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EXECUTIVE SUMMARY

1. Objective

Late in 1986 TvT Associates was invited by the Program Office of USAID/Senegal (PRM/EA) to prepare a Monitoring and Evaluation Plan for the African Economic Policy Reform Program (AEPRP) 685-6291.

The AEPRP is designed to

- reduce government intervention in the private sector;
- reduce disincentives to savings and productive investments;
- provide incentives for the growth of a competitive private sector.

These objectives are to be achieved by encouraging particular reforms, which are detailed below.

Progress toward these reforms is formulated as conditions precedent for release of various tranches of the support funds. These conditions are being monitored by PRM/EA.

The desired outcome of the AEPRP, and of related programs by the IBRD, the IMF and other donors is to reduce government constraints and rigidities imposed on the Senegal economy in order to free markets and thereby allow private investment and private enterprise to lead the economy to growth.

It will, however, take years before these reforms work their way through the economy to produce significant macro-economic changes in the Senegalese economy. In the interim, a detailed evaluation of the effect of particular changes (e.g. changes in tariffs) on particular industries can be used to evaluate the degree to which the AEPRP is achieving its purpose.

The monitoring and evaluation system which was developed by TvT Associates therefore concentrates on the design of a micro-economic monitoring system for industrial production in Senegal, which will furnish current data on inputs and outputs (quantity and price) of a group of nineteen products comprising a major part of the (formal) Senegalese production sector. These data can then be used both to motivate and to support small scale diagnostic studies to evaluate immediate and intermediate AEPRP effects.

Input data for the monitoring system come from three quarterly industrial surveys conducted by the Direction de Statistique (Statistics).

2. Project Output

The current work order (Delivery Order No. 3 under IQC PDC-0085-00-I-6108-00) was issued to implement the monitoring system design. Implementation has involved the following aspects.

- Technical Assistance to Statistics. This consisted of:
 - provision of a micro-computer and peripherals under a separate purchase order;
 - training in the use of the computer, in the use of data-input programs, and in handling the resultant data bases, to verify and correct data.
- Back-coding three year's data (1984-1986) to form a starting base-line for the monitoring procedures.

Due to inconsistency in codes used by the three surveys, this back-coding had not been completed at the time of the last T/A visit; the examples in this report are therefore based on a reduced data set (1/85 through 1/86). The back-coding is now completed, and the time-series will be updated accordingly.

- Extracting economic information for the AID monitoring system from the survey data bases.

Due to confidentiality considerations, not all product information can be transmitted to AID. In addition, the surveys contain information not of interest to AID.

- Producing and updating the analytic monitoring time series.

TSP programs have been provided, to be used at AID/PRM/EA, which will, for each of the nineteen products,

- update and maintain quarterly time series of:
 - production; sales; inventories; imports by product imported; inputs by product used; employment.

- produce and plot analytic time-series giving these quantities as indices, for purposes of monitoring their development.

These analytic time-series will form the basis at PRM/EA for further TSP analysis, and, eventually, for motivating further diagnostic evaluation studies.

3. Further Development -- Technology Transfer

A beginning has been made in this project in computerization of the three surveys at Statistics. This process is incomplete.

At present, the personnel at Statistics are able and comfortable with inputting their surveys into data bases, and providing AID with the necessary data input for the monitoring system. There is, however, little capability to use the data bases for their own purposes.

It is anticipated however, that with a moderate amount of technical assistance, a capability can be developed at Statistics to operate the TSP programs developed for AID. Thus, the development of the AID monitoring system will also improve the institutional capability of the GOS to routinely obtain current micro-economic data on the state of its productive sector.

I. INTRODUCTION

1. Project Objectives

The basic objectives of the African Economic Policy Reform Program (AEPRP) grant are to

- reduce government intervention in the private sector;
- reduce disincentives to savings and productive investments;
- provide incentives for the growth of a competitive private sector.

This objective is to be achieved by encouraging four particular reforms:

1. Reduction of tariffs and of quantitative restrictions on imports, and a more uniform application of the Customs Code.
2. Reform of the Investment Code to
 - reduce the number of current tax and other exemptions and exceptions granted;
 - reduce the potential for future grants of tax exemptions and other special provisions.
3. Reform the direct tax system in the direction of a global or unitary tax system with
 - reduced top marginal rates, to provide incentives to saving and investments;
 - a broadened tax base.
4. Preparation of a fiscal cadaster in Dakar and the surrounding area -- to provide a basis for broadening the tax base.

The ultimate outcome of the AEPRP, and of related programs by the IBRD, the IMF and other donors is to reduce government constraints and rigidities imposed on the Senegal economy, in order to free markets and thereby allow private investment and private enterprise to lead the economy to growth.

2. Evaluation Strategy

Evaluation of the AEPRP is required on several levels:

- o At one level, precise conditions precedent have been defined for release of the several tranches of support funds. These conditions require the Government of

Senegal to take certain actions. The Economic Analysis Unit of the USAID Program Office (PRM/EA) continuously monitors compliance with these conditions and this constitutes evaluation at this level.

- The GOS actions required are inputs to loosen the constraints on the private sector. Evaluation of the effectiveness of the program therefore requires a determination of whether increased competitiveness, increases in private investment (and growth) in fact follow from freer markets and increased opportunities for the private sector.

Freeing of markets, increases in competition, private investment and entrepreneurship, however, are processes which will take years to work themselves through to produce significant macro-economic changes in the Senegalese economy. In the interim a detailed evaluation of the effect of particular changes (e.g. changes in tariffs) on particular industries must be used to evaluate the degree to which the AEPRP is achieving its purpose.

The strategy adopted then is to install a micro-economic monitoring system to follow in detail the course of nineteen industries constituting a major fraction of Senegalese production. Quantities monitored include: sales, production, imports, inputs, exports and employment. For most, both quantities and prices are available. In addition, arrangements are being made to monitor complete country imports and exports of outputs and inputs of "industries on the list."

This monitoring system will form the basis for evaluation of detailed effects of the AEPRP. If changes are detected in the use or production of products for which tariffs have been changed, investigations will be made to determine the degree to which the tariff change is a cause. Conversely, if no change in production or inputs follows on a change in tariff, an investigation can show whether no effect, or a pair of countervailing effects have occurred.

Evaluation studies of the effects identified by the monitoring system can utilize rapid assessment methods developed by AID/PPC/CDIE, such as

- diagnostic studies of a firm's own assessment of the effect of the program. In part, these studies can use as inputs the firm's estimates of trend of business conditions contained in the "conjuncture" survey.
- short case studies of changes in the firm's cost and price structures and competitiveness vis-a-vis imports.

The Economic Analysis Unit in the Program Office is well equipped to make such evaluations. The monitoring system will provide the factual basis.

3. Technology Transfer

The monitoring data at AID originate in three surveys of business conditions taken quarterly by the "Direction de Statistique" (Statistics).^{*} These surveys have in the past been processed separately, by three separate statisticians, and three separate reports have been issued. Processing has been primarily manual, and there has been little opportunity for checking the accuracy and consistency of the data. Furthermore, it was discovered that inconsistent codes were in use for the same products and enterprises in the three surveys.

USAID (under a separate purchase order) has provided Statistics with a microcomputer, bernouilli box and printer. Under this current work order, four weeks' technical assistance has been provided to Statistics. This assistance has resulted in:

- familiarizing the statisticians with the operation and use of the computer.
- production of input screens and data-bases for data entry of the three surveys.
- development of a unified set of codes for products and enterprises and uniform units for products.
- development of reports which display values entered from the surveys, and allow checking and verification of recorded data.
- back-coding of a sufficient set of data to
 - train the statisticians in use of the system.
 - develop the rest of the AID monitoring system.

The original plan called for back-coding three years' data (1984-1986) for the three surveys in a three-week interval between two two-week stretches of technical assistance. Due to the inconsistency in codes between the three surveys, which was fully uncovered only during the back-coding, only 5 quarters' worth of "clean" data were produced at the end of the second assistance period -- in addition to the consistent codes. Work on the back-coding is continuing, and the full 12 quarters' baseline data will be available at the end of August, and regular quarterly updates thereafter.

^{*} Copies of these surveys with a detailed description of their contents, and the processed data available to date are contained in TvT Associates' Final Report: A Monitoring and Evaluation Plan for the African Economic Policy Reform Program (AEPRP) 685-0291, December 22, 1986.

The present status at Statistics is that the personnel are trained and able to

- input data from the three surveys;
- use print-outs of these data to correct and verify the data;
- provide AID with data from which the inputs to the AID monitoring system can readily be obtained (by interactive dBASE "sorts" and "totals").

Further technical assistance is planned, including computer program development, protocol development and training, which will enable personnel at Statistics to

- continue to enter survey results, verify and correct the data, and update and archive the data bases;
- produce the AID monitoring inputs, to maintain confidentiality;
- produce printouts which can serve as inputs to the three current quarterly survey reports;
- produce the equivalent of the AID time-series for the complete range of products on which data are obtained, for use by the GOS Planning Department. This will provide the GOS with continuing current economic information on the state of the (formal) productive sector.

Further results may be anticipated. The current surveys are somewhat duplicative, and economic information is dispersed between them. The personnel at Statistics are already discussing ways in which they can be rationalized and improved.

Weighting of products in the producer price index dates from 1974. Computerization will allow changing these weights while maintaining series based on both sets of weights for comparison. Finally, cooperation between PRM/EA and Statistics will result in identifying possible changes in the sample of firms used in the surveys.

It is anticipated that continued cooperation between the PRM/EA and Statistics, with occasional continued technical assistance, will result in

- an increasingly useful economic monitoring system at AID;
- continued provision of detailed current economic data on the productive sector to the Planning Department of the Government of Senegal.

II. THE SENEGAL AEPRP MONITORING SYSTEM

This section contains a description of the time-series that will constitute the monitoring system, and of the processing that will be done at USAID to produce these time-series from data obtained from Statistics. The material is descriptive of the economic significance and use of the data; details of processing, including some annotated programs, are presented in an Annex to this report.

1. Economic Data and Time Series

1.1 "Products" Monitored

There are potentially 19 "Products" which can be monitored by USAID. The list is determined by two considerations:

- Whether one or more producers are included in the sample of firms surveyed by Statistics.
- Whether data on the product can be divulged to AID without violating privacy considerations.

The list of nineteen products in Table 1 represents those products (or combinations) for which both those conditions are satisfied. Table 1 displays the "products" and the firms which produce them. They represent together a major fraction of the Senegalese formal productive sector.

1.2 Data Inputs

For each of the "products" of Table 1, the following data are potentially available each quarter:

- output quantity
- output value
- sales quantity
- sales value
- inventories (quantity)
- permanent employment
- seasonal employment
- total employment
- input quantity, separately for each reported input
- input value, separately for each reported input
- import quantity, separately for each reported input
- import value, separately for each reported input

Data for each of these series are being back-coded to 1984, and the 12 quarters from 1984 through 1986 will be used as a base-period to normalize the time-series (see next section).

The back-coding is currently completed; the programs have been developed on a partial set of data comprising the

Table 1

List of "Industries"*

1.	Canned tuna	NOUV. CONS. SENEG. SAPAL
2.	Frozen fish and shrimp	AMERGER.CASAM. CRUSTAVIF ADRIPECHE
3.	Condensed milk (sweetened and unsweetened)	SIPL CODIPRAL
4.	Raw peanut oil	LESIEUR + SODEC + SEIC (Ventes de SONACOS) + SEIB if possible
5.	Refined peanut oil	LESIEUR + SODEC + SEIC (Ventes de SONACOS) + SEIB if possible
6.	Wheat flour	G M D SENTENAC
7.	Biscuits	BISC MEDINE
8.	Sugar	BISC. ALIM. AFRIC. CSS <u>if possible</u>
9.	Yarn and thread	SIMIPAFRIC (SOTIBA) ICOTAF SOSEFIL COTO. CAP VERT
10.	Printed and dyed cloth	SOTIBA ICOTAF
11.	Unbleached cloth	STS
12.	Sawn lumber	FOREST.MAINE LEBOIS SEBOIS
13.	Refined petroleum products	SAR
14.	Soap	SAF NSOA
15.	Plastic and rubber shoes	SENEPLAST BATA
16.	Paint	SEIGNEURIE SAEC
17.	Cement	SOCOCIM
18.	Construction equipment	SENAC
19.	Metal packaging (cans)	CARNAUD (ex ELMAF) FUMOA

* From Final Report: A Monitoring and Evaluation Plan for the African Economic Policy Reform Program (AEPRP), op. cit.

quarters 85-1 through 86-1, which had been coded and "cleaned up" as of May 31, 1987, and the examples in the next section are based on these partial data.

Additional technical assistance is scheduled for the final quarter of FY87 to support Statistics in "cleaning up" the complete set, and producing the AID input series. The AID analysis programs will then be rerun.

1.3 Analytic Series

Analytic series derived from these data, separately for each product, are:

- output price index (PP)
- wholesale price index (WP)
- input price indices, by input product "x" (PCI_x)
- weighted input price index (weight average of above) (PCI)
- weighted input quantity index (QCI)
- relative output/wholesale price index (PPRWP=PP/WP)
- relative price of inputs (PRCI=PCI/WP)
- import price index, by import product "x" (PM_x)
- index for input/output coefficient by input product "x" (IO_x)
- inventories as % of outputs (SR)
- quarterly growth rate of output in % (GQ)
- quarterly growth rate of sales in % ((GY)
- quarterly growth rate of wholesale prices in % (GWP)
- quarterly growth rate of input price index in % (GPCI)

These series will be updated quarterly, and carried as TSP series in the computer. They can be plotted on demand, either all together, or sequentially, to analyze the development of production, sales, prices and imports of the nineteen products.

Use of the TSP package will allow statistical analysis of the time-series for changes, and econometric analysis of the time-series in terms of macro-economic variables to the extent that these are available to USAID from other sources.

Economic analysis, based on the time-series, can be supplemented by more detailed investigations into the productive sectors, using interviews, more detailed questionnaires (if acceptable), etc.

In this manner, the monitoring system will

- A. define a base-line of data from which to measure change;

- B. monitor production of the products monitored for change in the economic parameters and provide a measure of the amount of change and confidence that this is a real change; and thus
- C. guide the process of evaluating the effect of the AEPRP in the productive sector.

Attached are examples of the type of time-series to be generated by the system. They are examples only, based on the 5 quarters available at the end of May 1987.

2. Imports and Exports

2.1 Survey Output

As detailed in section 1 above, TSP time series will be available for:

- quantities and prices of imports reported in the surveys by product imported.
- quantities and prices of exports reported in the surveys by product exported.

These time-series, especially the import series, are unlikely to contain the complete quantities for the country as a whole. They will, however, furnish a means of identifying changes in the usage of imports, and in exports, and such changes will then be investigated for causal connections with economic reform.

2.2. Customs Data

Negotiations are currently underway to obtain data (quantities/prices of imports and exports by firm and product) for selected products from the Customs Service.

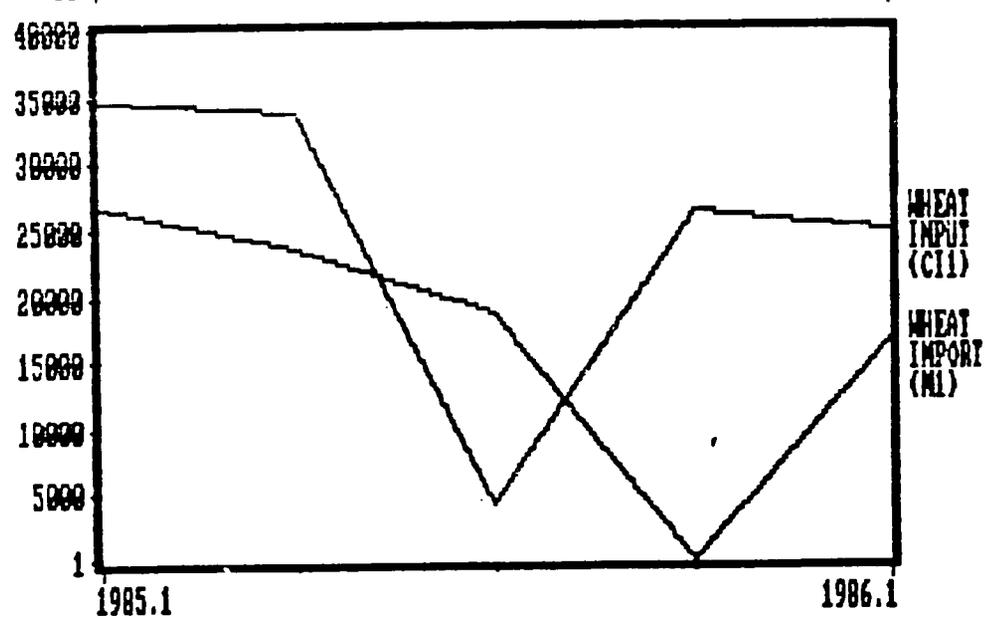
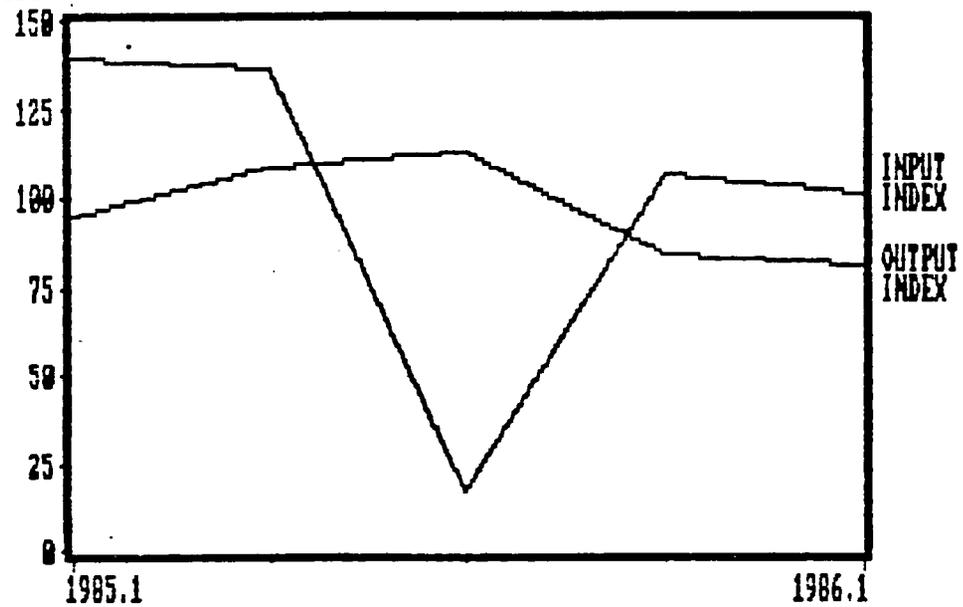
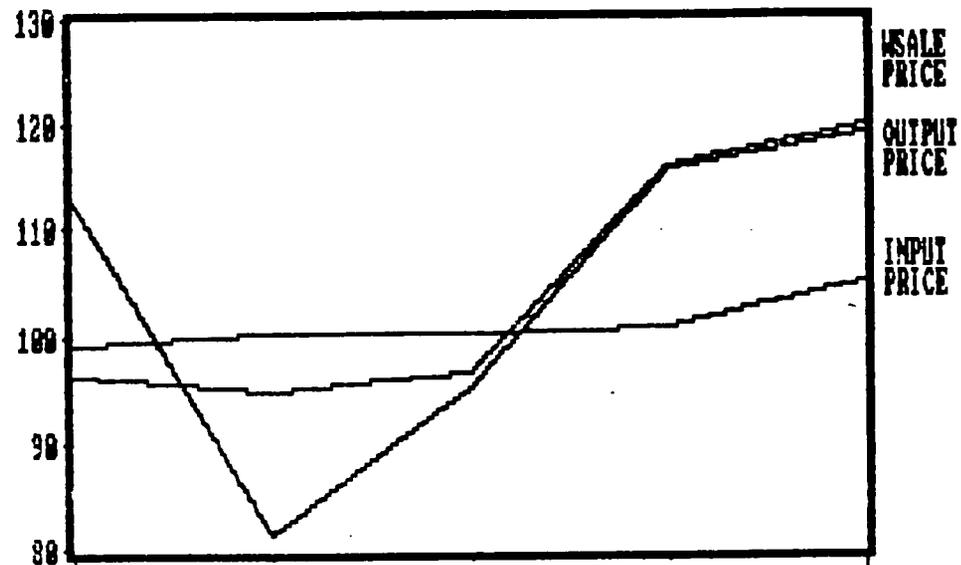
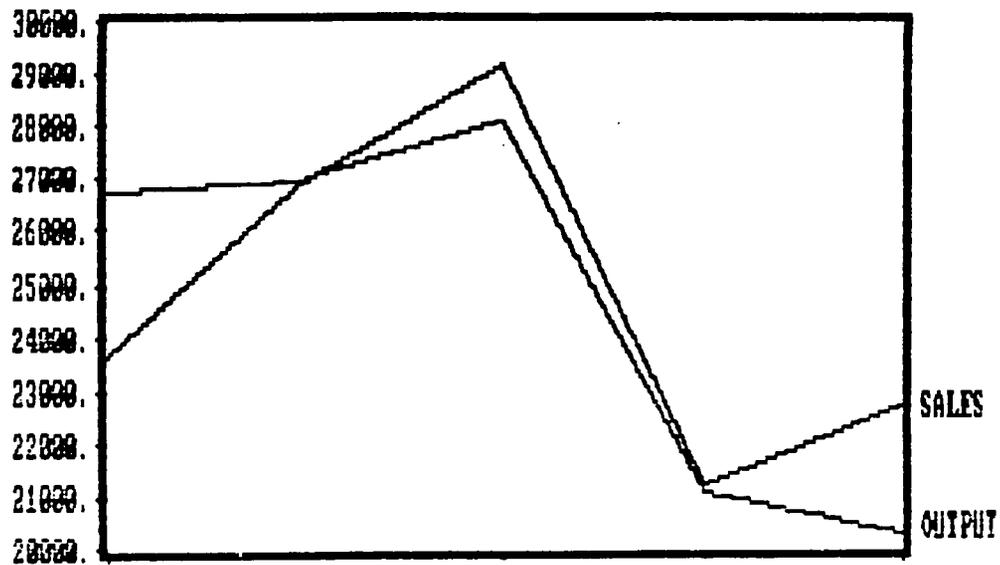
These data are routinely produced by the Customs. They represent data reported by importers and exporters to the Customs Service, on which collections of duties are based. If they can be obtained, they will furnish:

- best estimates for the national exports and imports of products for which the survey time series are produced, and for imported inputs to these products.

It may be possible to find stable ratios between the "national" and sample quantities, and then estimate the proportion of the national usage or exports presented by the sample.

- A check on the make-up of the sample, and a means of identifying possible new entrants.

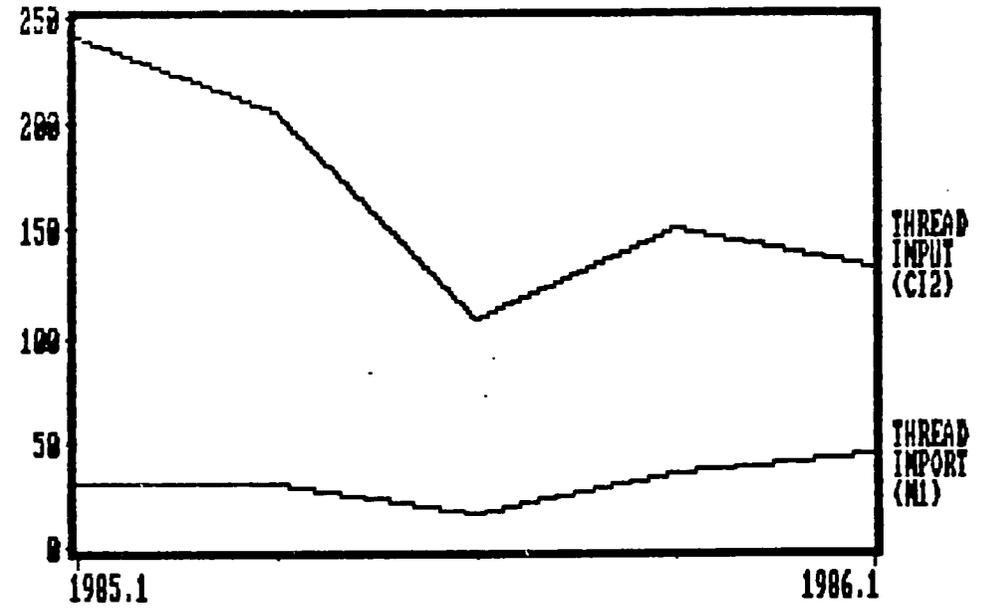
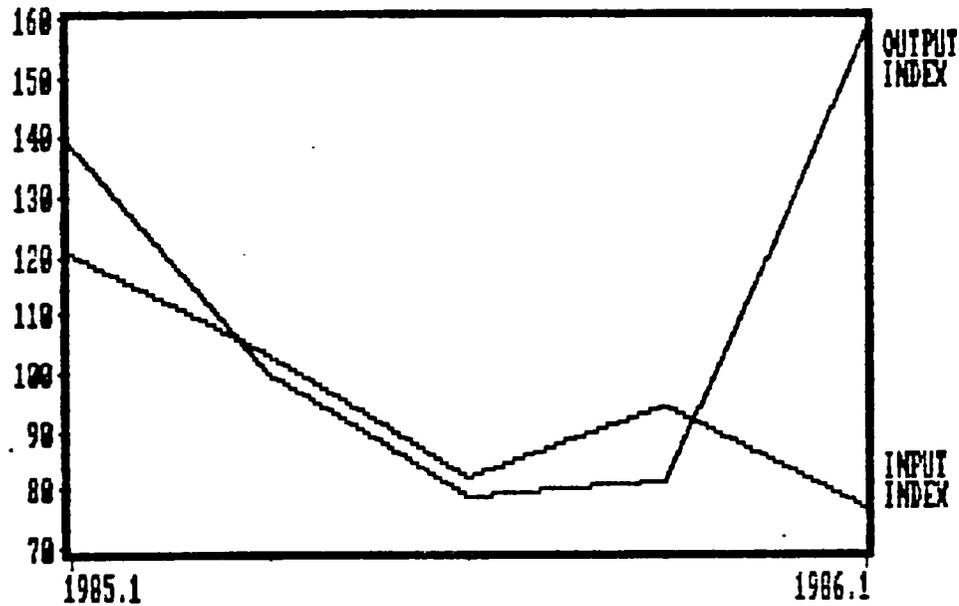
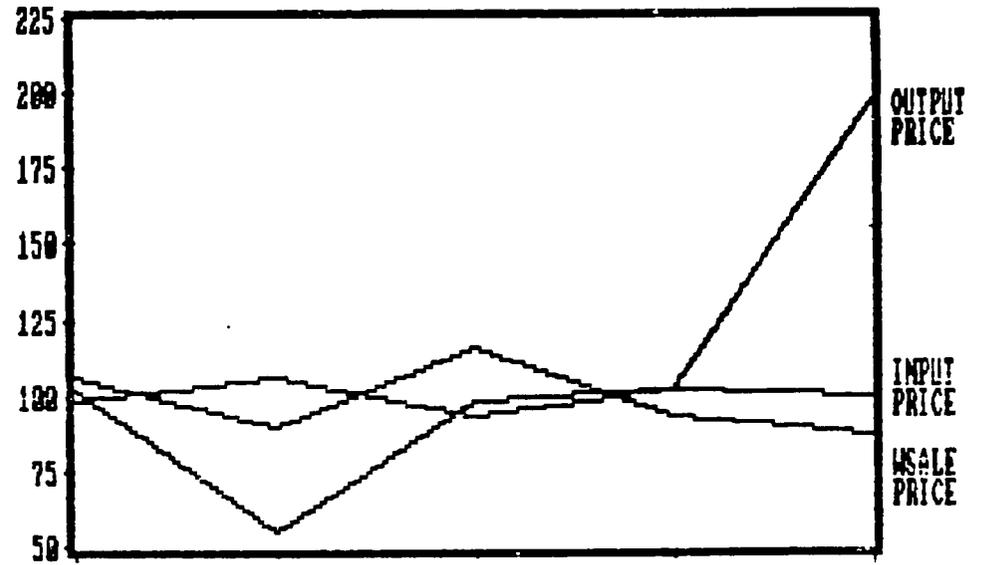
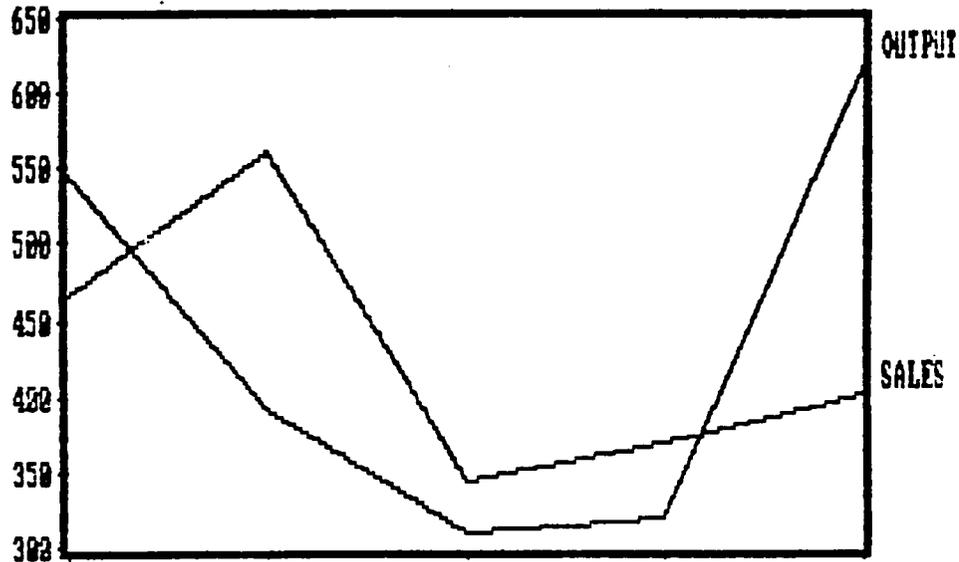
AID GROUP 6 : FLOUR



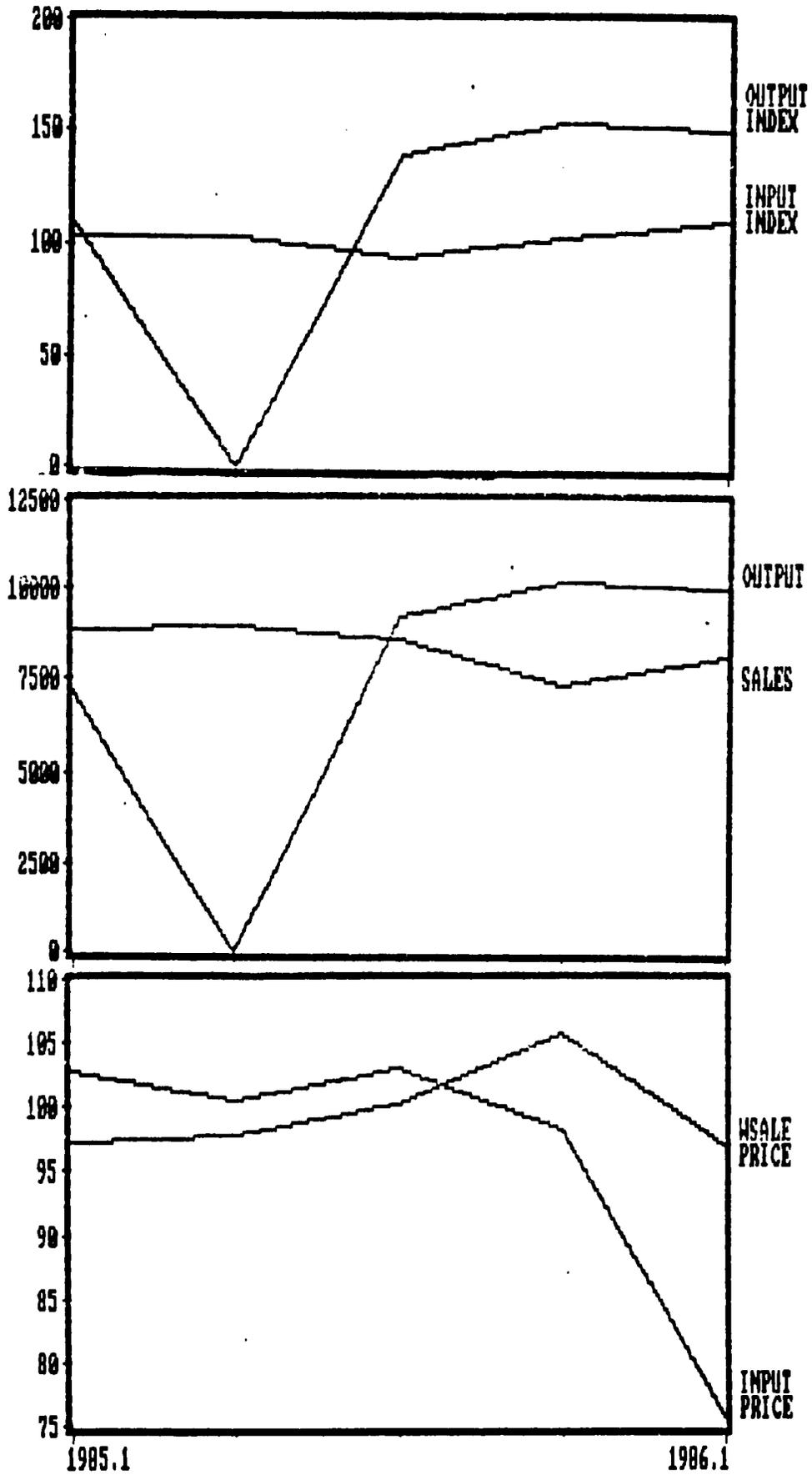
6

AID GROUP 9 : THREAD

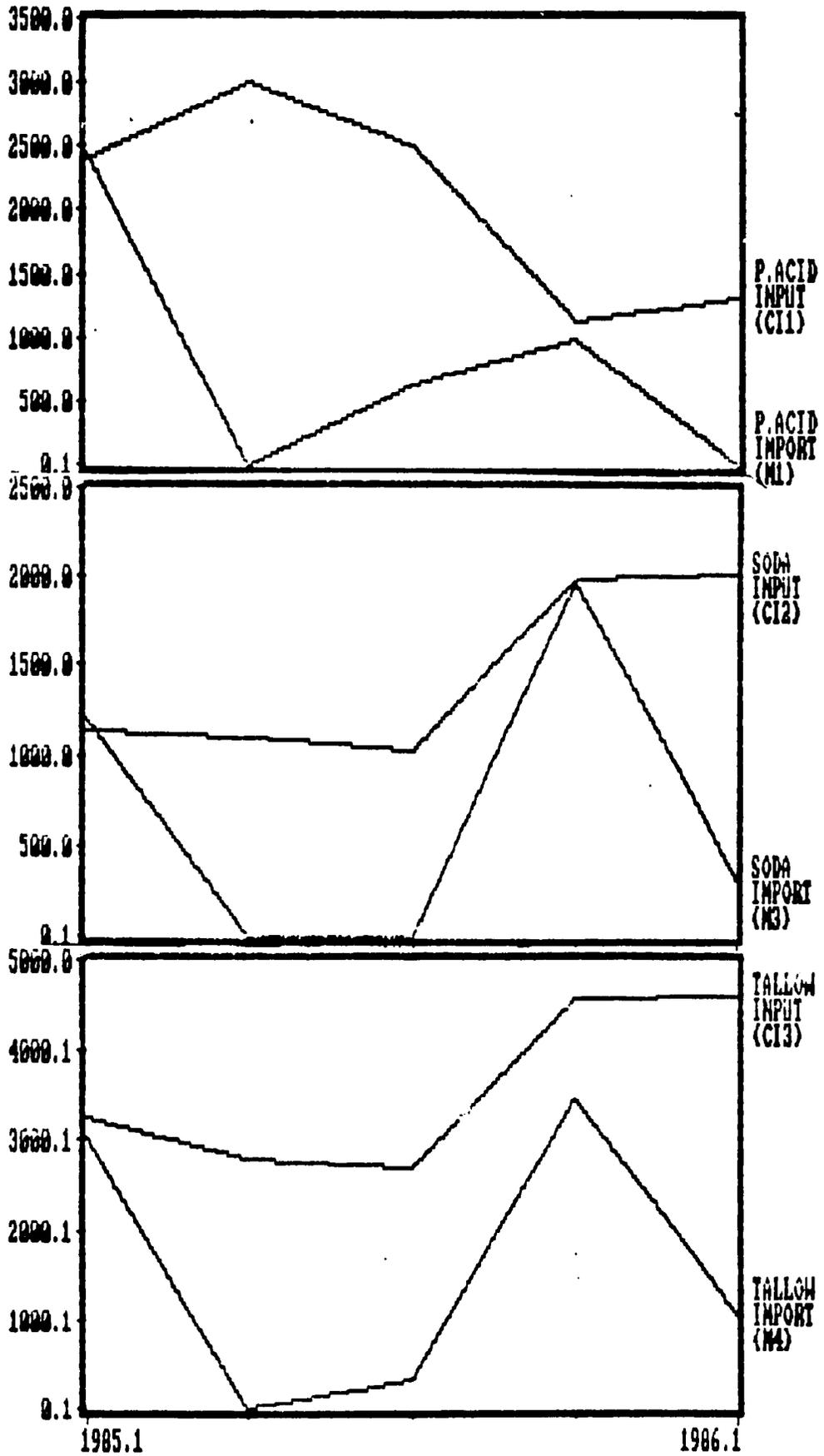
10



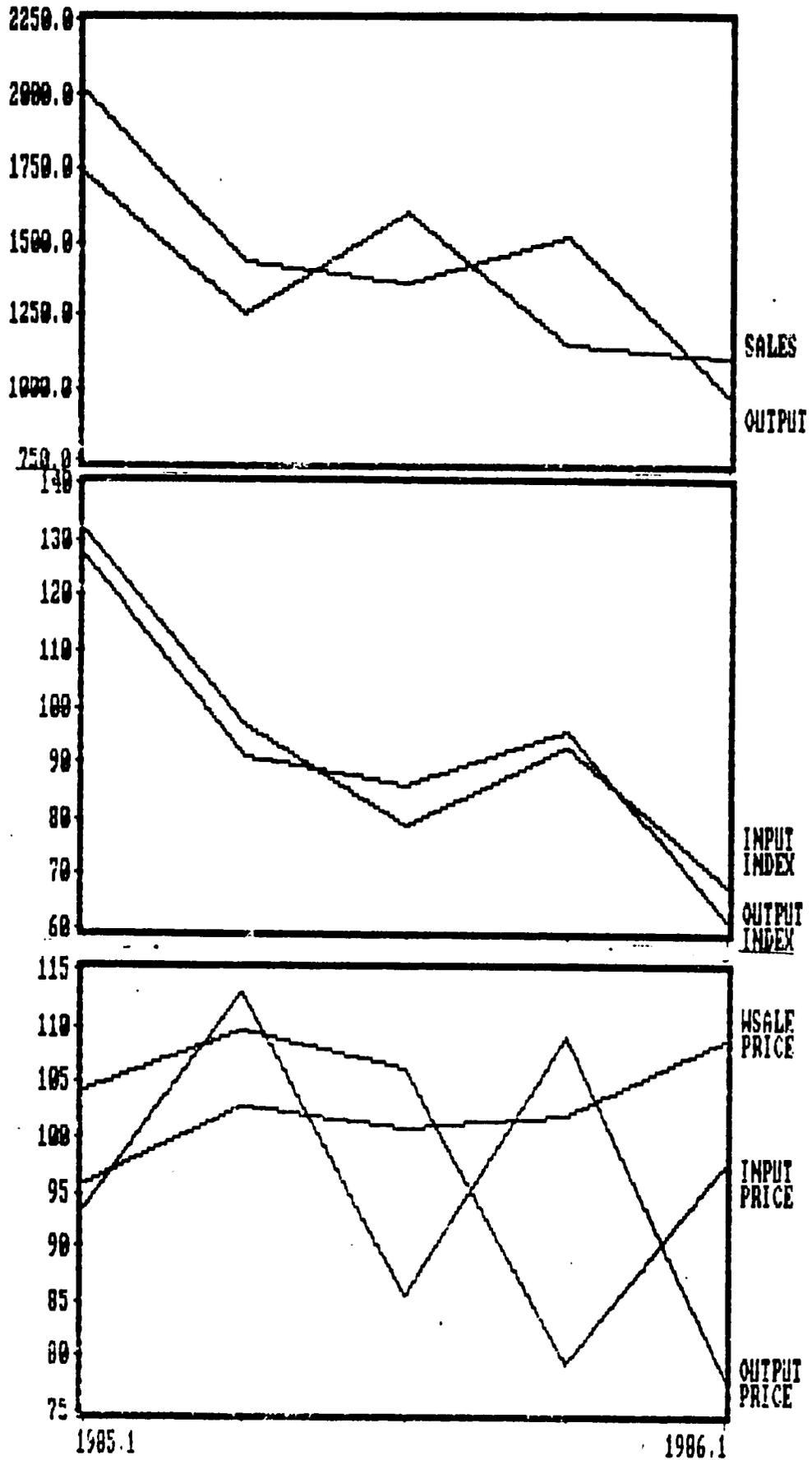
AID GROUP 14 : SOAP



AID GROUP 14 : SOAP



AID GROUP 18 : CONSTRUCTION MATERIALS



To the extent that firms in the sample use imported inputs in their production process (and most of them do), the appearance of firms not in the sample as importers will identify possible producers not in the sample. Investigation can show which of these are actual producers, and rough calculations can then estimate the continuing representativeness of the sample.

Also, if new entrants appear on the list (or old entrants disappear) it will be an indication that greater market liberalization has had an effect. Further investigation will be required to verify such an effect. The Customs data, however, are vital in identifying that potentially we may be observing the effect of increased competition.

3. Other Indicators

One of the surveys at Statistics records a number of non-quantitative data, such as need for more financing, and perceived direction (up/down/level) of prices, supplies, inventories and other business conditions. Seven of these indicators will be recorded:

1. Utilization of capacity
2. Difficulties with supplies
3. Difficulties with equipment
4. Insufficient personnel
5. Other reasons constraining growth
6. Difficulties with finance
7. Sufficient credit

and published as time-series for each industry. Due to delays in coding the inputs on these variables, this feature has not yet been implemented.

III. CURRENT STATUS

This section describes the current status of the monitoring system. Since the data for the monitoring system come from the surveys collected by Statistics, and the modest technical assistance provided to Statistics under this work order has given Statistics only a limited capability of producing outputs, the system does not yet run automatically. It does, however, run, giving continuing TSP time-series outputs from continuing data inputs, but it requires modest technical assistance to convert the data which Statistics inputs into the monitoring system into

the 19-product AID format. This technical assistance consists of:

- additional inspection and verification of the data from Statistics;
- aggregation of the data into the nineteen-product AID format.

Note that on a long-term basis these steps must be done at Statistics, because they require access to the raw data, many of which are confidential. They are currently performed jointly by Statistics and the T/A contractor.

Below we describe briefly the steps in the processing sequence, and their current status. The annex to this report contains the annotated computer programs that are used in these processing steps.

1. Data Input

Data input is performed at Statistics. This is currently routine. The three surveys are entered into seven data-bases from input screens. Five of the data bases contain information of economic interest. The data-bases are distributed over the surveys as follows.

- Wholesale price survey: 1 data-base
- Production survey: 2 data-bases
- "Conjoncture" surve: 4 data-bases

The annotated data-entry programs, screens, and data-base structures (i.e., names of variables) are presented in the Annex.

2. Data Verification and Correction

Listing programs have been provided which allow listing of data from the 5 data-bases used for AID inputs. These are presented in the Annex. To date the checking of data and verification and correction of odd-looking entries has been done interactively on the computer, and jointly by Statistics and T/A personnel. No protocol for checking and correcting data has been developed for execution by Statistics personnel independently. This task remains for planned additional T/A.

3. Production of Inputs to the AID Monitoring Program

This consists of the following steps:

1. Separate the data for AID inputs from the five data bases in which they are contained. This yields five "AID" data bases.

2. Separate data for

Output
Sales
Inventory
Employment
Inputs
Imports
Exports

into separate data-bases, and aggregate these to the economic variable to be plotted. Aggregation is to (AID) "Product" level for output, sales, inventory employment and exports.

For imports and inputs aggregation is to the individual product, separately for each (AID) "Product".

3. Convert the dBASE data to TSP inputs.

Steps 1 and 2 of this sequence have been done interactively in dBASE, and will probably continue to be done in this manner.

Step 1 should be done by Statistics, because of confidentiality considerations. It has in fact been done by T/A personnel at Statistics. Developing confidence and facility in Statistics personnel to perform these two steps is one of the outputs planned for continued T/A.

Step 3 requires a computer program to convert the data-bases with all AID data in them into separate data-bases for each economic variable. This program is attached in the Annex.

4. Development of the Time-Series

Three data files are loaded for each AID group (industry) to TSP:

-xxAID.TSP contains data on OUTPUT, quantity and value
SALES, quantity and value
INVENTORIES, quantity
EMPLOYMENT, perm., seas., and
total.

-xxINPUT.TSP contains data on INPUTS, quantity and value,
each specific item being identified.

For each of these *.TSP files, data have been organized by observation: all series are loaded first for the first quarter covered.

Those series are loaded in TSP through the READ instruction. Since different products have different numbers of inputs and of imports, there is a specific program for each product.

An example of such a program is given in the Annex. The names of the data series are:

Q	output quantity
QV	output value
Y	sales quantity
YV	sales value
S	inventories
LP	permanent employment
LS	seasonal employment
LT	total employment
CIx	input a quantity of product x
CIxV	input a value of product x
Mx	import a quantity of product x
MxV	import a value of product x

The most important series that are required for economic analysis are then computed by a TSP program run in batch mode and saved in the xxAIDDAT work file. This includes the computation of:

PP	output price index
WP	wholesale price index
PCIx	input x price index
PCI	weighted input price index
QCI	corresponding input quantity index
PPRWP	relative output/wholesale price index
PRCI	relative price of inputs (PCI/WP)
PMx	import x price index
IOx	index of input-output coefficient for input x
SR	inventories as a % of output
GQ	quarterly growth rate of output in %
GY	quarterly growth rate of sales in %
GWP	quarterly growth rate of wholesale price in %
GPCI	quarterly growth rate of input price in %

The indices will be initialized to the base-years 1984-1986. The examples provided in this report however, since the complete base-period had not been coded -- are normalized to 1985.

It is felt that these time series form a sufficient basis for monitoring the development of production. Since the original data are also available as TSP time series, further analyses, as well as comparisons with macro-economic variables when available, can be made as required.