would modify such formula-based regional allocations of funds. However, they may serve as the first cut in the exercise. It is also currently debated in the relevant quarters in the Planning Commission to consider use of sectoral criteria like hospitals, dispensaries, primary schools, utilities like water, electricity, etc. to allocate funds to different regions by sectors (See Appendix A below). This might lead to some centralization of decision making but could prove very effective to address the national priorities in the fulfillment of plan objectives and targets.

Table 1								
Proposed Regional Resource Allocation in Tanzania based on Criteria of Income, Population and Area								
Regions	Per capita Income		Population		Area		Average Rank/Weight	Percentage of Resources to be allocated
	Amount in T.Sh. (1987)	Rank or Weight	in '000 (1988)	Rank or Weight	Km <sup>2</sup>	Rank or Weight		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Tabora	684	17	1,036	9	76,151	19	15.0	7.2
2. Shinyanga	779	13	1,778	19	50,781	12	14.7	7.0
3. Dodoma	676	18	1,238	13	41,311	10	13.7	6.5
4. Mbey	1,012	9	1,476	18	60,350	14	13.7	6.5
5. Rukwa	598	20	695	3	68,635	17	13.3	6.3
6. Arusha	1,334	2	1,352	16	82,306	20	12.6	6.0
7. Lindi	704	16	647	2	66,046	16	11.3	5.4
8. Morogoro	1,196	3	1,223	12	70,799	18	11.0	5.3
9. Kagera	842	10	1,326	15	28,388	7	10.7	5.1
10. Mwanza	1,054	7	1,878	20	19,592	5	10.6	5.0
11. Iringa	1,120	4	1,209	11	56,864	13	9.3	4.4
12. Singida	814	12	792	5	43,341	11	9.3	4.4
13. Pwani	638	19	638	1	32,407	8	9.3	4.4
14. Mara	749	15	971	8	19,566	4	9.0	4.3
15. Kogoma	821	11	755	6	37,037	9	8.7	4.1
16. Ruvuma	1,081	6	783	4	63,498	15	8.3	4.0
17. Tanga	1,012	5	1,284	14	26,808	6	8.3	4.0
18. Mtwara	771	14	889	6	16,707	3	7.7	3.8
19. Kilimanjaro	1,037	8	1,109	10	13,309	2	6.7	3.2
20. Dar-es-Salam	4,235	1	1,361	17	1,393	1	6.3	3.0

Source: Planning Commission of Tanzania: "Mapendekezo ya Vigezo Vitakavyotumiwa Kugawa Rasiulimali Za Maendeleo Mikoani", Paper for internal circulation, 1990.

Thus, the basic weakness in the planning exercise in Tanzania appears to be the lack of a macro-model or methodologically sound framework which would consider different macroeconomic constraints and the interdependent nature of economic activity in the national economy to derive the physical targets from the resource availability in a consistent way. We examine the possibilities existing in this regard in Tanzania in the next two sections of the paper.

## 6. Uses of Input-Output Statistics in Planning

The history of the estimation of the input-output (i.e. I-O) table for Tanzania dates back to the year 1957 when Peacock and Dosser published in the *Review of Economic Studies* the first I:O Table for the Tanzanian economy. It was for the year 1954 and considered 18 sectors only. Subsequently, for the year 1961, another table of 17 X 17 sectoral dimension was prepared for Tanzania by the National Statistical Office. The Bureau of Statistics constructed a more detailed table having 45 X 45 sectoral dimension for the year 1969 which was subsequently revised and updated for the year 1970. The latest I:O table for Tanzania published in 1986 considers 73 sectors but dates back to the year 1976. (The list of the 73 sectors is given below in the Table-5.) Availability of statistics and competence for estimation of the I:O Table do not seem to pose any serious problem in Tanzania as also in most

other developing countries. These estimates, however, have not been used so far in the national planning exercises in Tanzania. It was felt that failure to develop workable and suitable applications of the I:O technique was primarily responsible for not using such estimates for planning. A special national workshop was, therefore, organized in Arusha during February 1986 to consider utilization of the Tanzanian Input-Output Table for 1976.

The main uses of the I:O Table in general and the one for Tanzania in particular are thought to be in:

- (1) Checking consistency in national accounts and testing the accuracy of macro predictions;
- (2) Forecasting and projecting output; and
- (3) determining intersectoral linkages and thereby identifying the key sectors.

Let us take the Tanzania's I:O Table for the year 1976 to illustrate some of these uses. We may compress the table into only 3 sectors. These sectors are:

Sector I	Primary sector or Agriculture (1 to 26 sectors in the detailed Table)
Sector II	Secondary sector or Industry (27 to 58 sectors)
Sector III	Tertiary sector or Services (59 to 73 sectors).

Table-2 presented above is a very useful way of keeping the national accounts. The rows in the table shows the disposal of the sectoral output to intermediate use as inputs in different industries/sectors and to final use which is classified into 5 different categories like private consumption, government consumption, exports, fixed capital formation and changes in stocks. Every column in the table shows the break up of the gross output of the respective sector into the cost items like inputs from different sectors including imports, indirect taxes and subsidies, wages and salaries, depreciation and operating surplus. Thus, the I:O table as presented in Table-2 above is a very powerful way of describing and analyzing the structure of the economy. Since it is only an alternative way of maintaining the national accounts in which detailed transactions are systematically recorded, it provides a consistency check on the national accounts. The last two rows in Table-2, for instance, represent the consistent estimates of industrial break down of the GDP in the Tanzanian economy in the year 1976.

All the remaining uses of the I:O Table are possible only if some plausible assumptions are made about the sectoral interrelationships and the structure of the economy. To illustrate the concept, let us consider the first three rows and columns of Table-2. We may represent each column in the form of proportions (coefficients) of the respective industrial (sectoral) gross output. These proportions are called Input Coefficients since they represent the input requirements from different sectors to produce one unit of the given sector's gross output. Table-3 presents the Input Coefficients for the simplified Tanzanian economy for the year 1976.

Input-Output Transaction Table for Tanzania, 1976										
(In Million T.Sh.)										
	Intermediate use				Final Use					Gross Output
	Agriculture	Industry	Services	Total Inter.	Pvt.Cons.	Govt.Cons.	Exports	FCF	Stocks	
Agriculture	316.6	1511.2	672.1	2499.9	6769.9	-	1341.2	69.9	98.3	10779.2
Industry	245.4	1129.6	1614.5	2989.5	3584.4	-	1038.4	193.9	38.4	7844.6
Services	297.1	1411.2	4779.4	6487.7	5048.5	5447.2	2107.7	2177.4	-	21368.5
Total Inter. Inputs	859.1	4052.0	7066.0	11977.1	15402.8	5447.2	4487.3	2441.2	136.7	39892.3
Imports	155.4	1665.1	1616.5	(3437.0)	579.0	-	-	1662.2	-	5678.2
Import Duties	10.7	128.2	86.9	(225.8)	58.4	-	-	76.3	-	360.5
Other Indirect Taxes	66.7	41.8	54.7	(163.2)	964.4	-	497.5	738.2	-	2363.3
Subsidies	-104.1	-138.6	-12.5	(-255.2)	-	-	-	-	-	-255.2
Wages & Salaries	570.8	966.2	6044.0	(7581.0)	-	-	-	-	-	7581.0
Depreciation	354.6	217.0	676.8	(1248.4)	-	-	-	-	-	1248.4
Operating Surplus	8866.0	912.9	5736.1	(15515.0)	-	-	-	-	-	15515.0
Gross Output	10779.2	7844.6	21268.5	39892.3	17004.6	5447.2	4984.8	4917.9	136.7	72383.5
GDP at Factor Costs	9791.4	2096.1	12456.9	24344.4	-	-	-	-	-	24344.4
GDP at Market Prices	9764.7	2127.5	12586.0	24478.2	-	-	-	-	-	24478.2

Input Coefficients for the Tanzanian Economy, 1976			
Sectors	Agriculture	Industry	Services
Agriculture	$\frac{316.6}{10779.2} = 0.03$	$\frac{1511.2}{7844.6} = 0.19$	$\frac{672.1}{21268.5} = 0.03$
Industry	$\frac{245.4}{10779.2} = 0.02$	$\frac{1129.6}{7844.6} = 0.14$	$\frac{1614.5}{21268.5} = 0.08$
Services	$\frac{297.1}{10779.2} = 0.03$	$\frac{1411.2}{7844.6} = 0.18$	$\frac{4779.4}{21268.5} = 0.22$

If we assume that the interindustry structure of the economy as revealed by the input coefficients (e.g. as given in Table 3) remains stable or constant over the planning horizon, we can derive consistent projections or forecasts of the important macro aggregates over the planning horizon based on certain desired goals of the final use of output of different sectors. This can be illustrated by considering the following 3 equations obtained from each of the first 3 rows of Table 2 using the input coefficients as given in Table 3.

$$\begin{aligned}
\text{1st Row:} & \quad 316.6 + 1511.2 + 672.1 + 8279.3 = 10779.2 \\
\text{i.e.} & \quad 0.03(10779.2) + 0.19(7844.6) + 0.03(21268.5) + (8279.3) = (10779.2) \\
\text{i.e.} & \quad 0.03 X_1 + 0.19 X_2 + 0.03 X_3 + F_1 = X_1 \\
\text{i.e.} & \quad F_1 = X_1 - 0.03 X_1 - 0.19 X_2 - 0.03 X_3 \quad \dots(1)
\end{aligned}$$

Similarly,

$$\text{2nd Row:} \quad F_2 = X_2 - 0.02 X_1 - 0.14 X_2 - 0.08 X_3 \quad \dots(2)$$

$$\text{3rd Row:} \quad F_3 = X_3 - 0.03 X_1 - 0.18 X_2 - 0.22 X_3 \quad \dots(3)$$

Thus, there would be as many equations as there are sectors in the I:O Table. In our simplified version, there are 3 sectors and 3 equations. When we specify targeted values of the final use of sectoral outputs (i.e.  $F_1$ ,  $F_2$  and  $F_3$ ), we find the sectoral gross outputs (i.e.  $X_1$ ,  $X_2$  and  $X_3$ ) as unknowns from the 3 equations. The solution would be unique since there are 3 independent linear equations with 3 unknowns. In terms of matrix algebra, the system of equations can be written as:

$$\begin{aligned}
F &= X - AX \quad \text{where } A \text{ is the input coefficient matrix} \\
F &= (I-A)X \\
(I-A)^{-1}F &= X \quad \dots(4)
\end{aligned}$$

We thus require inverse of (I-A) matrix and targeted values of F vector to get consistent predictions or forecasts of sectoral gross outputs. Table 4 presents the inverted (I-A) matrix for our simplified Tanzanian case of 3 sector economy.

<i>Table 4</i>				
<b>(I-A) Inverse for 3 X 3 Tanzanian Economy, 1976</b>				
	Agriculture	Industry	Services	Row Totals
Agriculture	1.0379408	0.2428819	0.0648317	1.3456544
Industry	0.0284627	1.1949602	0.1236547	1.3470776
Services	0.0464891	0.2851016	1.3130805	1.6446712
Column Total	1.1128926	1.72294337	1.5015669	4.3374032

The interpretation of the elements of the inverted (I-A) matrix as given in Table 4 becomes clear once we recognize that equation (4) above can also hold in incremental terms, i.e.

$$(I-A)^{-1} \cdot F = X \quad \dots(5)$$

Thus, if we consider a case where the final demand of agricultural produce increases by one unit with the final use in industry and services sectors remaining unchanged, the required change in gross outputs of all the 3 sectors would be given by the respective elements of the first column of Table 4, i.e. gross output in agriculture would have to change by 1.0379 units, in industry by 0.028 units and in services by 0.046 units. These numbers are derived by fully capturing all the intersectoral linkages existing in the economy. The concept of intersectoral linkages is very important in the economic planning not only to check the internal consistency of the plan but also to decide broad strategy of the plan and in identifying the 'key sectors' in the economy whose activation can generate significant spread effects in the rest of the economy. This would be the best strategy to use the available scarce resources most efficiently in an economy committed to achieving rapid economic development and transformation.

The I:O Table and the inverted (I-A) matrix can be used effectively to measure forward and backward linkages of a given sector in the economy. The direct linkages can be measured from the input coefficient matrix like the one given in Table 3; whereas the combined direct and indirect linkages of a sector can be measured from the inverted (I-A) matrix. Table 5 below gives the standard formulae for measuring different types of linkages and provides their estimates for each of the 73 sectors of the Tanzanian economy for the year 1976. Based on these values, it is possible to identify the seven most important 'key sectors' in Tanzanian economy as sector numbers: 6. Tobacco; 31. Grain Mill Products; 40. Textiles; 48. Fertilizers and Agrochemicals; 59. Electricity, 61. Construction; and 62. Commerce. A consideration of their import effects and income effects again as given in Table 5 clearly brings out that Commerce, Electricity, Tobacco and Textiles are far superior to other key sectors when import constraints are explicitly considered.

## 7. Possibilities of Using I:O Model in Tanzanian Planning

As we have already seen in the previous section, I:O statistics are compiled and prepared very competently in Tanzania. Lack of statistical network and the expertise needed to construct the I:O estimates do not appear to be the major deterrent in using I:O model for planning in Tanzania. However, it should be pointed out that the statistical network in Tanzania is not so developed that it can generate reliable I:O Tables quickly as and when required. As is the case in most of the third world countries, Tanzania can also generate the reliable I:O estimates only once in a decade and that too with a considerable lag between the collection of basic data required and the usable final I:O Tables. This is a major constraint because the economic structure as revealed by the available I:O table may not be relevant for the planning period for which it has to be used. Intelligent and informed guesswork is required to predict changes in the individual input coefficients before the I:O statistics could be used for planning under such circumstances.

Another major concern about the I:O model based economic planning is regarding the decentralization of the planning process. Regional I:O Tables can prove too costly for the developing countries and a generalized national I:O Table may not be relevant for planning at regional - i.e. states/provinces or district - levels in the case of most of the regions. The unresolved issue in this regard is to reconcile the regional planning in a decentralized framework with the national level planning based on a stringent consistency framework provided by the I:O model.

The officials in the newly formed Planning Commission in Tanzania are, however, hopeful of finding viable solution to these issues. Although currently, Tanzania does not have a well-defined macroplanning model based on internal consistency framework, the officials in the Planning Commission are seriously considering adopting an I:O model for national planning following the examples of countries like India and Kenya.

Table 5								
Measures of Intersectoral Linkages, Tanzania 1976								
Sector Name	Indices of Dir. Backward Links		Indices of Dir. Forward Links		Indices of Indir. & Direct Links		Indices of Dir. & Indir. Import Effects	Indices of Dir. & Indir. Income Effects
	Unwtd b1	Wtd b2	Unwtd f1	Wtd f2	Backwd B	Forwd F		
	1	2	3	4	5	6	7	8
1. Seed Cotton	0.1795	0.1007	0.5684	0.5609	0.8031	1.1904	0.0535	0.9465
2. Sisal fibre	0.1946	0.1012	0.3778	0.1565	0.8235	0.9671	0.0647	0.9353
3. Tea leaf	0.4089	0.0509	0.3289	0.1244	1.0503	0.9117	0.2161	0.7839
4. Coffee	0.0884	0.1241	0.0380	0.0350	0.7261	0.6739	0.0583	0.9417
5. Sugarcane	0.7660	0.1402	0.3619	0.1620	1.3761	0.9766	0.3768	0.6232
6. Tobacco	0.5844	0.1817	0.5689	0.3151	1.2183	1.1179	0.1544	0.8456
7. Cashew nuts	0.0379	0.0068	0.0870	0.0514	0.6855	0.7095	0.0045	0.9955
8. Pyrethrur	0.1567	0.0053	0.0535	0.0328	0.7939	0.6987	0.0212	0.9788
9. Maize	0.0569	0.1383	0.3609	0.3026	0.6924	0.9816	0.0157	0.9843
10. Wheat	0.2548	0.0379	0.2875	0.1458	0.8798	0.9299	0.2187	0.7813
11. Paddy	0.0670	0.0351	0.2190	0.1370	0.6992	0.8628	0.0141	0.9859
12. Other cereals	0.0321	0.0310	0.1418	0.0259	0.5699	0.7418	0.0008	0.9992
13. Legunes	0.0386	0.0631	0.0666	0.1117	0.6739	0.6970	0.0002	0.9998
14. Oil seeds	0.0991	0.0413	0.4219	0.2083	0.7187	0.9787	0.0000	1.0000
15. Plantains	0.0001	0.0001	0.0837	0.1081	0.6476	0.7114	0.0000	1.0000
16. Other horticult. crops	0.0498	0.0579	0.2147	0.1611	0.6862	0.7976	0.0062	0.9938
17. Coconuts	0.0001	0.0000	0.3899	0.3217	0.6476	0.9310	0.0000	1.0000
18. Other crops	0.0215	0.0349	0.0787	0.0847	0.6617	0.7143	0.0000	1.0000
19. Livestock	0.0731	0.2270	0.6238	0.3462	0.7238	1.1554	0.0318	0.9682
20. Fisheries	0.0409	0.0406	0.3090	0.3730	0.6885	0.8825	0.0094	0.9906
21. Forestry & Logging	0.0886	0.0764	0.4733	0.3618	0.7211	1.0766	0.0244	0.9756
22. Hunting	0.0671	0.0022	0.0035	0.0069	0.7190	0.6501	0.0826	0.9174
23. Stone quar. clay & sand	0.0191	0.0076	0.2709	0.3984	0.6653	0.8996	0.0196	0.9804
24. Salt mining	0.2501	0.0091	0.0069	0.0026	0.8778	0.6528	0.2308	0.7692
25. Diamond mining	0.1843	0.0553	0.0250	0.0027	0.8233	0.6698	0.0733	0.9267
26. Other mining	0.2318	0.0035	0.0777	0.0104	0.8560	0.7109	0.1185	0.9815
27. Sugar & Confectionery	0.5938	0.3104	0.3549	0.0880	1.3130	0.8894	0.2337	0.7663
28. Bakery products	1.0447	0.1835	0.0178	0.0130	1.8890	0.6612	0.2931	0.7069
29. Proc. meat & Dairy	0.3735	0.0869	0.1718	0.0554	0.9671	0.7923	0.3939	0.6061
30. Oils & fats	0.8098	0.2082	0.1063	0.0367	1.3795	0.7232	0.2931	0.7069
31. Grain mill products	0.8657	0.5595	0.5408	0.1063	1.3242	1.0075	0.2920	0.7080
32. Cann. fruits & Veggies.	0.8863	0.0456	0.0070	0.0051	1.5929	0.6529	0.2398	0.7602
33. Other food mfg.	0.5989	0.3540	0.0658	0.1344	1.2068	0.7123	0.1070	0.8930
34. Beverage Industries	0.4081	0.2359	0.0994	0.0824	1.0508	0.7367	0.2277	0.7723
35. Local brewing	0.4752	0.1142	0.0000	0.0000	1.0288	0.6475	0.0253	0.9747
36. Tailoring	0.7272	0.2130	0.0000	0.0000	1.3938	0.6475	0.1367	0.8633

Table 5 (contd)

	1	2	3	4	5	6	7	8
37.Other S.S.Industries	0.7853	0.9486	0.1015	0.0398	1.2464	0.7292	0.0494	0.9506
38.Tobacco mfg.	0.8082	0.5105	0.1101	0.0701	1.5929	0.7279	0.1708	0.8292
39.Cotton ginning	0.5375	0.5783	0.2361	0.2258	1.0839	0.9058	0.0431	0.7569
40.Textiles	0.4008	0.5113	0.8620	0.2650	1.0496	1.2636	0.1979	0.8021
41.Rope twine & cordage	0.5771	0.2127	0.1607	0.2289	1.1493	0.8526	0.1097	0.8903
42.Garment manufacturing	0.4042	0.1320	0.0300	0.0688	1.0492	0.6752	0.3487	0.6513
43.Leaner & leather prds.	0.6142	0.0886	0.2978	0.1311	1.1719	0.8794	0.3459	0.6541
44.Footwear	0.6890	0.1144	0.0007	0.0048	1.3991	0.6480	0.2277	0.7723
45.Wood & Wood prds.	0.4767	0.1274	0.2208	0.0916	1.1074	0.8426	0.2244	0.7756
46.Paper prng.& pub.	0.3979	0.2228	0.8735	0.5812	1.0412	1.5476	0.3894	0.6106
47.Chem.& Phar.ex agro.	0.5900	0.3730	0.3980	0.3247	1.2331	0.9569	0.3730	0.6270
48.Fert.& Agro.Chems.	0.3760	0.0929	0.4311	0.1772	1.0084	1.0790	0.4769	0.5231
49.Petroleum & Pet.prds.	0.0801	0.1070	0.8540	0.8287	0.7118	1.5176	0.7860	0.2140
50.Rubber products	0.3677	0.1268	0.0845	0.3001	0.9943	0.7975	0.4899	0.5101
51.Plastic products	0.3798	0.0512	0.2670	0.0879	1.0133	0.8524	0.3955	0.6045
52.Glass & Non-met.prds.	0.5335	0.0477	0.2680	0.0823	1.1406	0.8336	0.2700	0.7300
53.Cement	0.7660	0.1012	0.0922	0.1201	1.3276	0.7340	0.2554	0.7446
54.Iron steel & Non-ferr.	0.5307	0.2578	0.6734	0.4247	1.2670	1.4736	0.6161	0.3839
55.Fabricated met.prds.	0.6705	0.2253	0.3401	0.1531	1.3856	0.9183	0.3666	0.6334
56.Machinery & equips.	0.2857	0.0939	0.4866	0.1986	0.9214	1.0801	0.5018	0.4982
57.Trans.eqp. & repairs	0.2721	0.1541	0.3074	0.4382	0.9290	0.9700	0.5053	0.4947
58.Other manufacturing	0.2387	0.0262	0.2926	0.1072	0.8629	0.8921	0.2165	0.7835
59.Electricity	0.4126	0.1552	0.6800	0.3063	1.0007	1.2308	0.1392	0.8608
60.Urban water supply	0.5957	0.0994	0.1090	0.0964	1.2212	0.7485	0.2911	0.7089
61.Construction	0.4657	1.7221	0.4922	0.4146	1.0757	1.1373	0.2403	0.7597
62.Commerce	0.4379	4.0825	4.2520	2.8654	1.0147	4.6546	0.0893	0.9107
63.Hotels & Restaurants	0.7903	0.5772	0.1314	0.4576	1.3713	0.7739	0.1395	0.8605
64.Transport	0.1589	1.4001	1.7359	3.8072	0.7953	3.3758	0.1212	0.8788
65.Communications	0.2704	0.1277	0.2003	0.4229	0.9108	0.9741	0.1024	0.8976
66.Fin.institutions	0.1615	0.1856	1.8025	0.8278	0.8037	2.2799	0.1486	0.8514
67.Real estate	0.3121	0.2317	0.2280	0.2728	0.9685	0.9135	0.0896	0.9104
68.Business services	0.3583	0.1923	0.6749	0.5008	0.9842	1.4082	0.1279	0.8721
69.Pub.administration	0.4376	3.0285	0.0000	0.0000	1.0678	0.6475	0.1543	0.8457
70.Education	0.1594	0.3624	0.2627	0.2089	0.7919	0.9676	0.0924	0.9076
71.Health	0.1818	0.2656	0.0218	0.0121	0.8111	0.6676	0.2145	0.7855
72.Other services	0.3342	0.1920	0.2283	0.1304	0.9749	0.8589	0.3518	0.6482
73.Unspecified	0.1840	0.3098	0.7786	1.5495	0.8586	1.4247	0.5745	0.4255
Average Value	0.3674	0.3003	0.3674	0.3003	1.0000	1.0000	0.1915	0.8045

Note: Definitions of Indices are on the next page.

## Definition of Indices

### Direct backward linkages

$$bl_j = \frac{\sum_{i=1}^n X_{ij}}{X_j} = \sum_{i=1}^n a_{ij}$$

{  $a_{ij}$  is the input coefficient in i-th row and j-th column.

### Weighted direct backward linkages

$$b2_j = bl_j \cdot n \cdot \frac{X_j}{X}$$

### Direct forward linkages

$$f1_i = \frac{\sum_{j=1}^n X_{ij}}{X_i}$$

### Weighted forward linkages

$$f2_i = f1_i \cdot n \cdot \frac{X_i}{X}$$

### Direct and indirect backward linkages

$$B_j = \frac{\frac{1}{n} R_j}{\frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n r_{ij}} \quad \text{where } R_j = \sum_{i=1}^n r_{ij}$$

$r_{ij}$  is element of the inverted Leontief-matrix in i-th row and j-th column.

### Direct and indirect forward linkage

$$F_i = \frac{\frac{1}{n} R_i}{\frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n r_{ij}} \text{ where } R_i = \sum_{j=1}^n r_{ij}$$

### Direct and indirect import effects

$$b_j = \sum_{i=1}^N \beta_i \cdot r_{ij} \text{ where } \beta_i = \frac{\text{Import sector } i}{\text{Total production sector } i}$$

### Direct and indirect income effects

$$r_j = 1 - b_j$$

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## Appendix-A

### Criteria To Be Developed/Used in Future as Basis For Regional Resources Allocations

(Source: Planning Commission, Tanzania)

#### DATA

- i) Size
- |            |       |                 |                |
|------------|-------|-----------------|----------------|
| Total area | ..... | km <sup>2</sup> | 1.2.3.4.5,..20 |
| Land area  | ..... | "               |                |
| Water area | ..... | "               |                |
- ii) Population
- |             |       |
|-------------|-------|
| Size        | ..... |
| Density     | ..... |
| Growth Rate | ..... |
- iii) Climate
- |                            |       |
|----------------------------|-------|
| Annual Mean Rainfall(mm)   | ..... |
| Annual Mean temperature C° | ..... |
- iv) Economic Growth
- |                                  |       |
|----------------------------------|-------|
| Regional Growth Domestic Product | ..... |
| Regional Per Capita Income       | ..... |
| Growth Rate                      | ..... |
- v) Administrative Division
- |   |
|---|
| Districts.....                          |
| Divisions.....                          |
| Wards.....                              |
| Villages.....                           |
| Total Registered villages.....          |
| Villages Survey & with title needs..... |
- vi) Local Government
- |                              |         |
|------------------------------|---------|
| Cities.....                  | No..... |
| Municipalities.....          |         |
| Townships.....               |         |
| Rural District Councils..... |         |
- vii) Co-operatives Development
- |                                 |
|---------------------------------|
| Unions.....                     |
| Village Primary Societies.....  |
| Savings and Credit Society..... |
| Others.....                     |
- viii) Land Use
- |                             |
|-----------------------------|
| Arable Land.....            |
| Land Under cultivation..... |
| Forest reserves.....        |
| Pasture land.....           |

- a) Crop Production
  - Cultivated land.....
  - Irrigated land.....
  - Area under permanent crops.....
  - Storage capacity.....
  - Main food crops.....
  - Main cash crops.....
  
- b) Livestock and Poultry Production
  - Cattle.....
  - Goats.....
  - Sheep.....
  - Pigs.....
  - Poultry.....
  
- c) Construction
  - Bulldozers, Graders and Caterpillars.....
  - Tarmac roads (Kms).....
  - Gravel roads (Kms).....
  - Earth roads.....
  
- d) Transport
  - Buses.....
  - Trucks (7 tons).....
  - Lorries.....
  - Vans, Pickups.....
  - Tractors.....
  
- e) Post and Telecommunications
  - Main post offices.....
  - Sub-post offices.....
  - Telephone lines (capacity).....
  - Telex lines (capacity).....
  
- f) Finance and Credit
  - Bank Branches.....
  - Insurance Branches.....
  
- g) Energy Consumption
  - Electricity :    Domestic.....
  - Industrial.....
  - Wood/charcoal.....
  - Oil/Petroleum products.....
  
- h) Water
  - Rural Annual Water Supply Capacity.....
  - Number of rural people supplied with water.....
  - Urban water supply annual capacity.....
  - Number of urban people supplied with water.....

i) Health Facilities

Hospitals.....  
Hospital beds/person.....  
Dispensaries/person.....  
Dispensaries.....  
Health centres.....  
Health centres/person.....  
Doctors.....  
Doctors/person.....  
Trained Nurses.....  
Nurses/person.....

j) Health Condition

Life expectancy(years).....  
CBR per 1000.....  
CDR per 1000.....  
Infant Mortality rate.....

k) Education

Primary Schools.....  
Secondary Schools.....  
Vocational Training Centres.....  
Emolument rate/Primary, Secondary.....  
Literacy rate.....