TRAINING ON
THE USE A COMPUTER SIMULATION MODEL
FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES
OF NON-ALIGNED MOVEMENT

Ciawi - Bogor, Indonesia, August 1 - 12, 1995

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No.3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609, 2610; 7806174 Fax (021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

TRAINING ON
THE USE A COMPUTER SIMULATION MODEL
FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES
OF NON-ALIGNED MOVEMENT

Ciawi - Bogor, Indonesia, August 1 - 12, 1995

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No.3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609, 2610; 7806174 Fax (021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

TABLE OF CONTENTS

Page

I. **BACKGROUND** 1

II. **OBJECTIVES** 1

III. **PROJECT OUTPUTS** 1

IV. **PROJECT MANAGEMENT** 2

V. **IMPLEMENTATION OF THE RPOJECT** 4

VI. **STATEMENT OF ACCOUNT** 7

ANNEXES :

ANNEX 1. : LIST OF PARTICIPANTS

ANNEX 2. : DETAILS OF DAILY TRAINING PROGRAMME

ANNEX 3. : EVALUATION OF TRAINING

ANNEX 4. : INTRODUCTION TO COMPUTER

ANNEX 5. : TRAINING CONTENTS

REPORT
OF THE TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF NAM

I. BACKGROUND

01. The Ministry of Agriculture of the Republic of Indonesia has been awarded grant amounting to a sum of US $ 70,000 from Perez-Guerrero Trust Fund (PGTF) of G-77 to conduct a training program on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of Non-Aligned Movement (NAM).

02. The Project is proposed by Indonesian Government in order to follow up the results of the Conference of Ministers of Food and Agriculture of the NAM on Food Security held in Bali in 1994 in which were proposed encompassing among others :

a. Training and exchange of information;
b. Technology generation and transfer;
c. Input supply and production;
d. Institution building;
e. Trade; and
f. Policy Reforms.

II. OBJECTIVES

03. The main objective of the project was to improve policies and strategies on Food Security in Developing Countries of the NAM to achieve sustainable food security. Specifically, the immediate objective of this project was to strengthen and improve national capabilities of NAM's developing countries in analyzing and formulating policies and strategies on Food Security.

III. PROJECT OUTPUTS

04. The outputs expected from the project were :

a. Computer Simulation Model
b. Trained Food Security Trainers and Planners
c. Computer-based system (installed computer hardware and software) for forecasting supply, demand and prices of major agricultural commodities in NAM Countries.

IV. PROJECT MANAGEMENT

05. This project has been executed by the Ministry of Agriculture (MOA) of the Republic of Indonesia. The Project Management comprised of the following personnels :

Project Coordinator	:	**Mr. Suharyo Husen** Director, Bureau for International Cooperation of MOA
Project Manager	:	**Mrs. Subiyanti Sa'ud, M.Agr.St.** Head of Bilateral Division, Bureau for International Cooperation of MOA
Project Secretariat	:	**Mr. Nyoman G. Widhi Adnyana** Head of Africa and Middle East Sub-division, Bureau for International Cooperation of MOA
Treasurer	:	**Dewi Pudjiastuti** Staff, Bureau for International Cooperation of MOA
Liaison between PGTF and Project Management	:	**Mr. R. Muhamad Benyamin Carnadi** Staff, Directorate for Economic Relations Among of Developing Countries, Ministry of Foreign Affairs.

06. The Project Management was responsible for the following tasks :

a. Project coordination among participant countries
b. Control and disbursement of PGTF Funds
c. Overseeing the project implementation and
d. Evaluation and reporting the progress of the project.

07. Technical inputs to the project were provided by a project team consisting of :

a. Project manager
b. National consultants

The National Consultants consisted of the following personnels :

a.	Food Security Analyst Specialist	:	**Dr. Tjuk Eko Hari Basuki**
b.	Training Specialist	:	**Mrs. Budiarti R., M.Sc.**

08. The National Consultants were responsible for the following activities:

a. Food Security Analyst Specialist

(1). To coordinate and supervise the project's team members in the collection of data for constructing computer simulation model for food security analysis

(2). To analyze data for construction of computer simulation models for food security analysis

(3). To construct a computer simulation model as follow:

a. Modeling of food supply, demand and prices :

(I) structure model
(ii) supply model
(iii) demand model
(iv) prices model
(v) stock model

b. Regression analysis

(I) equations model

c. Regression analysis using Time Series Package (TSP) software

(I) data generate
(ii) graphs
(iii) regression analysis

d. Changing the model

(I) re-estimation of parameters
(ii) determining policy parameters

e. Computer Simulation Model of Food Security

(I) data input
(ii) specification
(iii) parameter changes
(iv) simulation and forecast in Lotus 123

(4). To train food security analysis capable of using the computer simulation model for food security analysis in developing countries of NAM

(5). To evaluate the training

(6). To prepare final report on the activities carried and during the subscriber assignment.

b. Training Specialist

(1). To prepare training manuals and training kit including training models for participants in close coordination with the food security analyst specialist.

(2). To coordinate and supervise the preparation of training schedules for the project capable of using the computer simulation model for food security analysis in developing countries of NAM.

(3). To train food security analysis capable of using the computer simulation model for food security analysis in developing countries of NAM.

(4). To evaluate the training.

(5). To prepare final report on the activities carried out during the subscriber assignment.

V. IMPLEMENTATION OF THE PROJECT

09. The complete list of activities appears in Table 1

Table 1. : Schedule Activities of the Project from March 1995 to April 1996.

	Activities	Proposed Date of Completion	State of Progress
1.	Project Administration	March 1995	Completed
2.	Appointment of Consultants	March 1995	Completed
3.	Notification to Asia & Africa Countries	March 1995 - June 1995	Completed
4.	Data Collection	March 1995	Completed
5.	Construction of Simulation Model	April 1995 - July 1995	Completed
6.	Procurement of Hardware - Two Wearners 486/ DX 2-8 Mb RAM 210 Mb HDD. 2 HD. FDD. SVGA Monitor - Two Note Book USA-COM 486 SLC 2-50 Colour - Printer HP Desk Jet 600 C - Epson LQ-1070 + - Two UPS - ICA 10213	July 1995	Completed
7.	Asia and Africa Training for Trainers	1-12 August 1995	Completed
8.	Preliminary Progress Report	December 1995	Completed
9.	Post Evaluation	March 1996	Completed
10.	Final Report	April 1996	Completed

THE TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF NAM

10. The Training on the Use of a Computer Simulation Model for Food Security Analysis was conducted in the Agricultural In-Service Training Center (BLPP) Ciawi-Bogor, Indonesia from 1 to 12 August 1995. The training was opened by H.E. Mrs. Saodah BA. Syahruddin, the Ambassador of the Republic of Indonesia to the United Nations. Because of its intensive and applied computer-based character, the Training had to be limited to 13 participants from 6 (six) invited countries (Bangladesh, India, Indonesia, Nigeria, Sudan and Senegal). Due to delay in transferring air ticket from appointed airlines to Nigerian's participant, one Participant was not able to participate the Training. The list of the participants is appended as **Annex 1.**

11. The objective of the Training was to improve the capability of participants in methods of analysis of the information of data on supply, demand and prices of major agricultural commodities, such as rice, corn, soybean, livestock products etc., to improve policy and strategy formulation in achieving sustainable food security. By the end of the Training Program, the Participants were expected to be able to understand and develop model for forecasting supply, demand and prices for major agricultural commodities for their respective countries.

12. The Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM was in general divided into three parts as follows:

Part I. Concepts of demand and supply accompanied with statistical tools for estimation parameters in demand and supply functions and the use of microcomputers for policy analysis.

Part II Topics on consumption, production and marketing with Indonesia as a special case.

Part III. An example of computer simulation model for food security policy with Indonesia as a special case.

The complete programs of the Training were as follows :

- Use of Personal Computer
- Spreadsheet program (LOTUS 123)
- Elasticities
- Demand Analysis
- Supply Analysis
- Regression Analysis
- Demand Projection
- Supply Projection
- Food Security Simulation

13. The Training started on Tuesday, 1 August 1995 and completed on Saturday, 12 August 1995. Daily training sessions were held from 8 a.m. to 5.30 p.m. with two short coffee breaks and lunch break. Details of the Training Program is appended as **Annex 2.**

14. The Training was commenced with an introduction by consultants on information in general of using a computer in particular for policy analysis. In advance, the participants were introduced by using LOTUS 123 spreadsheet software as one of a tool for computation.

15. The participants were invited to refresh the theories on demand, supply and prices as well as statistical analysis using regression basing on data availability.

16. The participants carried out exercises using personal computers to familiarize themselves with the annual model of supply, demand, and prices. They undertook regression analysis in an effort to further improve the estimated structural relationships for production, consumption and price, which could then incorporated in the model. In a discussion on these exercises, the participants made suggestions regarding the inclusion of exchange rates and social factors in smallholdings supply function.

17. Furthermore the participants were invited to project demand and supply on data availability of some main Indonesian agricultural commodities by using regression analysis which was followed by doing simulation on Food security with data on food consumption food production and food availability as well as considering agricultural marketing and food distribution.

18. In order to provide the participants as a trainer, the participant were also invited to discuss "Training for Trainer" session. In this session the participants discussed a plan for an effective training with preparing a task analysis, setting training objectives and formative evaluation procedures and building the training group.

19. The Training strongly felt after completion of the program, it would be beneficial for participants from the NAM member countries to inform each other on updating and other improvements that they had made, particularly as regards supply projections, and to coordinate further work on the simulation model.

20. At the end of the Training, an evaluation exercise was conducted to asses the usefulness of the Training. Details of results of the evaluation is appeared on **Annex 3.**

21. To evaluate the useful of training to their home countries, post evaluation is needed to be done after 6 month course. Therefore, an evaluation to India and Bangladesh was conducted on March 1996.

22. The complete Final Report of the "Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM" is submitted after Post Evaluation been done on March 1996.

POST EVALUATION OF THE TRAINING

23. The post evaluation was done in March 1996 by sending a form to each participants in order to evaluate the follow-up so far done by participants. Response from the participants will be usefull to evaluate target needs of the project.

VI. STATEMENT OF ACCOUNT

24. The following Table 2, shows the description and amount of expenses borne by the project during March 1995 through April 1996. Table 3 explains the notes as given in **Table 2.**

Table 2

STATEMENT OF ACCOUNT
Perez Guerrero Trust Fund
for the Training on the Use of a Computer Simulation Model
for Food Security Analysis in Developing Countries Non-Aligned Movement

No.	Description	Amount (US $)	Description	Amount (US $)
	Receipt		**Payment**	
1.	Data Collection	2,500.00	Team members for Data Collection (a)	2,500.00
2.	Construction of a Computer Simulation Model Implementation Local Consultants		Construction of a Computer Simulation Model Implementation Local Consultants 2 x 4 x US $ 750 (b)	6,000,00
3.	Asia & Africa Training for Trainers : * Airfare for Participants	15,750.00	Asia & Africa Training for Trainers Airfare for Participants from : (c)	11,160.00
			1 person from Bangladesh 1 x US $ 1,730	1,730.00
			1 person from India 1 x US $ 1,205	1,205.00
			1 person from Nigeria 1 x US $ 4,590	0.00
			1 person from Senegal 1 x US $ 4,475	4,475.00
			1 person from Sudan 1 x US $ 2,700	2,700.00
			7 persons from Indonesia 7 x US $ 150	1,050.00
	* Accommodation	14,400.00	Accommodation for 12 Participants 2 rooms for Instructors and OC (d)	14,400.00
	* Perdiem	7,200.00	Perdiem 11 x 12 x US $ 50 (e)	6,600.00
	* Local Travel	3,000.00	Transportation (f) - Rental Car/Bus during the Course - Immigration Administration - Others	3,000.00

No.	Description	Amount (US $)	Description	Amount (US $)
	Receipt		**Payment**	
	* Training Facilities	2,000.00	Training Facilities (g) - Executive Seminar Map - Block Note - Brousure (General Information) - Book Reference - Diskettes - Computer Paper - TSP - Computer Ribbon - Card Identity for Participants, Instructors and OC	2,000.00
	* Honorarium for Instructor	3,150.00	* Honorarium for Instructor (h) 63 hours x US $ 50	3,150.00
4.	Procurement	10,000.00	Procurement (i) - Two Wearnes 486/DX2-8Mb Ram, 210 Mb HDD, 2 HD FDD, SVGA Monitor - Printer HP Deskjet 600C - Printer Epson LQ-1700 - Two UPS-ICA 1021B - Two Note Book USA COM 486 SLC 2-50 Colour	14,690.00
5.	Secretariat	5,000.00	Secretariat (j) - Correspondence - Preparation Meetings - Stationary - Certificate - Documentation/Photograph - Honorarium for SC and OC - Others	5,000.00
6.	Dissemination of the Report	1,000.00	Progress and Final Report and Dissemination of the Report (k)	1,500.00
	GRAND TOTAL	**70,000.00**		**70,000.00**

Receipt, Payment and Balance in US$ at conversion rate **1 US $ = Rp. 2,200.-**

Subiyanti Sa'ud
PGTF Project Manager

Dewi Pudjiastuti
Treasurer

Mr. Subaryo Husen
PGTF Project Coordinator,
Director, International Cooperation Bureau
Ministry of Agriculture

NOTES OF ACCOUNT

Note (a)	:	Payment for Data Collection during 4 (four) months.
Note (b)	:	Payment for 2 (two) Consultants for construction of a Computer Simulation Model.
Note (c)	:	Payment of Airfare of the Participants.
Note (d)	:	Payment made for lodging and meals of participants, and other expenses related to the accommodation during the training.
Note (e)	:	Payment for perdiem of the Participants.
Note (f)	:	Payment for local transportation of the participants, instructors, Organizing Committee and other items related to the traveling expenses during the training.
Note (g)	:	Payment made for training facilities including materials related to the training, book reference, meeting preparation and others.
Note (h)	:	Payment for the honorarium of instructors during the training.
Note (i)	:	Payment for procurement of 2 (two) set Computers and 2 (two) Note-Book USA-COM Colour. The difference between the amount appropriated by the Agreement and the actual expenses was covered for the balance of Participants Airfare (Note c) and Perdiem of Participants (Note e).
Note (j)	:	Payment for expenses related to the Secretariat activities such as. Correspondence, preparation, inspection at the training location.
Note (k)	:	Payment for the Progress and Final Report and dissemination of the reports. The difference between the amount appropriated of the Agreement and the actual expanses was covered for the balance of Participants Airfare (Note i).

ANNEX 1
LIST OF PARTICIPANTS

Training on
the Use of a Computer Simulation Model
for Food Security Analysis in Developing Countries
of Non-Aligned Movement
Ciawi-Bogor, Indonesia, 1-12 August 1995

LIST OF PARTICIPANTS

NO.	COUNTRY	NAME/OCCUPATION
1.	Bangladesh	Ms. Monwara Begum Assistant Chief Ministry of Agriculture
2.	India	Mr. Rajiv Kumar Bora, I.A.S. Deputy Secretary Ministry of Food Government of India
3.	Indonesia	Binari Sinurat, SE, MS Agency for Agribusiness Development Ministry of Agriculture
4.	Indonesia	Mr. Masdulhaq Yumm, MPA Center for Technology & Economic Research National Logistics Agency
5.	Indonesia	Mr. Dadang Kusnandi, MBA Head of Division Market and Prices Analysis, National Logistics Agency
6.	Indonesia	Ms. Anastasia Promosiana, MS Directorate General of Food Crops and Horticultura Ministry of Agriculture

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No. 3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609,2610 ; 7806174 Fax :(021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

Training on
the Use of a Computer Simulation Model
for Food Security Analysis in Developing Countries
of Non-Aligned Movement
Ciawi-Bogor, Indonesia, 1-12 August 1995

7.	Indonesia	Mr. Iskandar Panjaitan Bureau for International Cooperation, Ministry of Agriculture
8.	Indonesia	Mr. Hasudungan Batubara Bureau for International Cooperation, Ministry of Agriculture
9.	Indonesia	Ms. Roch Widaningsih Center for Agricultural Data, Ministry of Agriculture
10.	Indonesia	Ms. Dyah Riniarsi Triyanti Center for Agricultural Data, Ministry of Agriculture
11.	Nigeria	Mr. Abugu John Ohgebudri Ministry of Agriculture
12.	Senegal	Mr. Moussa Cisse Chief Cell of Studies and Information, in Charge of Market Information System Food Security Office, General Secretary of the Government Prime Ministry
13.	Sudan	Mr. Salih Hussein Mohamed Head of Computer Center, Dept. of Agric. Economics & Statistics Ministry of Agriculture

list – p/dewi

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No. 3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609,2610 ; 7806174 Fax :(021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

ANNEX 2
DETAILS OF DAILY TRAINING PROGRAMME

Training on
the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of Non-Aligned Movement

Ciawi-Bogor, Indonesia, 1-12 August 1995

Date	Topics	Instructur/Speaker	Assistant
Tuesday, 1 August 1995			
09.00 – 10.00	Openning Address		
10.00 – 10.30	Coffee break		
10.30 – 12.00			
12.00 – 13.00	Lunch Break		
13.00 – 15.00	Introduction to Computer	Ir. Susana, MSc	Ir. Bayu Mulyana./Foa H
15.00 – 15.30	Coffee Break		
15.30 – 17.00	Discussion	Ir. Susana, MSc	Ir. Bayu Mulyana./Foa H
Wednesday, 2 August 1995			
08.30 – 10.00	Computer applications	Ir. Susana, MSc	Ir. Bayu Mulyana./Foa H
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Ir. Susana, MSc	Ir. Bayu Mulyana./Foa H
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Elasticities	Ir. Susana, MSc	Ir. Bayu Mulyana./Foa H
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Continued	Ir. Susana, MSc	Ir. Bayu Mulyana./Foa H
Thursday, 3 August 1995			
08.30 – 10.00	Demand Analysis	Dr. Togar A. Napitupulu	Ir. Bayu Mulyana./Foa H
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Dr. Togar A. Napitupulu	Ir. Bayu Mulyana./Foa H
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Elasticities	Dr. Togar A. Napitupulu	Ir. Bayu Mulyana./Foa H
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Continued	Dr. Togar A. Napitupulu	Ir. Bayu Mulyana./Foa H
Friday, 4 August 1995			
08.30 – 10.00	Supply Analysis	Dr. Togar A. Napitupulu	Ir. Bambang Agus/Slamet
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Dr. Togar A. Napitupulu	Ir. Bambang Agus/Slamet
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Applications	Dr. Togar A. Napitupulu	Ir. Bambang Agus/Slamet
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Continued	Dr. Togar A. Napitupulu	Ir. Bambang Agus/Slamet

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No. 3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609,2610 ; 7806174 Fax :(021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

Training on

the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of Non-Aligned Movement

Ciawi-Bogor, Indonesia, 1-12 August 1995

Saturday, 5 August 1995			
08.30 – 10.00	Regression Analysis	Dr. Tjuk Eko Hari Basuki	Ir. Bambang Agus/Slamet
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bambang Agus/Slamet
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bambang Agus/Slamet
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bambang Agus/Slamet
Monday, 7 August 1995			
08.30 – 10.00	Demand Projection	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Supply Projection	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
Tuesday, 8 August 1995			
08.30 – 10.00	Food Security Simulation	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Continued	Dr. Tjuk Eko Hari Basuki	Ir. Bayu Mulyana./Foa H
Thursday, 10 August 1995			
08.30 – 10.00	Discussion and Exercise	Ir. Mochtar	Ir. Bambang Agus/Firna Farina
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Ir. Mochtar	Ir. Bambang Agus/Firna Farina
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Continued	Ir. Mochtar	Ir. Bambang Agus/Firna Farina
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Continued	Ir. Mochtar	Ir. Bambang Agus/Firna Farina
Friday, 11 August 1995			
08.30 – 10.00	Training for Trainer	Ir. Mariam, MSc	Ir. Bambang Agus/Firna Farina
10.00 – 10.15	Coffee Break		
10.15 – 12.15	Continued	Ir. Mariam, MSc	Ir. Bambang Agus/Firna Farina
12.15 – 13.15	Lunch Break		
13.15 – 15.15	Continued	Ir. Mariam, MSc	Ir. Bambang Agus/Firna Farina
15.15 – 15.30	Coffee Break		
15.30 – 17.30	Food Policy Modelling	Dr. Ato Suparpto	Ir. Bambang Agus/Firna Farina

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No. 3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609,2610 ; 7806174 Fax :(021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

ANNEX 3
EVALUATION OF TRAINING

EVALUATION OF THE TRAINING

Evaluation of the training could be divided into two types namely time allocated for each training components and general evaluation.

A. Training Component

1. Most of the participants responded that the time allocated for each components of the training was sufficient, 81 % percent.

2. The response of participants for Food Security Simulation and Practicing the Working of the Model Components, 20.00 % and 16.7 %, respectively, indicated that time allocated for those components should be extended.

B. General Evaluation

1. Using general evaluation sheet enclosed, the ex-participants were asked for writing their response on narration. Furthermore, this response was concluded into general opinion of the participants.

2. Generally, the participants responded that the training was useful to enhance their knowledge and skill to analyze food security using computer.

3. Some participants concluded that the theory of one component namely Regression Analysis should be shortened and the practice of it should be lengthened.

4. Most of the participants had the objective that after participating this training they would follow up and apply the result of the training in their own institutions.

RESPONSES PARTICIPANTS TO THE TOPICS OF TRAINING IN % (Percentage)

NO.	COMPONENT OF THE TRAINING	TOO LONG (%)	OK (%)	TO BRIEF (%)	REMARKS (%)
1.	Introduction to Computer	12.5	87.5	0.0	100.0
2.	Computer Application	0.0	87.5	12.5	100.0
3.	Demand Analysis	33.3	55.6	11.1	100.0
4.	Supply Analysis	11.1	77.8	11.1	100.0
5.	Regression Analysis	0.0	90.0	10.0	100.0
6.	Demand Projection	0.0	90.9	9.1	100.0
7.	Supply Projection	0.0	90.9	9.1	100.0
8.	Food Security Simulation	0.0	80.0	20.0	100.0
9.	Practicing the Working of the Model	0.0	83.3	16.7	100.0
10.	Length of the Training	0.0	66.7	33.3	100.0
	AVERAGE	**5,7**	**81.0**	**13.3**	**100.0**

Training on
the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of Non-Aligned Movement
Ciawi-Bogor, Indonesia, 1-12 August 1995

Jakarta, March 11, 1996
Ref.G77A/B.8.3/III/1996

.....

The Ex-Participant,
Training on the Use of a Computer
Simulation Model for Food Security
Analysis in Developing Countries of NAM

Re. ***Request for information of the follow- up of the training***

Dear Sir/ Madam,
I am pleased to congratulate you for completing the training participated at Agriculture In-Service Center (AITC) in Ciawi, Indonesia in August 1995. I hope also you had a pleasant journey home and arrived safely.

Due to the program scheduled, we intend to review and evaluate the result and the follow-up of the training done in your institution after 6 months passed. This information become important because of two reasons. Firstly, it becomes a way to keep a communication between the committee and the ex-participants. Secondly, it becomes an input for committee to evaluate the benefit of this training furthermore it could be useful for the next consideration.

According to the above mentioned reasons, I would like to request your written comment about two following matters, firstly, the benefit the participant gained after participating this course particularly after 6 months passed, secondly, the follow-up the participant done.

I am pleased to get those information shortly and briefly by sending them through the address below:

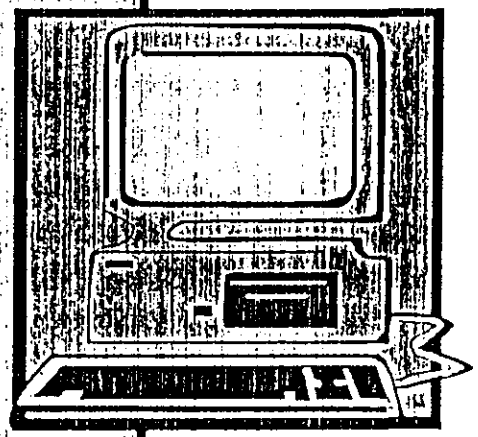
Bureau for International Cooperation (Biro KLN)
Ministry of Agriculture
Jl. Harsono RM No. 3 Pasar Minggu
Jakarta-Indonesia
Fax. no. : 62 21 7804176

Thank you very much for your continued cooperation.

Yours Sincerely,

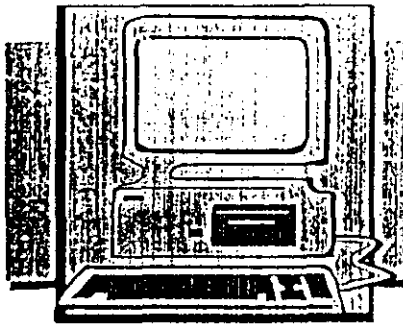
Subiyanti Sa'ud
Project Manager
pgf/pgf

ANNEX 4
INTRODUCTION TO COMPUTER



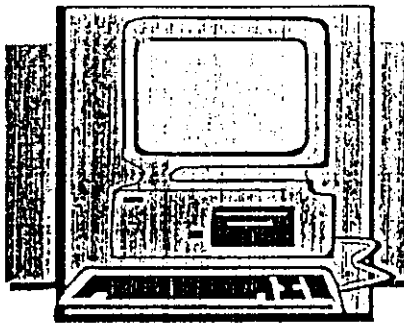
Introduction to Computer

Center for Agricultural Data - Ministry of Agriculture



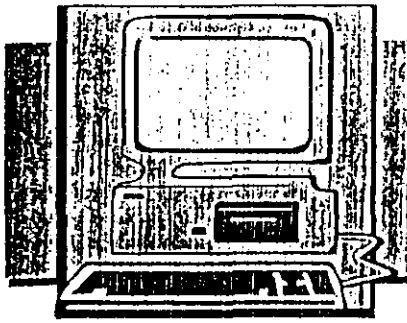
Computer can

- Calculate
- Store and Retrieve Data
- Communicate



Evolution of Computer System

- 1st generation
  - 1946-1959, vacuum tubes
  - ENIAC, UNIVAC, IBM 701, IBM 650
- 2nd generation
  - 1960-1964, transistors
  - IBM 7000, IBM 4000
- 3rd generation
  - 1964-1970, integrated circuits
  - IBM S/360, IBM S/370
- 4th generation
  - 1970-now, LSI, VLSI
  - IBM, DEC, Honeywell, NCR
- Development of minicomputer
  - 1970s, less power, less expensive
  - DEC, DG, HP
- Development of microcomputer
  - 1980s, microprocessor
  - Apple, IBM, IBM clones



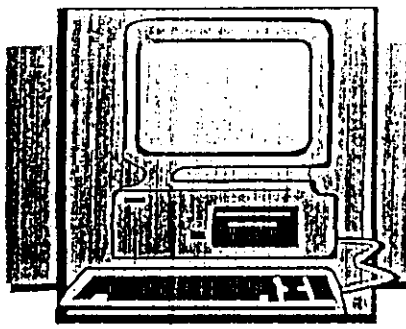
Types of Computer Systems

CATEGORY :

- Super Computers
- Mainframes
- Mini Computers
- Micro Computers (PC)
- Hand-held Computers

APPLICATION:

- Sciencetific & Engineering Computing
- Organizational
- Workgroup, Small Org'l
- Personal Computing
- Field Computing



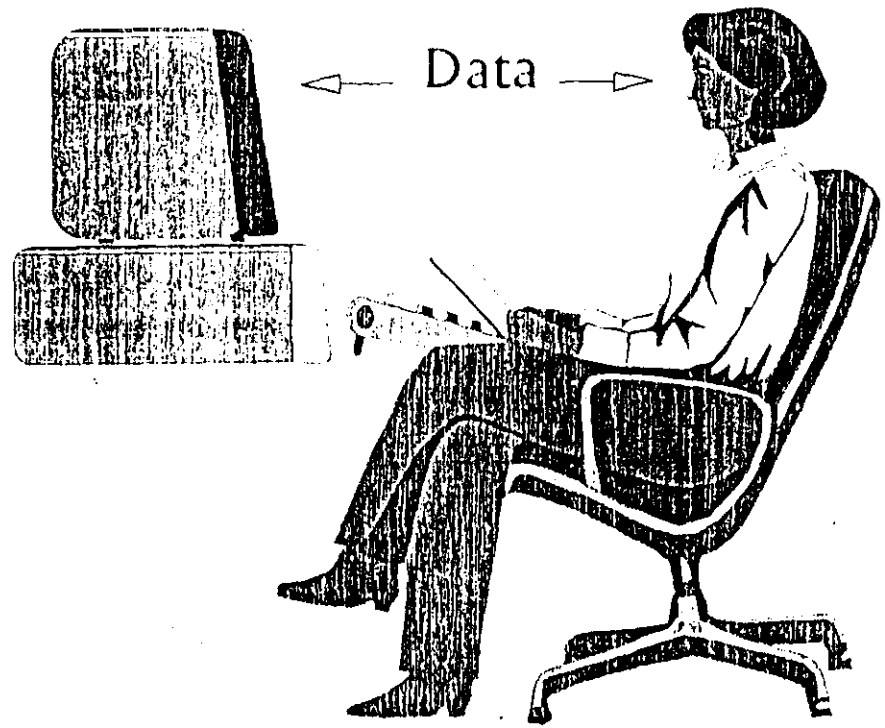
Contents

- Hardware/Computer
- Software/Program
- Brainware/People
- Data
- Procedure
- Networking & Data Communication

Hardware

follows instructions in

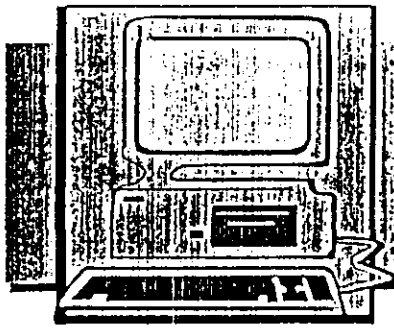
Software



People

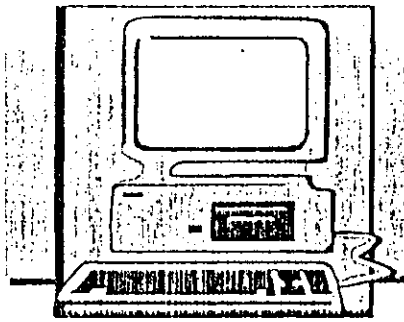
follows instructions in

Procedures

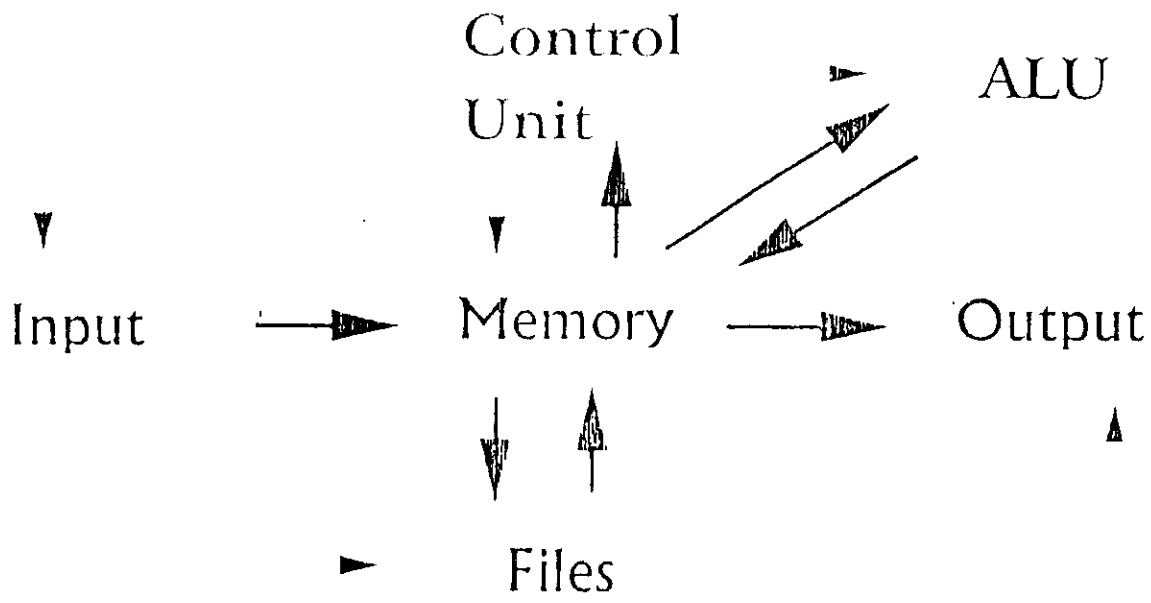


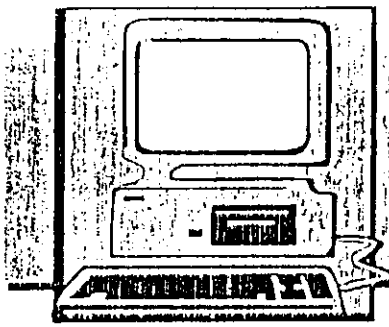
HARDWARE - *the physical pieces of a computer system that can be touched*

- Central Processing Units (CPU)
- Main/Primary Memory
- Input Devices
- Output Devices
- Storage/File Devices or Secondary Memory



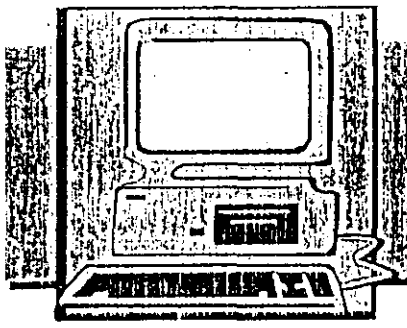
Basic Structure of Computer System





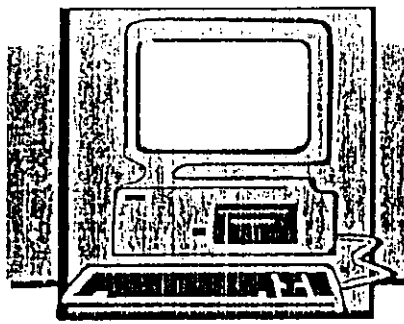
Input Devices - *translate data from people-understandable into computer-understandable form*

- *Keyboard*
  - ✓ Computer keyboard
  - ✓ Special-purpose keyboard
- *Scanner*
  - ✓ Optical Character Reader
  - ✓ Bar-code Reader
  - ✓ Mark-sense Reader
- *Touch-tone*
- *Voice Recognition*
- *Mouse / Track Ball*



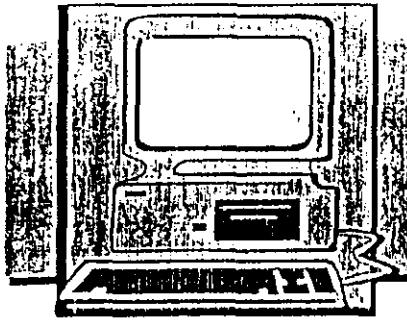
Output Devices - *translate data from computer-understandable into human-understandable form*

- *Soft Copy (display unit)*
  - ✓ Color
  - ✓ Monochrome
- *Hard Copy (paper)*
  - ✓ Printer
    - ★ Dot matrix, Laser, Ink-jet
  - ✓ Plotter
- *Computer Output Microfilm (COM)*
- *Multimedia*



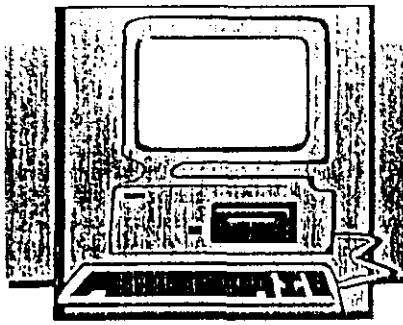
Memory

- Analog to the post office boxes
- Has cells and address for each cell
- Holds data in each cell until it is changed
- Each cell consists of a set of circuits
- Each circuits has two states: on and off (bit)
- 8 bits represent a single character (byte)
- Each cell has capacity:
  - one character of data (byte)
  - two or more character of data (word)
- Coding scheme represents data in memory
  - EBCDIC, ASCII



Storage Devices

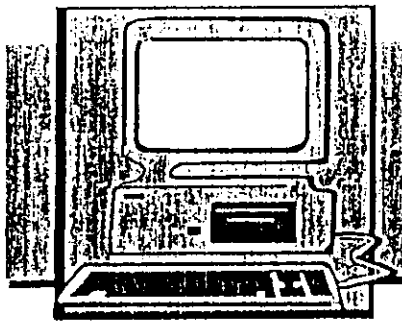
- *Magnetic Disk*
  - ✓ Harddisk
  - ✓ Floppy disk/diskette
- *Magnetic Tape*
- *Optical Disk*
  - ✓ CD-ROM
  - ✓ WORM
  - ✓ Rewritable



SOFTWARE - *a set of instructions that control the operation of the computer system*

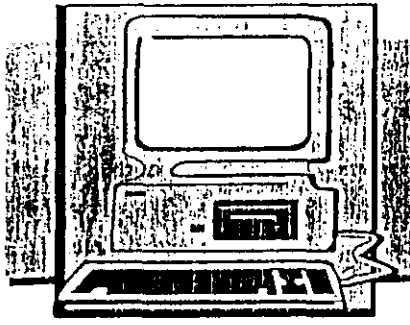
- *Support/System Programs*
  - Operating System
  - Utilities
  - Language Translators
  - Data Base Management Systems
  - Communications Interface Programs

- *Application Programs*
  - Ready-made/Packaged Programs
  - Custom Developed



System Programs

- Operating System - *a program that coordinates the execution of all other programs*
  - ✓ IBM: MVS, VM, OS/400, AIX, PC-DOS, OS/2
  - ✓ DEC: VMS, ULTRIX
- Utilities: sort, merge, link, copy, load/unload
- Language Translator - *a program that translates program into machine language*
  - ✓ Compiler - translate the entire program before it is executed: COBOL, FORTRAN, PASCAL, PL/1, FOCUS, PowerHouse
  - ✓ Interpreter - translate single statement and execute it: BASIC
- DBMS - a program used to create, manage and protect organizational data
  - – Type: hierarchical (IMS), network(IDMS), relational (DB2, INGRES, dBASE IV, Paradox)
- Communication Programs - let computers talk to one another



BRAINWARE – *possess key skills and trained*

- *User*
- *Operator*
- *Analyst*
- *Programmer*
- *Technician*

Garbage In

DATA

★ Complete & Correct

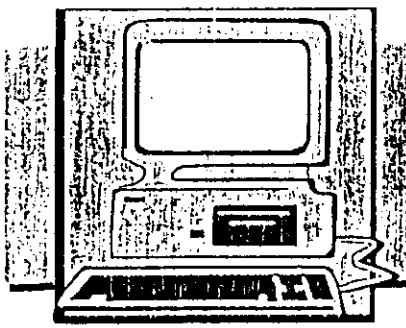
PROCESS

- *HARDWARE*
- *PROGRAMS*

Garbage Out

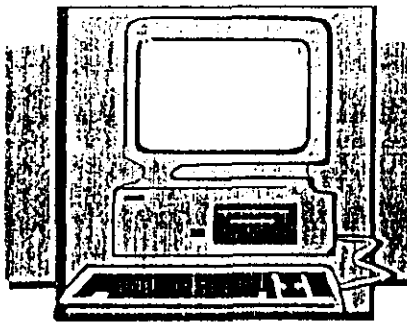
INFORMATION

★ Pertinent
★ Timely
★ Accurate
★ Able to reduce uncertainty



Computer Data

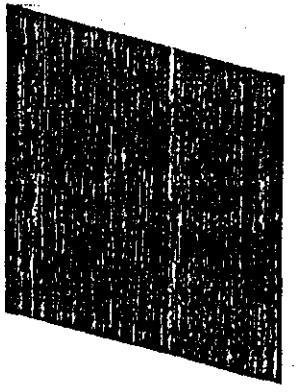
- Format: binary digit - bit [1 and 0 or On and Off]
- Type: numeric, alphanumeric [ASCII, EBCDIC]
- Byte: a group of 8 bits, represents either one alphabetic or numeric data
- Field: a group of related characters/bytes
- Record: a collection of related fields
- File: a collection of related records
- Database: a collection of related files/tables

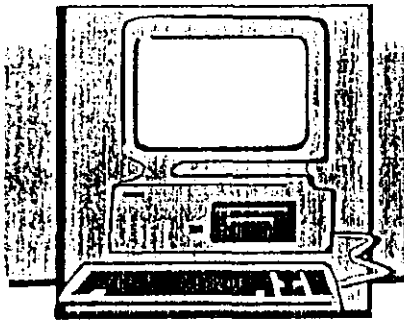


Procedure - instructions to people on how to use a computer system

- Normal Processing [user & operator]
- Failure Recovery [user & operator]
- Development [developer: analyst, programmer]

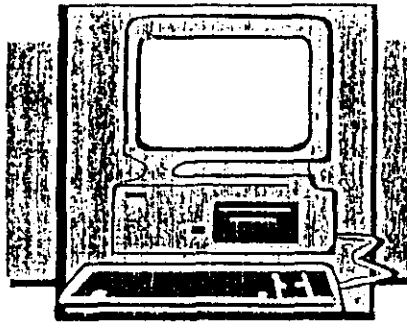
Documentation !!





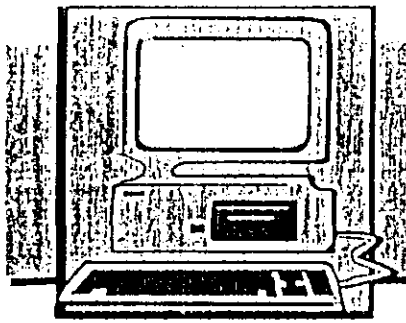
Microprocessor - *microcomputer's CPU*

- *Intel (IBM & IBM Compatible)*
  - ★ 8088 (PC-XT), 8 bits, 5 MHz
  - ★ 80286 (PC-AT), 16 bits, 8 - 16 MHz
  - ★ 80386 (386 PCs), 32 bits, 25 - 30 MHz
  - ★ 80486 (486 PCs), 32 bits, 33 - 66 MHz
  - ★ Pentium (Pentium PCs), 32 bits, 60 - 100 MHz
- *Motorola (Apple Macintosh)*
  - ★ 68000 (Mac Classic)
  - ★ 68020 (Mac LC)
  - ★ 68030 (Mac II)
  - ★ 68040 (Mac Quadra)
  - ★ 68050
- *IBM, Apple, Motorola*
  - ★ PowerPC 601 RISC, 64 bits, 60 - 80 MHz



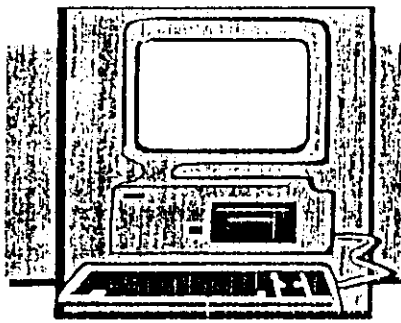
Microcomputer's Main Memory

- *RAM (Random Access Memory)*
  - ★ Volatile
  - ★ Base/Conventional, Extended
  - ★ Total Memory: 1 - 256 MB
- *ROM (Read Only Memory)*
  - ★ Nonvolatile
  - ★ start-up and some operating system routines



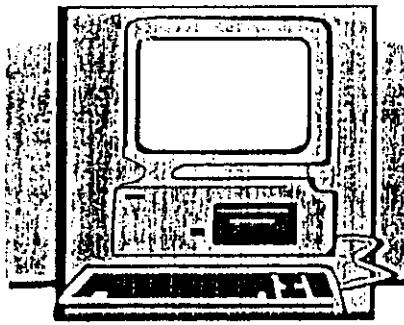
Microcomputer-Based Software

- *System Software*
  - ✓ OS: DOS, GUI, OS/2, System 7, UNIX, Netware
  - ✓ Utility: DOS, shareware, 3rd party vendors
- *Application Software*
  - ✓ DBMS: dBASE, FoxBase, Paradox, DataEase
  - ✓ WordProcessor: WS, WP, MS-Word, AmiPro
  - ✓ Spreadsheet: Lotus 123, MS-Excel, Quattro
  - ✓ Presentation Graphics: HG, Freelance, PowerPoint
  - ✓ DTP: PageMaker, Ventura, Publisher, FrameMaker



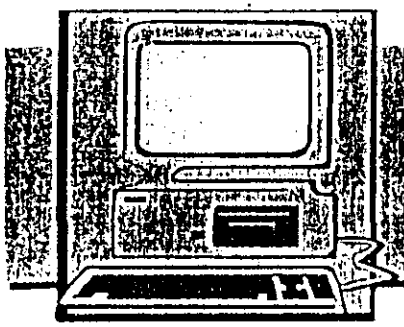
Selecting the PC

- Processor: *type, upgradable*
- Speed
- Standard/Max RAM
- Cache Memory
- Video: *resolution, VRAM, color, card*
- Expandability: *slots, drive bays, ports, drive interface /controller*
- Disk Drives: *capacity, size*
- Security Features
- Keyboard
- Mouse
- Casing
- Standard Software
- Warranty



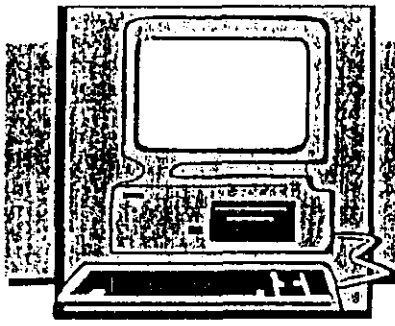
Shared Information Systems

- Sharing Hardware
- Sharing Software
- Sharing Data
- Reducing Costs
- Facilitate human communication: E-mail



Network - *collection of computers connected by communication lines*

- *Local Area Network* - a network within one building or small area
- *Metropolitan Area Network* - a network within one city or location
- *Wide Area Network* - a network connecting locations (geographically separated)

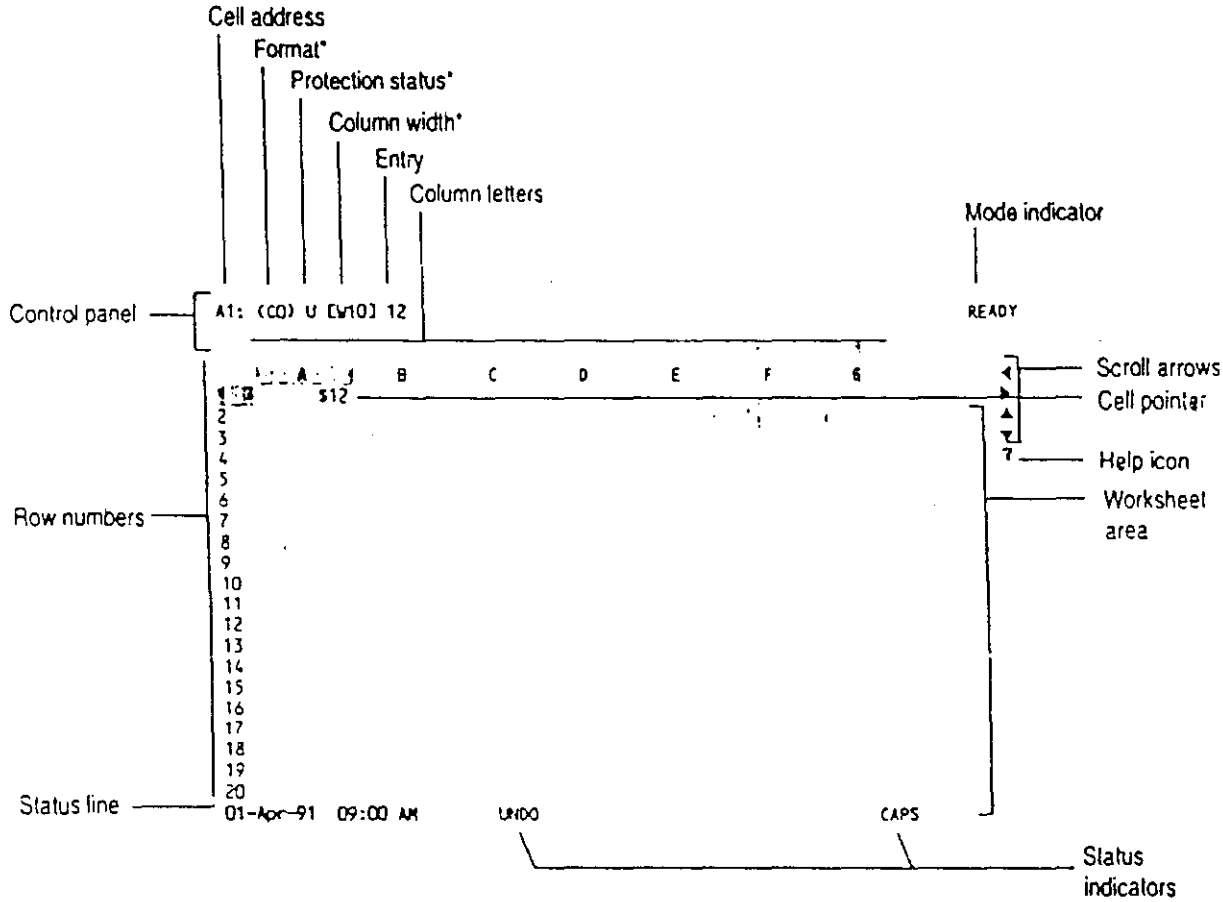


Data Communication –

transmission of data over communication lines

- Media
  - *High-speed:* coaxial cable, optical fibers, microwave, and satellite transmission
  - *Low-speed:* telephone line
- Int'l Data Comm
  - Media: telephone line, satellite
  - Network: Infonet, Internet

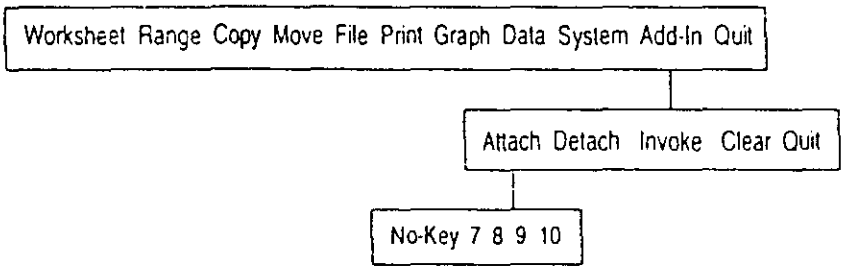
The 1-2-3 Screen



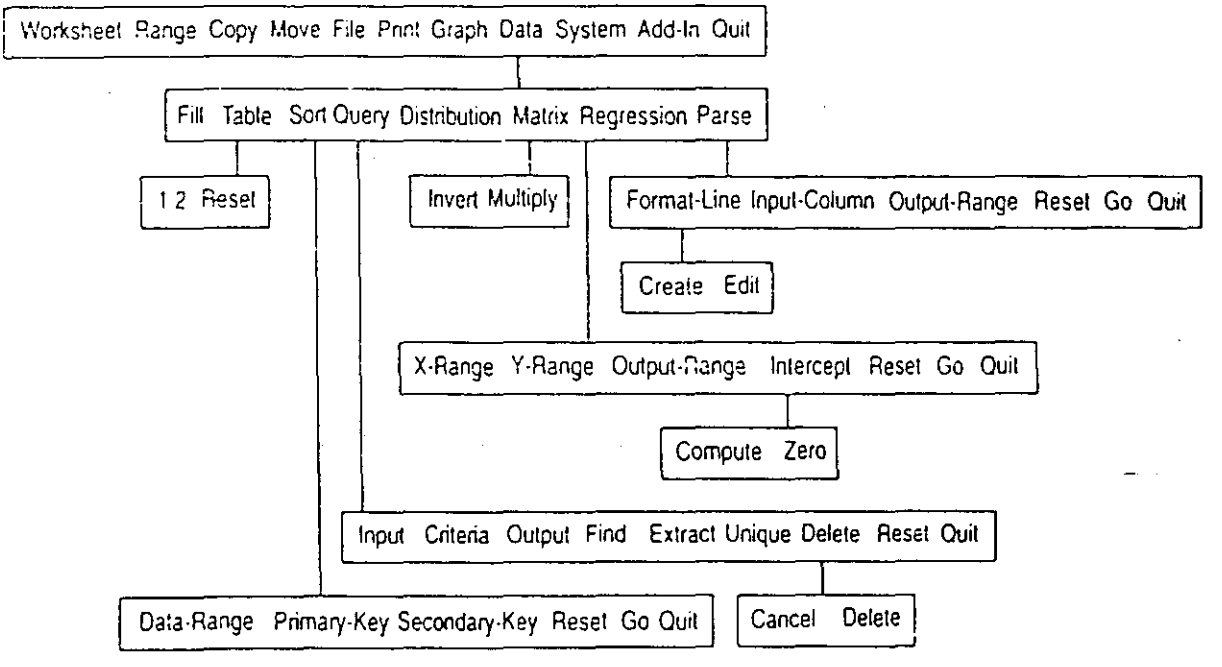
* Appears only if you have changed the default settings

1-2-3 Menu Trees

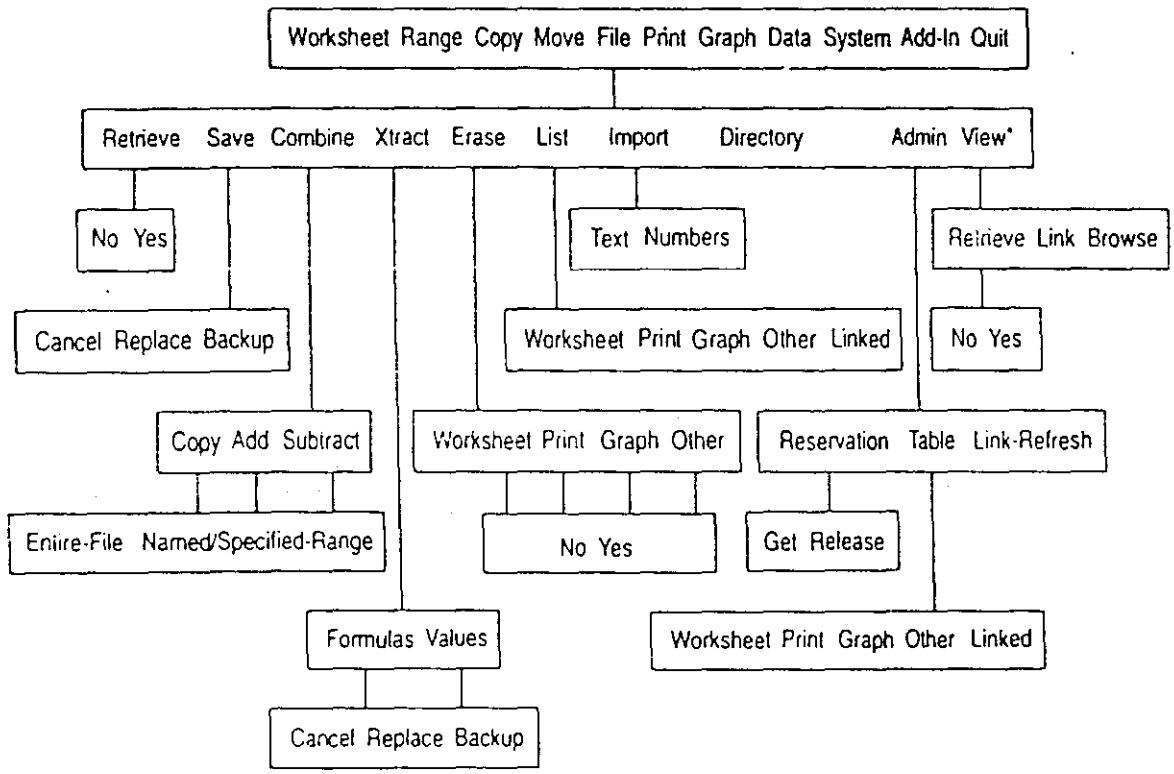
Add-In Commands



Data Commands

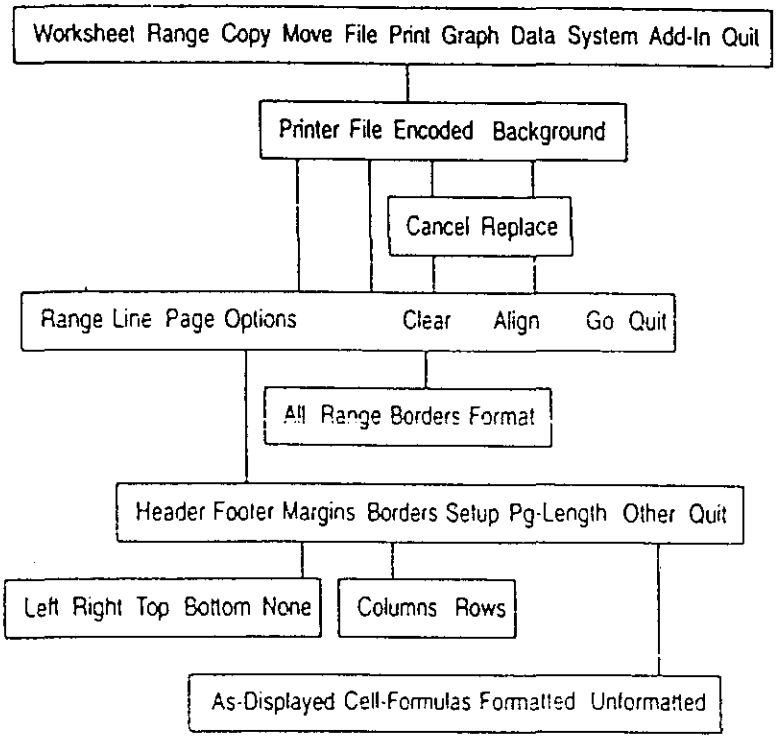


File Commands

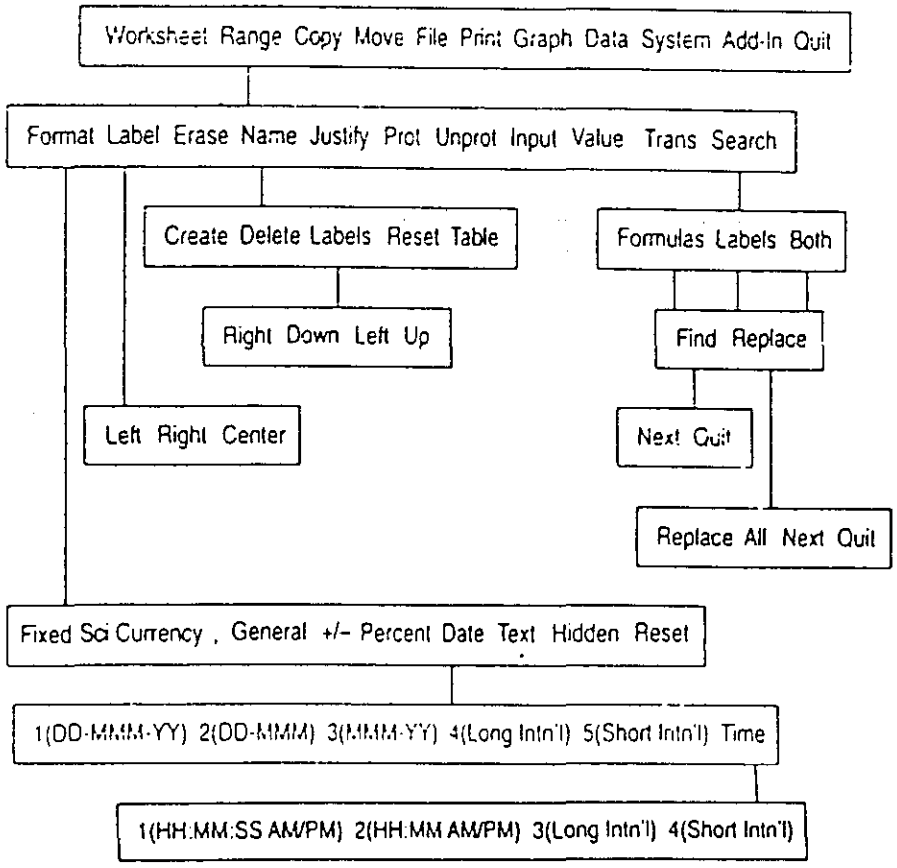


*When Viewer is attached, you can select the View command to activate the Viewer menu.

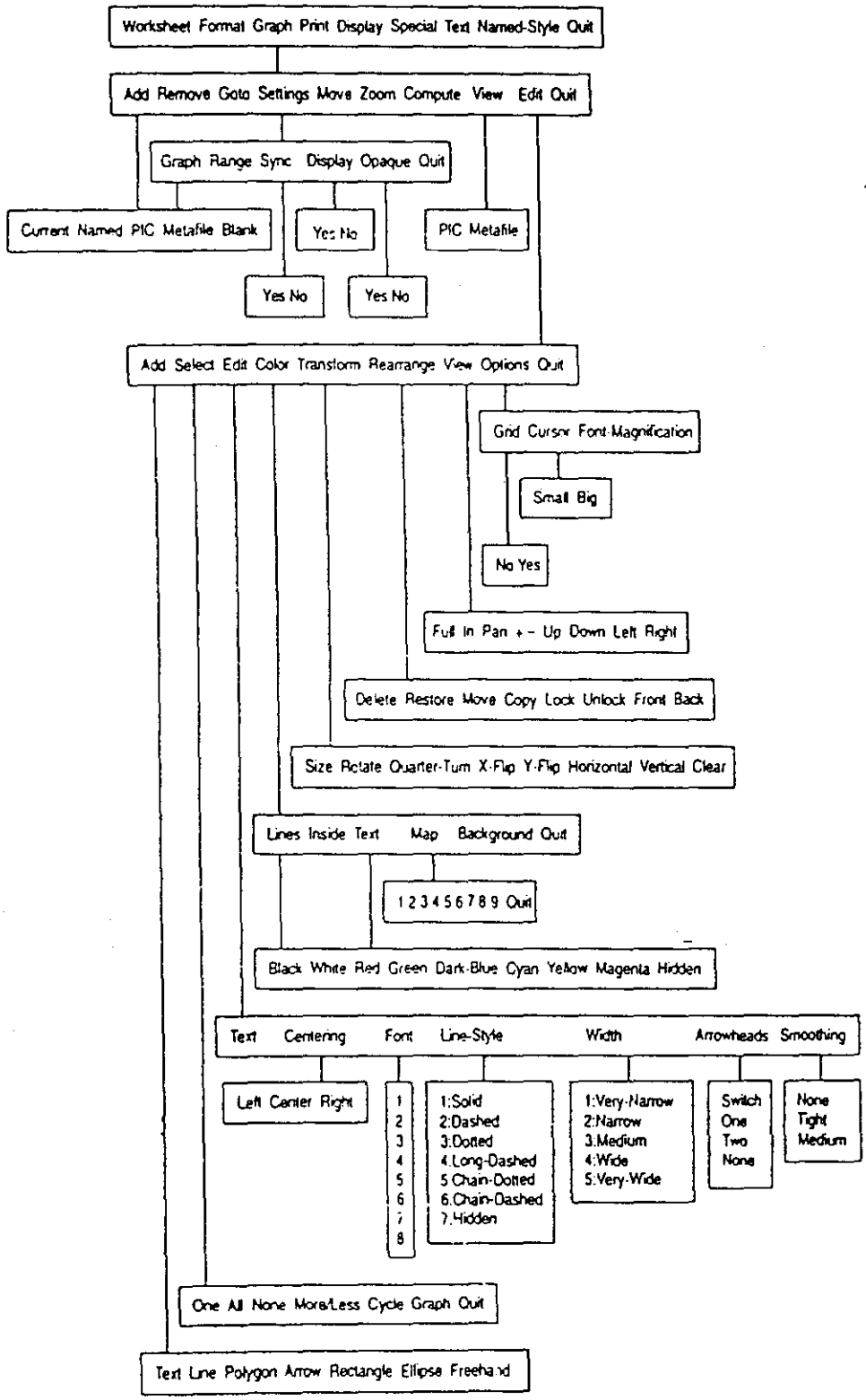
Print Commands



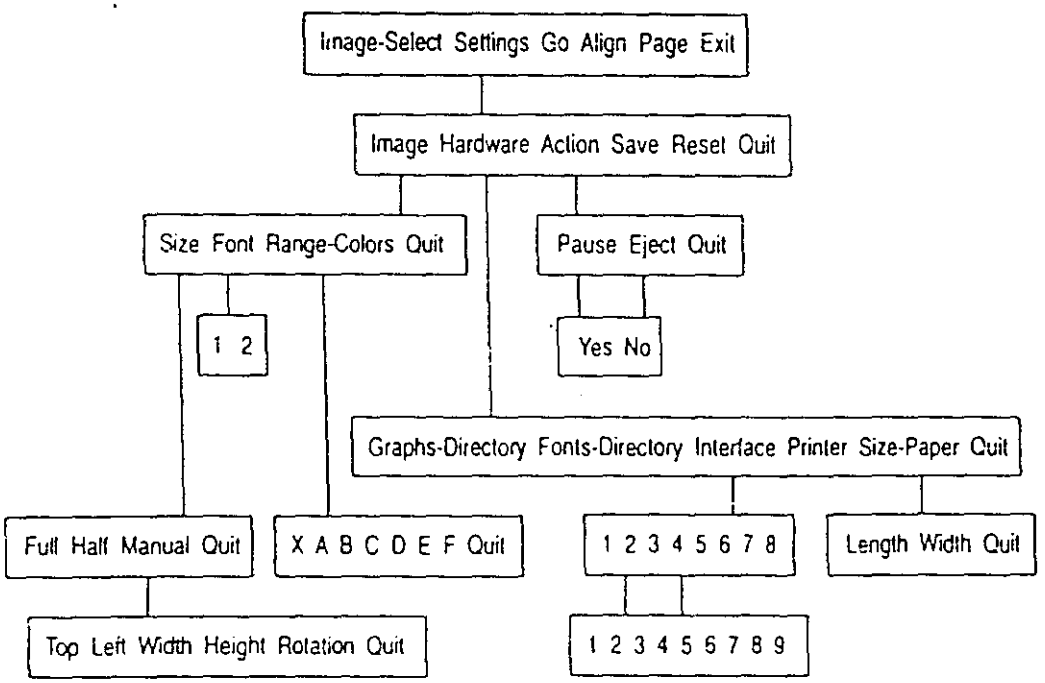
Range Commands



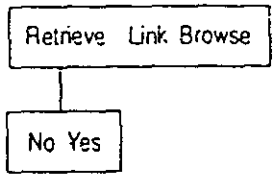
Graph Commands



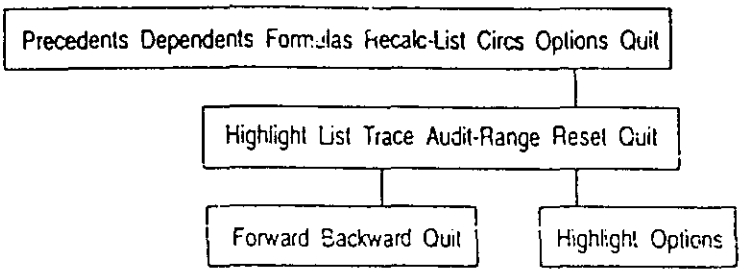
PrintGraph Menu Tree



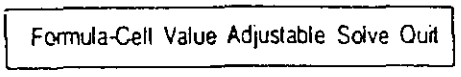
Viewer Menu Tree



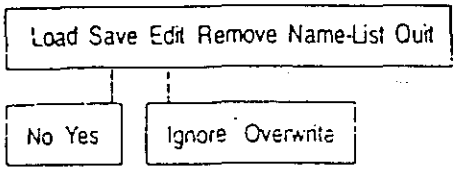
Auditor Menu Tree



Backsolver Menu Tree

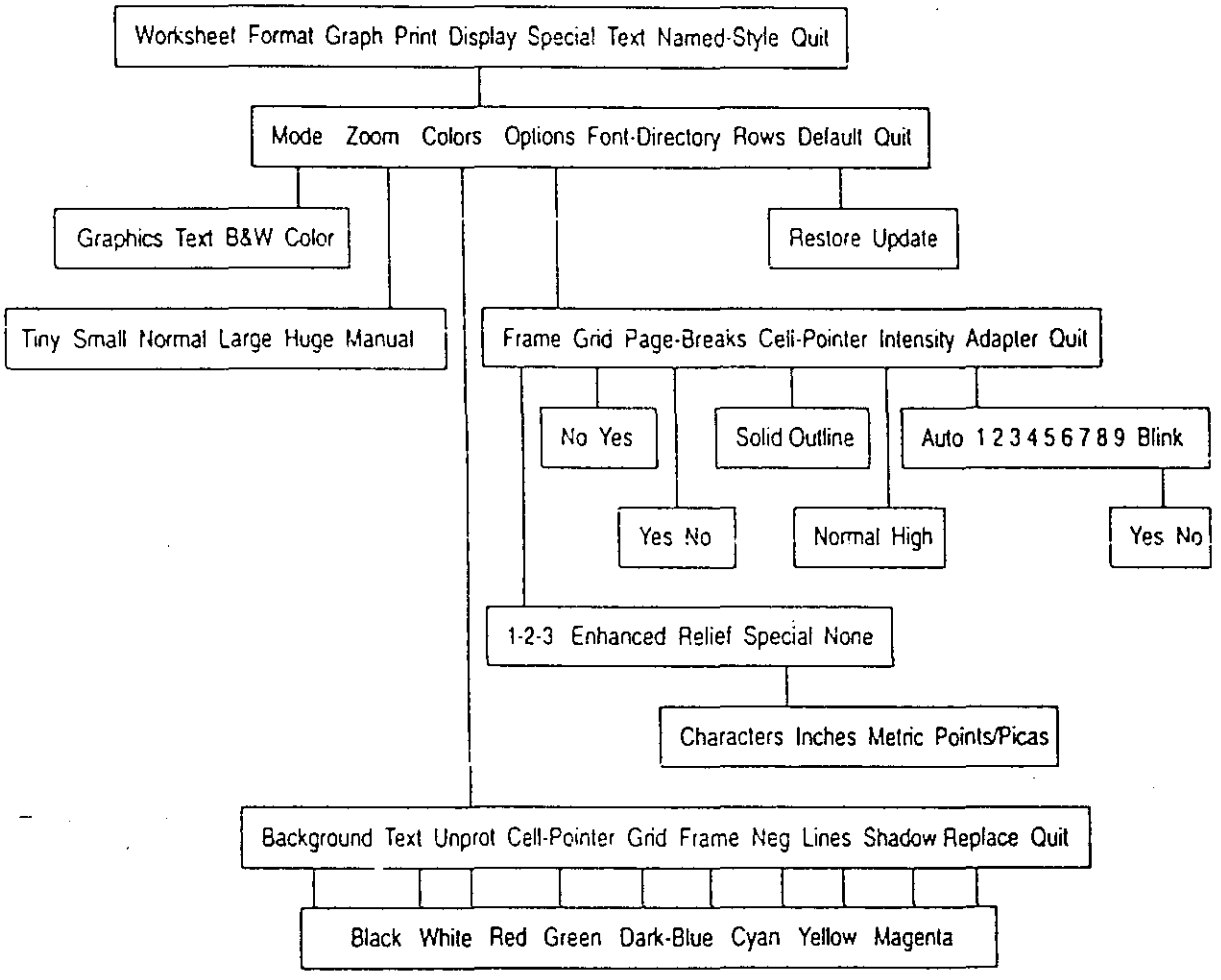


Macro Library Manager Tree

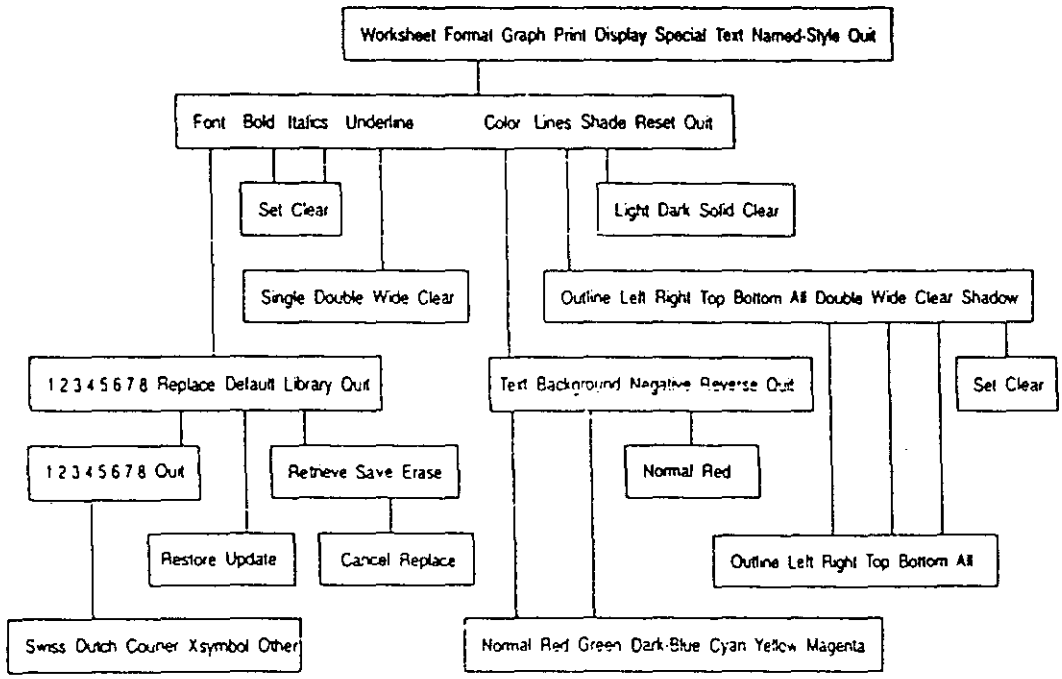


Wysiwyg Menu Trees

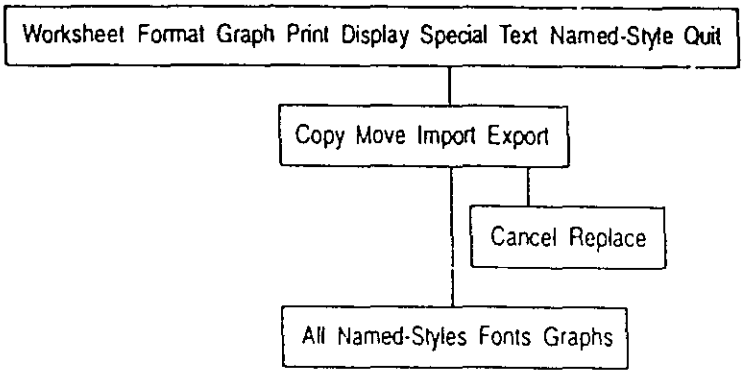
Display Commands



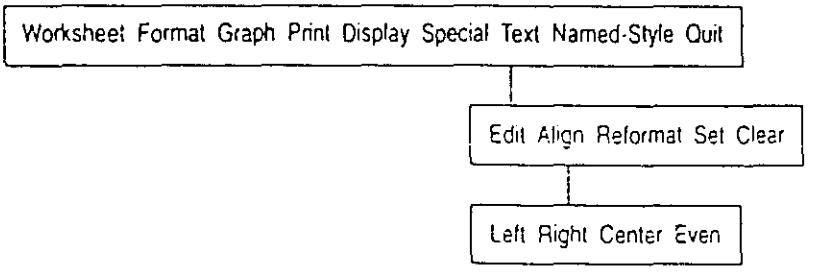
Format Commands



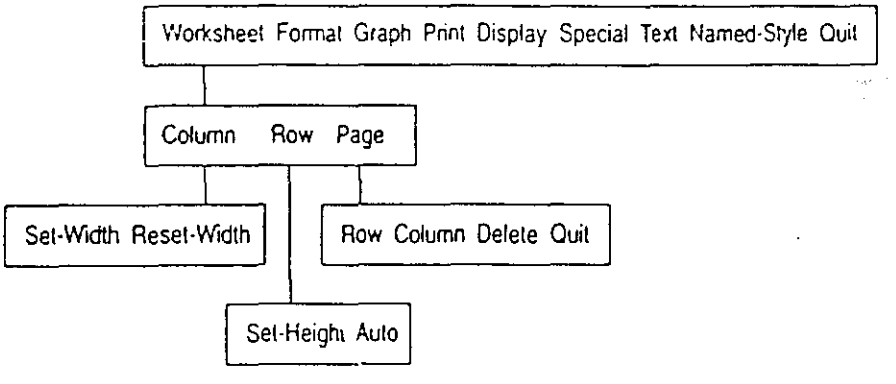
Special Commands



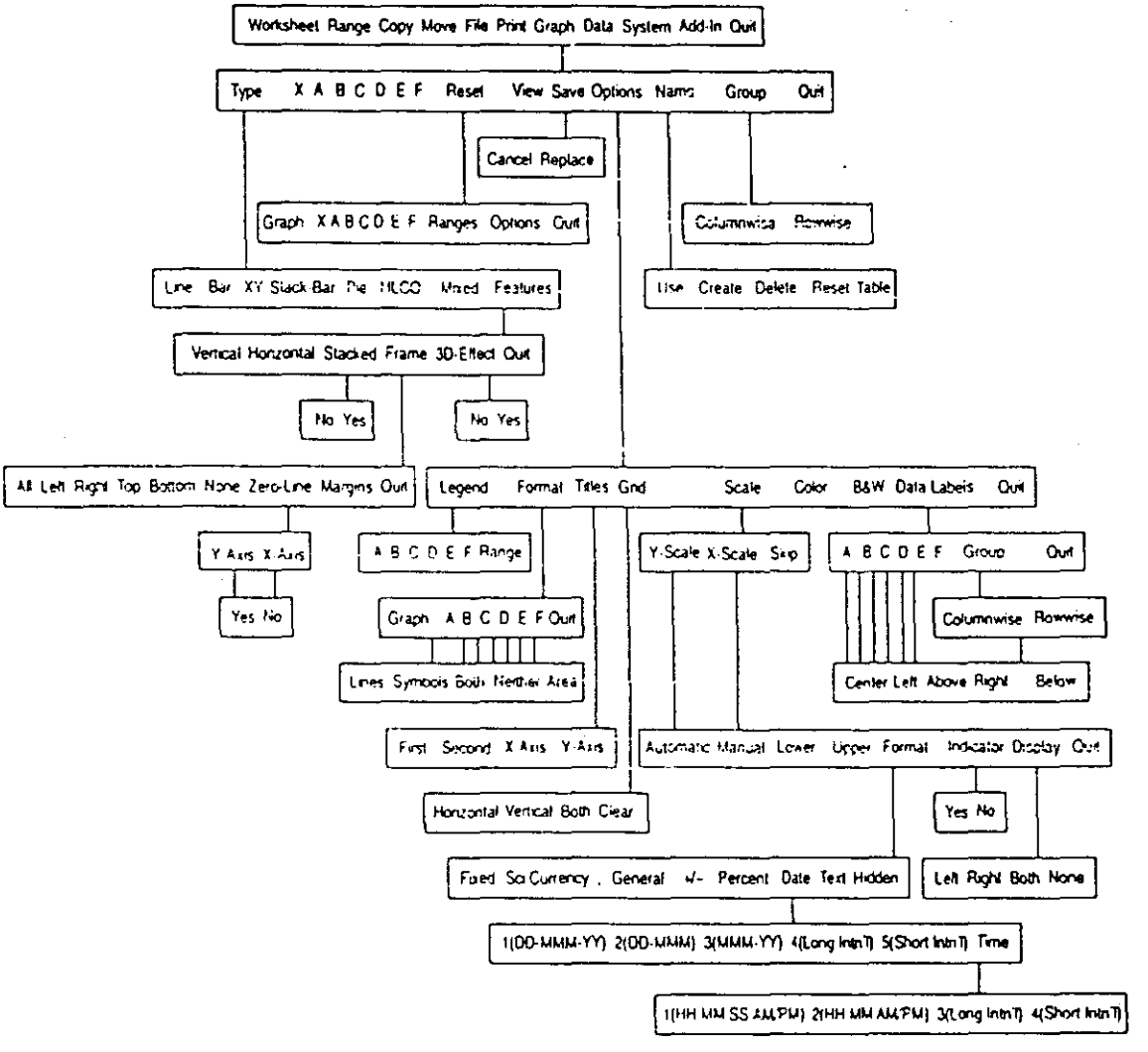
Text Commands



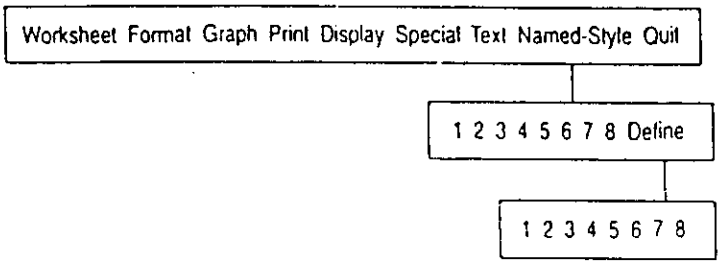
Worksheet Commands



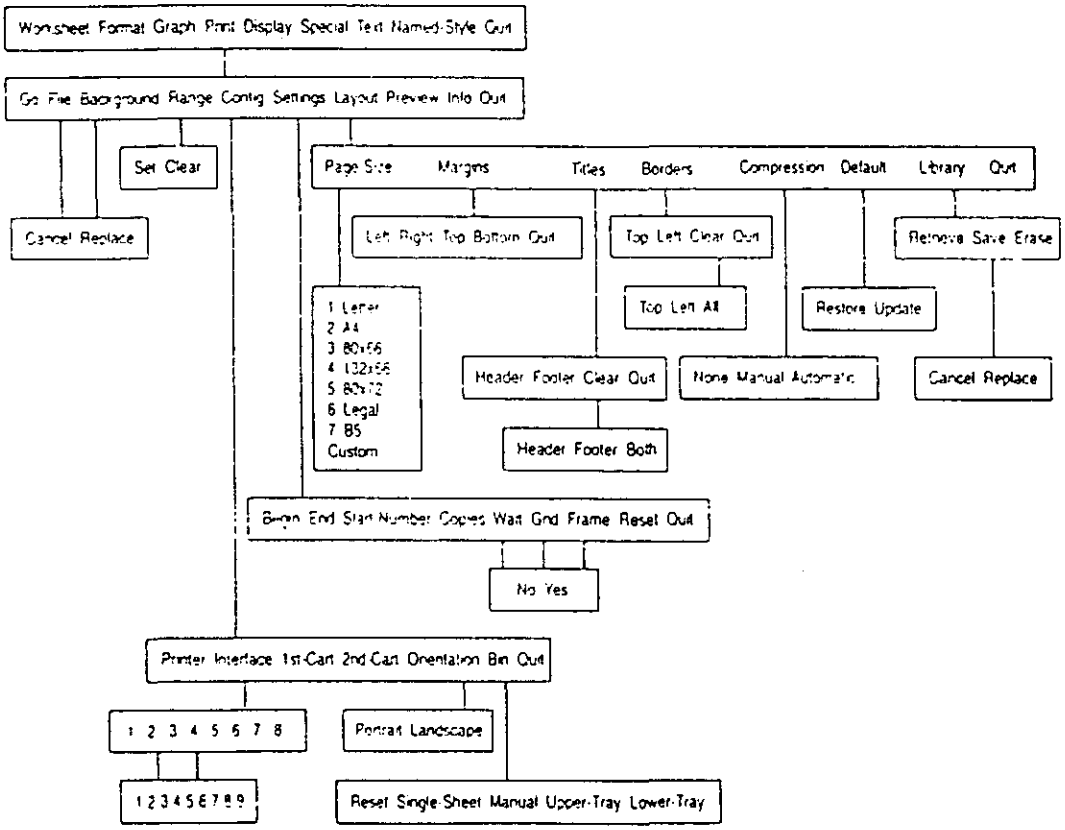
Graph Commands



Named-Style Commands



Print Commands



ANNEX 5
TRAINING CONTENTS

CHAPTER 1

INTRODUCTION

The major goal of food production has been towards food self-sufficiency. Food sufficiency in per capita calorie terms appears to have been attained in most countries. Even low-income countries are, on the average, adequately provided with calories. However, this has not been translated to improvements in the nutirtion situation. In spite of the fact that food production is increasing, manifestations of malnutrition still remain. To a large extent, malnutrition cannot be attributed to a lack of food expecially at the national levels, but to inadequate intake of the necessary complementing nutrients. For countries which have approached food self-sufficiency, the problem is to find the right food production mix; while for others, the problem is how to attain food self-sufficiency while aiming for nutritional adequacy.

As a result food intake of some population groups, such as those who are physiologically and economically at risk, is insufficient in calories. It is noted with much concern that despite adequate calories in the region, production of various foods was not satisfactory. The lack of improtant qualitative aspects in the diets even with a satisfactory quantitative availability of food, indicates a need for a re-examination of food and agriculture plans to make diets nutritionally adequate. It is hoped that through successive development plan periods, food and agriculture planners would be able to diversify food production guided by nutritionally desirable dietary patterns to improve the nutritional quality of diets such that nutritional balance and consequently, the achievement of nutritional adequacy.

Both the quantitative and qualitative lack of food is a pressing problem for most countries of the Asia-Pacific Region. This is because per capita food intake has an indirect effect on output through its influence on the capacity of man to perform work and the attitude of man toward work. As a result of inadequate food intake, healthis impaired, resistance to disease is lowered, and capacity to work is reduced. If human energy is so restricted by malnutrition as to significantly retard the development process, an increase in agricultural production and resultant improvements in diet might in itself have a significant effect in increasing over-all production.

Attention has increasingly shifted to a concern with the conditions under which food products can be distributed and be consumed. In contrast to the traditional food system where little lies between production and consumption, nowadays, the food system transforms the farm

product to a form that is desired by the consumer. Other major functions performed are related to the time the product needs to be made available to consumers in the market system, and the place the product should be moved to satisfy consumer demand. Marketing channels between the point of production and tne consumer may differ for the same products and between products. For other countries, analyzing the demand on the agricultural sector requires complex consideration of international trade and of goods manufactured from food commodities.

The food sector's performance is linked with the general agricultural policy environment. Food supply is not the primary cause of malnutrition, since effective demand is a more crucial factor. However, it cannot be denied that an insufficient and inadequate food supply is a principal constraint to improvements in food consumption. The major functions of a food system include : the determination of what foods to produce, how much and how best to produce them; the provision for maintenance and possible expansion of productive capacity; and the allocation or distribution of foods to consumers. This entails an examination of both the potential and current constraints in the food system in order to understand their implications for planning in food and agriculture.

Training Content

The training on the use of a Computer Simulation Model for Food Security Analysis in Developing Countries of Non-Aligned Movement three part. Part I deals with the concepts of demand and supply, accompanied with statistical tools for estimating parameters in demand dan supply functions, and the use of Microcomputers for policy analysis. Part II deals with the topics on consumption, production and marketing with Indonesia as aspecial case. Part III is an example of computer simulation model for food security policy with Indonesia as special case.

	Module 1	Introduction
PART I	Module 2	Using Microcomputers for Policy Analysis
	Module 3	Demand Theory and Elasticity Matrix Construction
	Module 4	Supply and Elasticity Estimation
	Module 5	Regression and Statistical Methods
PART II	Module 6	Food Consumption
	Module 7	Food Production and Food Availability
	Module 8	Agricultural Marketing and Food Distribution
PART III	Module 9	A Spreadsheet Model for Food Security Policy Simulation for Indonesia

CHAPTER 2

MODULE 2

USING MICROCOMPUTERS FOR POLICY ANALYSIS *)

*) Elton Li and Arthur L. Stoeker, 1989. Chapter 3 in Luther Tweeten, ed. *Agricultural Policy Analysis Tools for Economic Development*, Westview Press, Colorado.

3. USING MICROCOMPUTERS FOR POLICY ANALYSIS

by Elton Li and Arthur L. Stoecker

The microcomputer revolution which is transforming the professional workplace on a global scale grew out of efforts by hobbyists and amateurs to utilize the microprocessors developed during the early 1970s. Policy analysts can greatly benefit from microcomputer technology. The modern microcomputer can place powerful analytical capacities within the hands of analysts and technicians in both developing and developed countries. Like other technological innovations, it has its costs as well as benefits. Some of these costs are for training needs of the user population which has enlarged to include novices and the non-technical users.

OBJECTIVES

The general objective of this chapter is to discuss the potential for using microcomputers in agricultural policy analysis. Specific objectives are to discuss the role of microcomputers in the professional work-place for policy analysts, define some of the commonly used terminologies, and discuss the major types of software useful for agricultural policy analysis in both developed and developing countries. Because the microcomputer field is undergoing rapid evolution, the chapter will focus on what are believed to long-term concepts rather than the current technology.

KEY POINTS

1. Policy analysis involves problem identification, analyses of policy alternatives, and presentation of results to policy makers. A microcomputer system can facilitate this process.
2. Modern microcomputer hardware is comparable in capacity to many mainframe computers in the past but at greatly reduced cost. This means that lack of

computing power need no longer constrain thorough analysis of alternative policies.

3. Modern microcomputer software is designed to be used by non-computer experts. A novice can achieve meaningful results with an electronic spreadsheet after only a few hours of instruction.
4. The microcomputer can facilitate the building of complex policy models if needed and reduce the effort required to maintain and update these models.
5. Useful microcomputer software for policy analysis includes spreadsheets, database management systems, computer languages, statistical packages, project management software, word processing programs, and business graphics.

CONCEPTS AND APPLICATIONS

The Policy Analysis Process

Inadequate capacity to perform an adequate analysis before a policy has been adopted and implemented has often resulted in agricultural policies falling short of serving the needs of decision makers and/or society at large. The policy analysis process requires the identification of a problem or problems, the analysis of alternative solutions, and the presentation of these results to policy makers. The mechanics of the policy analysis process are not unlike those of simple report writing. Specific tasks include collection of information, the organization and distillation of key points from the data, and report preparation. The last step involves producing a narrative text with accompanying tables and graphs which is edited and redrafted to produce an acceptable final copy. Although perhaps only two pages, a final executive summary presented to a busy policy maker may require substantial input from computers at several stages.

Services aided by microcomputer hardware and software include integrating the collection of information, the analysis of the data, and the publishing of reports. The microcomputer allows the analysts to consider more policy alternatives because the process of data tabulation, processing, and report writing can be quickly and readily extended and revised. The microcomputer is a relatively low-cost means to store and promptly retrieve data, perform numerical computations, and deliver quality printed results to decision makers. In broad terms, the computer facilitates the process of transforming conceptual ideas into functional procedures and results.

Preconditions for Policy Analysis

An agency's capacity to perform analysis requires at least three preconditions: availability of supporting databases, conceptual capacity, and logistical capability.

1. Supporting Database. A well organized database can provide a numerical history of past events in the agricultural and non-agricultural economy. Data should be organized to be readily available, reliable, and easily updated and expanded. Edit programs

are available or can be written to check for data outlines and for consistency. New data can be transferred to the database by typing from printed or handcoded information, by diskette, by electronic network and/or by telecommunication linkages. The process of entering and checking the data for accuracy is time consuming and expensive but is necessary if confidence is to be placed in the data. If the microcomputer system is to be used as an electronic filing cabinet, then steps must be taken to ensure the data are organized, consistent, non-redundant, accurate, up-to-date, and are capable of being shared for different applications in an agency and by different agencies. Electronic storage of information is low in cost and requires little physical space. It allows quick retrieval of the relevant facts and easy preparation of necessary data in a format suitable for further analysis. The difference between raw data and an information system featuring a well organized data base is not unlike the relation between low-grade ore and the refined metal: much processing is required to convert the former into the latter.

The data base entry and maintenance process is largely clerical and thus requires the less technically trained workers to interact with the computer. Danziger and Kraemer reported from a long-term study of computer use in government that most data entry personnel had little difficulty; however, success was higher where adequate support was provided. The faster operating speeds, larger hard disk units, newer operating systems, and optical disks will remove many of the present limitations of using microcomputers to handle larger data sets.

2. *Conceptual Capacity.* Conceptual capacity entails developing the logical framework used to explain why past economic events occurred, to predict future events, and to estimate the benefits and costs of alternative policy actions. In agricultural policy analysis, this training usually includes such subject matter areas as agricultural economics, economics, political science, sociology, statistics, and operations research. Microcomputer training is often included in course work or available through special courses in the current graduate curriculums. However, continuing education through special shortcourses (Li and Stoecker) or on-the-job training may be necessary to reduce the amount of time required for previously trained professionals to reach the levels fully exploiting the potential of the microcomputer.

Although microcomputer skills are no replacement for conceptual capacity, microcomputers are invaluable in providing a laboratory environment where concepts can be experimented with, implemented, and learned. A staff that has ready computer access and receives quick turnaround is encouraged to experiment. Experimentation can increase the reliability of an analysis by solidifying theoretical concepts and inviting further learning. As an example, the economics of a representative farm can be investigated with linear programming or simulation models. Modern microcomputers can provide solutions to realistic-size linear programming and simulation models in less time than was required by small mainframe computers a few years ago. Of course modern mainframe computers are much faster. A practical measure of time is that elapsed between the submission of the job and the return of the results. A somewhat slow interactive microcomputer system may provide more rapid feedback than a fast mainframe shared by many users and located away

from the policy analysis group. The system with the shortest total turnaround time will provide the greatest opportunity to gain insights through experimentation with parameter changes and refinement of the model.

3. *Logistical Capability.* Logistical capacity is the process of converting conceptual ideas into operational procedures and the subsequential execution of these operational procedures. In a modeling situation, this encompasses construction of the model by the model builder, followed by utilization, updating, and maintenance of the model by the user or operator. The gap between conceptualizing a model and the derivation of results usable by decision makers is substantial. Many logistical issues must be resolved including assembling and/or reducing data, obtaining solutions, summarizing and reporting results. These logistical problems are not usually difficult in a conceptual sense but rather they tend to be cumbersome, time-consuming, and error-prone when performed by hand. The continued operation, updating, and maintenance of a model often involves similar logistical problems. Models or analytical tools which are designed without regard to their usability, operability, and maintainability may be unused or underutilized. Alternatively, model builders resort to simplistic models because more complex models cannot logistically be operated by an agency.

Over time, microcomputers can be used to alleviate this logistical impairment to model development and usage in two ways. First, the continuous and effective use of microcomputer systems increases an agency's confidence and efficiency in assembling and operating models. Second, the model builders can develop more effective and perhaps automated procedures for updating and maintaining a model. For example, an agricultural sector model can be more easily maintained and updated by developing programs which specify parameters or values from various data files or individual spreadsheets and integrate those results into the main tableau. An agency may routinely update cost of production budgets for various agricultural enterprises. Spreadsheets with linkages to these budget files or special computer programs can be used to copy information into the main model whenever budgets or population sensitive parameters have changed.

Concepts of a Microcomputer System

One major difference between using a mainframe computer and microcomputer is that the microcomputer user usually operates the computer. As mentioned above the microcomputer explosion has brought the computer novice and the non-technically trained into the role of computer operator (Otte; Danziger and Kraemer). In principle, operation of a microcomputer does not require a through understanding of it, but some basic understanding is desirable. This section provides basic concepts and terminologies needed for understanding a modern microcomputer system.

1. *The Central Processing Unit.* A computer's heart is the central processing unit (CPU). CPU is central in the same sense as an engine is central to a car. It is where the computational and data processing power of a computer is generated. Also

like an engine, the task performed by the CPU is relatively simple-minded. A CPU processes information, coded as 1s and 0s, needed by the rest of a computer system.

2. *Computer Memory: ROM and RAM.* A CPU processes information but cannot retain it. It must operate with a *scratch pad* or place where programs and data can be stored. This scratch pad is the Random Access Memory or RAM. *Random access* is a special way to say that the CPU can both read from and write to the memory in any order. This contrasts with ROM or Read Only Memory, whose contents can be read but not be altered (written to) by CPU. ROM generally contains special programs provided by the computer manufacturer for enhancing the CPU.

3. *Bits and Bytes.* The unit of information in the computer is a byte. A byte contains 8 binary digits or bits. A binary digit can either be one or zero . Thus one bit can contain only information that has two states, 1 or 0. In Morse Code, characters were represented by combinations of dots and dashes. Two bits can be coded as 00, 01, 10, or 11 and hence represent 4 unique characters. Thus, a byte, which contains 8 bits can represent 2 to the eighth power or 256 different characters. This is sufficient to represent the English character set, which with 26 upper case characters, 26 lower case characters, 10 Arabic numerical digits, punctuation, and other special characters, consists of about 256 different symbols. For example, the letter "A" is represented as 01000001, the period symbol "." is represented as 00101110. This particular coding scheme is the internationally recognized ASCII code, where ASCII stands for American Standard Code for Information Interchange. This code was originally developed as a standard for sending Teletype messages. Other coding schemes are used on certain mini and mainframe computer systems. Since one byte holds one English character, the words byte and character are used interchangeably. A modern microcomputer usually contains at least 512K bytes of RAM, where 1K stands for 1024 or roughly 1000. Some advanced microcomputers contain 8M bytes of RAM, where 1M is 1024K. One page of a double-spaced document in English would occupy about 1.5K of storage. Wolf provides a good discussion of the microcomputer components the buyer encounters in purchasing microcomputer hardware.

Secondary Storage and Disk Operating System

The information stored in RAM is lost whenever electricity is turned off. It is also a relatively expensive storage device. Secondary storage is used for permanent storage of data and programs. Secondary storage usually refers to diskettes, fixed disk, and magnetic tape. In the near future optical disks may be used for low-cost mass storage. A diskette is removeable from the computer and allows relatively compact data storage. One diskette depending on type can store about 360K to 1.4M bytes of information. A fixed disk is not removable. It usually has a much higher capacity than diskettes, ranging from 10M bytes to 80M bytes or more. An additional advantage over diskettes in that information stored on fixed disc can be accessed by the computer much faster. Diskettes and fixed disks are secondary in the sense that the information must first be transferred to RAM before it can

be processed by the CPU. Then the processed data must be rewritten for permanent storage on a secondary device. The Disk Operating System (DOS) is the computer program which controls this traffic between RAM and secondary storage.

Because DOS is a computer program, it occupies part of the RAM when the computer is running. You then request another program to be loaded into RAM by issuing the appropriate DOS command. Newer Disk Operating Systems are appearing which will allow the CPU to address larger memory size, allow multiple programs to run simultaneously in RAM, and support multiple users.

Computer Software

The impact of the microcomputer on the modern workplace would have been much less without the concurrent progress in the design of computer software. Many of the advances in human factors studies since the 1970s have been incorporated in modern microcomputer software. Ideally, the user can interact with the software in a natural way and have easy recovery from errors. This allows the user to concentrate on the problem at hand rather than worrying about the computer program. This concentration on the interface with the end user has allowed microcomputer software to advance to where it is easier to acquire the necessary skills to operate microcomputer programs than it is to operate mainframe programs. Kelly and Stevens have published a directory of software available for socioeconomic analysis.

The modern spreadsheet may be the one piece of software capable of doing the calculations common to most types of policy analysis. These calculations include tabulations involving rows and columns of numbers, financial analysis, solution of equations, development of graphs and charts, and statistical analysis. Indeed, the first electronic spreadsheet was invented by a business school student to escape the boredom and exhaustion of the many repetitive calculations required for case studies in business and finance. This program called Visicalc[tm] was an instant success and a significant factor in the success of the Apple[tm] computer.

Spreadsheet Applications

Fundamentally, an electronic spreadsheet is an interactive electronic blackboard which appears to the user in a row and column orientation or as a two-dimensional matrix of cells. An individual cell may be empty, contain a data entry, a label, or a formula which relates two or more cells. If the cell contains a formula, the user sees the result of the calculation rather than the formula itself. Each cell has a row and column coordinate. Thus C2 refers to contents of the cell in column c and row 2. If the formula 2 + a1 + b1 is inserted in cell C2, the user would see the result (2 plus the value in cell a1 plus the value in cell b1).

The spreadsheet in Figure 3.1 illustrates the calculations for ending and beginning inventories in a commodity balance sheet. The user enters data regarding production and consumption along with imports and exports and the beginning stock. The values for the

Formulas for		A	B	C	D	E	F	formulas for
for	[1]	Beg.In.	Prod.	Imp	Xprt	Cons	End In.	column F
Column A	[2]	80	100	0	20	60	100	<- +A2+B2-C2-D2
+F2-->	[3]	100	90	0	30	70	90	<- +A3+B3-C3-D3
+F3 ->	[4]	90	85	0	30	75	70	<- +A4+B4-C4-D4
+F4 ->	[5]	70	80	0	25	75	50	<- +A5+B5-C5-D5
+F5 ->	[6]	50						

Figure 3.1. Spreadsheet Calculation for Commodity Balance Sheet.

ending stock are calculated as the beginning inventory plus production and imports less consumption and exports. The beginning stock each year is taken to be the ending stock from the previous year. The formulas which would be entered into column F calculate the ending inventory and the formulas which would be entered into Column A transfer the ending inventory from the previous year to be the beginning inventory for the next year. The formula entered in cell A2, +F2, copies the ending inventory from cell F2 into cell A3. If any of the data entries are revised, the calculated values for the ending and beginning inventories are automatically recalculated.

Most spreadsheets have built-in functions for financial calculations like net present value and the internal rate of return. Other features may include database functions (sorting and query), graphics, and matrix and statistical operations. The main attraction of the spreadsheet is its flexibility and versatility in inserting and revising data and formulas.

The electronic spreadsheet will handle nearly all tasks related to data tabulation, preparation of tables, and graphic presentations. This text contains many spreadsheet applications. These include applications to welfare analysis in Chapter 6, simulation analysis in Chapter 7, enterprise budgeting in Chapter 8, construction of linear programming tableaus in Chapter 9, and project analysis in Chapter 10. Templates for many agricultural applications developed by Land Grant Universities and others are available at nominal cost. Researchers have developed software packages and templates for a wide array of government planning and policy analysis.

Computer Languages

Traditionally, most use of the computer has involved writing or using a computer language. Early microcomputers were equipped with BASIC, a simple computer language designed for beginners. Every computer comes with its own native language, expressed in 1s and 0s, called machine language. Few programmers write programs in machine language. Instead, some programmers use assembler language, which allows the use of

mnemonic and symbolic names. More often, programmers prefer writing in a higher-level language such as FORTRAN, COBOL, or PASCAL. However, a computer cannot execute a program until it is translated into machine language. This translation is done with computer programs called compilers or interpreters. A wide variety of language compilers are available on the microcomputer today.

With microcomputer capacity approaching that of mainframe computers of just a few years ago, computer programs and models developed previously to operate on mainframe computers can now be compiled to operate on microcomputers. Many mainframe models and programs were written in FORTRAN, a language designed for scientists and engineers. Because FORTRAN is a relatively standardized language, most FORTRAN programs written for the mainframe do not require major modifications when ported to the microcomputer. It is not uncommon for FORTRAN programs of over 20,000 lines to compile successfully on the microcomputer. Other popular mainframe languages, such as COBOL and PL/1, are also available on the microcomputer.

FORTRAN, COBOL, PL/1, and BASIC originated before 1970 and do not contain features for implementing modern programming concepts such as abstract data types, modularity, and object-originated programming. Many programmers today prefer the more modern languages such as PASCAL, C, MODULA-2, and ADA.

Computer languages have a steep learning curve and considerable practice is required to gain proficiency. Boussard suggested that programmers should devote a large fraction -- perhaps one-third or one-half of the time for qualification upgrading. This must be accepted as an additional cost inherent to the use of computers. Much of the popularity of electronic spreadsheet is that the novice can achieve meaningful results after a few minutes of instruction. However, there are applications which cannot be achieved with spreadsheets and which require special programs. One example might be a report writer for a linear programming model. Another example might be transforming a survey from past year's format into current format.

Database Management Systems

A database is a set of data stored in some special way on secondary computer storage. A database management system (DBMS) is the software that handles the storage and retrieval of the records in this database. Most microcomputer DBMS are self-contained in the sense that they use their own storage format, and provide their own query and retrieval procedures. DBMS packages typically contain facilities for designing data entry forms and producing standard reports. The more advanced DBMS contain their own programming language.

Many useful applications can be easily done with DBMS without using programming language. This includes developing mailing lists and processing payrolls. More advanced applications such as survey processing would require some form of programming, usually in the language provided by the DBMS. In this case, as Boussard indicates, the difficulty of learning about the basic concepts in the DBMS is equivalent to the difficulty of learning a general programming language.

The size of a data base manageable on the microcomputer is limited. The first limitation is the size of the secondary storage; the second is the time needed to locate the relevant information as the size of the database increases. The emerging technology in greater processor speed, larger and faster fixed disks, and optical disks should reduce this difficulty. However, very large database applications require large central computers.

Other Software

Other microcomputer software useful for policy analysts include statistical packages, project management packages, and business graphics. New and refined software is continually being released.

CONCLUSIONS

This chapter provides some guidelines on the potentials and limitations of microcomputers for policy analysis. Advances in microcomputer technology have reduced the capital cost of quantitative analysis which creates opportunities for more complete analysis of alternative policies. Advances in microcomputer technology have reduced the capital cost of quantitative analysis and have opened up opportunities for more sophisticated and timely analysis. Taking advantage of this opportunity requires, however, an increase in analytical capability -- the subject matter of the other chapters of this book.

REFERENCES

Boussard, J. M. 1986. The Use of Computers in the Monitoring and Evaluation of Rural Development Projects. Paris, Institut National de la Recherche Agronomique, France.

Danziger, J. N. and K. L. Kraemer. 1986. *People and Computers: The Impact of Computing on End Users in Organizations*, New York: Columbia University Press.

Griffiths, J. M. 1981. Application of Minicomputers and Microcomputers to Information Handling. PGI-81/WS/28. Paris: United Nations Educational, Scientific, and Cultural Organization.

Kelly, V. and R. D. Stevens. 1983. An Annotated Directory of Statistical and Related Microcomputer Software for Socioeconomic Data Analysis. Working Paper No. 12, MSU International Development Series. East Lansing: Department of Agricultural Economics, Michigan State University.

Laver, M. 1980. *Communters and Social Change*. Cambridge Computer Science Texts 10. Cambridge: Cambridge University Press.

Li, E. 1987. Application of Microcomputers to Policy Analysis in Developing Countries. Unpublished Dissertation. Stillwater: Oklahoma State University.

Li, E. and A. L. Stoecker. 1988. Microcomputer Applications in Agricultural Development. APAP Report A-48. Stillwater: Department of Agricultural Economics, Oklahoma State University.

Otte, F. H. 1983. Consistent User Interface. Chapter 13 in Y. Vassiliou, ed., *Human Factors and Interactive Computer Systems*. Norwood: Ablex Publishing Co, New Jersey.

Wolf, C. 1983. Guidelines for Selection of Microcomputer Hardware. MSU International Development Papers. East Lansing: Department of Agricultural Economics, Michigan State University.

MODULE 3

DEMAND THEORY AND ELASTICITY MATRIX CONSTRUCTION *)

*) David Pyles, 1989. Chapter 4 in Luther Tweeten, ed. *Agricultural Policy Analysis Tools for Economic Development*, Westview Press, Colorado.

4. DEMAND THEORY AND ELASTICITY MATRIX CONSTRUCTION

by David Pyles

The demand for a particular commodity is generally defined as a function relating the quantity of the commodity that buyers would be willing and able to purchase, over a given interval of time, to commodity prices, income levels, and possibly other variables. Knowledge of demand functions and of their parameters is essential to any analysis concerned with prices and quantities of traded goods. For this reason, estimation of demand functions and demand function parameters is basic to policy analysis. For example, an analyst equipped with estimates of the demand functions for food items in a particular country could examine and predict the likely consequences of government intervention designed to influence nutrition using programs involving subsidies to producers, retail price ceilings, or targeted food assistance.

The primary focus of this chapter is the estimation of demand functions. A brief summary of the classical theory of the consumer demand function is presented. It is then shown how the theory may be empirically incorporated so as to facilitate the estimation.

OBJECTIVES

The objectives of this chapter are to:

1. Present a brief summary of consumer demand theory with emphasis given to the properties that such theory implies for the elasticities of demand.
2. Introduce the concept of strongly separable utility functions, and explain the peculiarities of the demand elasticities under such utility functions.
3. Demonstrate how certain of the price elasticities may be estimated from estimates of the income elasticities when the underlying utility function is strongly separable.

KEY POINTS

1. Data limitations and statistical considerations generally forbid the direct estimation of all elements in demand matrices.
2. If the utility function is strongly separable, then certain of the price elasticities may be indirectly estimated with use of estimates for the income elasticities.

CONCEPTS AND APPLICATIONS

A typical *demand function* for a commodity, say commodity a, is of the general form:

$$q_a = q_a(p_a, p_b, p_c, y)$$

where p_a is the price of commodity a; p_b and p_c are prices of commodities that are related to commodity a, and y is the income of the potential purchaser. Given that all other factors influencing willingness and ability to purchase commodity a are held constant, $q_a(p_a, p_b, p_c, y)$ indicates the quantity demanded of commodity a at alternative levels of p_a, p_b, p_c, and y.

With any demand function, there is an underlying assumption that factors influencing demand other than those listed among the function's arguments are held fixed as one moves along the surface of the function. These assumptions are most commonly called the *ceteris paribus* assumptions. An analyst using a demand function needs to be aware of the underlying ceteris paribus assumptions.

The factors affecting willingness and ability to purchase a typical commodity include the price of the commodity, the prices of related commodities, consumer income, consumer wealth, interest rates, liquidity of consumer assets, government redistributions, expectations with regard to future movements in all of the preceding, the degree of certainty with which such expectations are held, and consumer tastes and preferences. In a typical demand function, some of these factors would be assumed variable, while others would be assumed fixed. The choice as to which factors are variable and which are fixed is quite arbitrary; however, most observed demand functions have the commodity's own price included among the variable factors.

A case of extreme ceteris paribus assumptions occurs with the popular demand curve, where quantity demanded is plotted against commodity price. Here it is assumed that all factors other than commodity price are held constant as one moves along the curve. A second extreme case occurs with the *Engel Curve*. Here, quantity demanded is plotted against consumer income; accordingly, all factors other than income are assumed fixed as one moves along the curve. The remainder of this chapter utilizes demand functions for which the variable factors are commodity price, prices of all other commodities, and consumer income.

As in supply analysis, the elasticity serves a useful role in demand analysis. Suppose a consumer purchases a total of n commodities. Let the prices of these commodities be denoted by $p = (p_1, p_2, \ldots, p_n)'$; let the consumer's income be denoted

by y, and let the n demand functions be q_1 (p, y) through q_n (p, y). Then the elasticities of demand are defined as:

$$\varepsilon_{ii} = \partial q_i / \partial p_i \, (p_i / q_i) = \partial \ln q_i / \partial \ln p_i$$
$$\varepsilon_{ij} = \partial q_i / \partial p_j \, (p_j / q_i) = \partial \ln q_i / \partial \ln p_j$$
$$\varepsilon_{iy} = \partial q_i / \partial y \, (y / q_i) = \partial \ln q_i / \partial \ln y.$$

Recall that an elasticity measures the percentage change in the dependent variable induced by a 1 percent change in the independent variable. In many contexts the elasticity is a more workable measure than the corresponding partial derivative because the elasticity is a unitless measure whereas the partial derivative is not.

Demand functions are typically estimated as regression equations. Although this is a convenient and direct approach, it poses several problems. One is that economic theory, while generally specifying the relevant variables affecting demand, seldomly prescribes the general form of the demand function; e.g. linear, polynomial, log-linear, etc. It is popular to assume that demand functions are either linear or log-linear, because these functional forms are quite flexible and are easily handled. One then estimates the demand functions with regression equations of the assumed form (see Tweeten). The log-log form is particularly popular because the parameters of this function are elasticities. Log-log regression equations corresponding to the demand system mentioned above are:

$$\ln q_1 = \beta_{10} + \beta_{11} \ln p_1 + \ldots + \beta_{1n} \ln p_n + \beta_{1y} \ln y + u_1$$
$$\ln q_2 = \beta_{20} + \beta_{21} \ln p_1 + \ldots + \beta_{2n} \ln p_n + \beta_{2y} \ln y + u_2$$
$$\vdots$$
$$\ln q_n = \beta_{n0} + \beta_{n1} \ln p_1 + \ldots + \beta_{nn} \ln p_n + \beta_{ny} \ln y + u_n$$

where the u_i are disturbance terms. The β_{ij} are estimates of the elasticities.

A difficulty with the above approach is that the elasticities are assumed to be constant when in fact an elasticity can vary as one moves along the demand surface. For example, empirical studies have found income elasticities to be quite variable for some commodities. Knudsen and Scandizzo have estimated the income elasticity for food in India and Indonesia to be .8 for the poorest of the population, and .3 for the richest, thus indicating that the elasticity varies with the level of income. For this reason, various functional forms should generally be tested when attempting to estimate demand functions, including forms allowing elasticities to vary. The linear form admits variable elasticities but assumes constant partial derivatives. Of course, any functional form entails some degree of restrictiveness.

Many analyses can be accomplished with but one or two of the demand functions. However, comprehensive studies may require the entire demand system. In this context, the *demand matrix* often becomes a useful instrument. The demand matrix is the matrix of all price and income elasticities corresponding to a complete set of consumer demand

functions. For a consumer who purchases a total of n commodities the demand matrix is:

$$\begin{matrix} \varepsilon_{11} & \varepsilon_{12} & \cdots & \varepsilon_{1n} & \varepsilon_{1y} \\ \varepsilon_{21} & \varepsilon_{22} & \cdots & \varepsilon_{2n} & \varepsilon_{2y} \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \varepsilon_{n1} & \varepsilon_{n2} & \cdots & \varepsilon_{nn} & \varepsilon_{ny} \end{matrix}$$

Data and statistical limitations generally prohibit the estimation of complete demand matrices with regression equations. Hundreds of commodities may be purchased by a typical consumer. Data limitations alone preclude the estimation of such a large number of elasticities. Also, price data tend to be highly collinear; consequently, the estimation problem is compounded by the presence of multicollinearity. In the remainder of this chapter, we present the basic classical theory underlying the consumer demand function. We then utilize this theory in the development of a scheme wherein many of these difficulties can be reduced or eliminated to obtain a generally practical procedure for the estimation of demand matrices.

Utility Maximization and Demand Function Derivation

Consumer demand functions are generally derived from the utility maximization problem. The consumer is assumed to allocate income to the purchase of the various commodities such that utility is maximized. In classical consumer demand theory, the utility maximization problem is mathematically stated as follows:

$$\begin{aligned} &\text{maximize (x): } U(x) \\ &\text{subject to: } p'x = y \end{aligned}$$

where $U(x)$ is the consumer's utility function and is assumed to be strictly quasiconcave and twice continuously differentiable; $x = (x_1, \ldots, x_n)'$ denotes the vector of commodities, and $p = (p_1, \ldots, p_n)'$ denotes the vector of commodity prices. $U(x)$ has the property that if x_1 is preferred to x_2, then $U(x_1) > U(x_2)$, and if the consumer is indifferent between x_1 and x_2, then $U(x_1) = U(x_2)$. Hence, the objective of the utility maximization problem is to find the most preferred of commodity combinations attainable at the given set of commodity prices and the given level of income. It is generally assumed that the consumer always prefers more to less; subsequently, the most preferred commodity combination must exhaust the consumer's income, that is $p'x = y$. The assumption that all income is spent may be somewhat relaxed by designating one of the n commodities as savings and assigning the commodity a price equal to one.

As mentioned above, the utility function has the properties: (1) if x_1 is preferred to x_2, then $U(x_1) > U(x_2)$, and (2) if the consumer is indifferent between x_1 and x_2, then $U(x_1) = U(x_2)$. However, in some contexts these are taken to be more than mere properties; they are frequently taken to be the very criteria defining a utility function. That

is, any function satisfying these two properties is, by this definition, a utility function. Utility so defined is called *ordinal* utility. When the utility function is limited to ordinality, the actual value of the function is of significance only insofar as it reflects the ranking of commodity bundles with respect to preference. Subsequently, if $U(x_1) = 2$ and $U(x_2) = 1$, it could be said that the consumer prefers x_1 to x_2, but it could not be said that the consumer prefers x_1 twice as much as x_2, even though the utility function doubles upon moving from x_2 to x_1. Any utility function having significance in the latter sense is said to be *cardinal*.

Existence of one ordinal utility function implies existence of infinite other ordinal utility functions. For example, if $F(x)$ were an ordinal utility function, then $U(x) = a + bF(x)$ for $b > 0$ would be an ordinal utility function also, because $U(x)$ does indeed rank commodity bundles according to preference. More generally, if $F(x)$ is an ordinal utility function and if $T(.)$ is any monotonic-increasing transformation, then $U(x) = T[F(x)]$ is also an ordinal utility function.[1]

Though there will be an infinite number of ordinal utility functions, each is optimized by the same commodity bundle when incorporated in the utility maximization problem. Subsequently, if $\bar{x}$ is a solution to the utility maximization problem when the utility function is $F(x)$, then $\bar{x}$ will also solve the problem when the utility function is $T[F(x)]$, where T is any monotonic-increasing transformation. Hence, the optimal solution to the utility maximization problem is invariant with respect to monotonic-increasing transformations of the utility function. This follows from the fact that a monotonic-increasing transformation preserves the extrema of a function.

If the maximization problem above is intended to characterize an aggregate market consisting of numerous consumers, then the existence of a representative consumer must be assumed. The representative consumer is defined as one who will purchase average per-capita quantities when provided with average per-capita income. Accordingly, x is taken to be the vector of average per-capita quantities, and $U(x)$ is taken to be the utility function of the representative consumer.

The Lagrangian to the utility maximization problem is

$$L(x, \lambda) = U(x) + \lambda(y - p'x)$$

Because $U(x)$ is differentiable, an optimal solution must satisfy the first-order conditions

$$\partial L / \partial x_i = \partial U / \partial x_i - \lambda p_i = 0; \qquad i = 1, 2, \ldots, n$$
$$\partial L / \partial \lambda = y - \Sigma x_i p_i = 0$$

The second condition is simply the requirement that all income be spent. As for the

[1] A monotonic-increasing transformation is defined as any function having positive slope.

first set of conditions, upon taking a ratio of any two of these, one obtains the *proportionality rules*

$$U_i / U_j = p_i / p_j; \qquad i, j = 1, 2, \ldots, n$$

The price ratio on the right represents the rate at which one unit of x_i can be exchanged for x_j on the market. On the other hand, the ratio of marginal utilities represents the marginal rate at which the consumer would be willing to exchange one unit of x_i for x_j. For example, if the marginal-utility of x_i were twice that of x_j, then the consumer would be willing to exchange no more than two units of x_j for one unit of x_i. This ratio is known as the *marginal rate of substitution*. If the consumer and the market are not in agreement as to the rate of exchange between commodities, then utility gains may be had by substituting some commodities for others. As utility is assumed to be maximized here, no such gains should be possible.

Under general regularity conditions, $x_i^*(p, y)$ and $\lambda^*(p, y)$ will exist such that $x_i = x_i^*(p, y)$ and $\lambda = \lambda^*(p, y)$ will solve the maximization problem and the first-order conditions. The $x_i^*(p, y)$ are by definition the demand functions for a utility maximizing consumer. Also, one can define

$$U^*(p, y) = U[x_1^*(p, y), x_2^*(p, y), \ldots, x_n^*(p, y)]$$

$U^*(p, y)$ is known as the *indirect utility function*, and is equal to the utility of a utility-maximizing consumer with income y and when commodity prices are p. It can be shown that

$$\partial U^* / \partial y = \lambda$$

Hence, λ is the marginal utility of income when such income is disposed in a utility maximizing fashion.

We now complete this section with an example in which a utility function is maximized and in which demand functions and an indirect utility function are derived. Suppose that the utility function is of the form

$$F(x_1, x_2) = a x_1^{\alpha_1} x_2^{\alpha_2}$$

where a, α_1, and α_2 are all positive. We take the utility function to be of ordinal significance only, hence any monotonic-increasing transformation of the above function is an equally acceptable measure of utility. For example, consider the transformation

$$T(z) = \log(z / a); \qquad a > 0$$

Because the derivative $T'(z) = 1 / z > 0$ for all $z > 0$, the transformation is needed monotonic-increasing over the relevant domain. Upon applying this transformation to $F(x_1, x_2)$, we obtain the second ordinal utility function

$$U(x_1, x_2) = T[F(x_1, x_2)] = \alpha_1 \log(x_1) + \alpha_2 \log(x_2)$$

We are at liberty to use either of these utility functions. Because $U(x_1, x_2)$ is more convenient for analysis, we shall henceforth use it.

The utility maximization problem becomes

$$\text{maximize } (x_1, x_2): \ \alpha_1 \log(x_1) + \alpha_2 \log(x_2)$$
$$\text{subject to: } p_1 x_1 + p_2 x_2 = y$$

The Lagrangian to this problem is

$$L(x_1, x_2, \lambda) = \alpha_1 \log(x_1) + \alpha_2 \log(x_2) + \lambda(y - p_1 x_1 + p_2 x_2)$$

The first-order conditions require that all partial derivatives of the Lagrangian be equal to zero; hence

$$\partial L / \partial x_1 = \alpha_1 / x_1 - \lambda p_1 = 0$$
$$\partial L / \partial x_2 = \alpha_2 / x_2 - \lambda p_2 = 0$$
$$\partial L / \partial \lambda = y - p_1 x_1 - p_2 x_2 = 0$$

We can solve the first two equations for x_1 and x_2 and substitute the results into the third equation to obtain

$$y - \alpha_1 / \lambda - \alpha_2 / \lambda = 0$$

which implies

$$\lambda = \lambda^*(p_1, p_2, y) = (\alpha_1 + \alpha_2) / y = \alpha / y$$

where we have defined $\alpha = \alpha_1 + \alpha_2$. Substituting the expression for λ back into the first-order conditions, we obtain the demand functions

$$x_1^*(p_1, p_2, y) = \alpha_1 y / \alpha p_1$$

$$x_2^*(p_1, p_2, y) = \alpha_2 y / \alpha p_2$$

Because the demand for both quantities is proportional to income, the income elasticities are equal to one. Likewise, the inverse proportionality between quantity demanded and own-price indicates that own-price elasticities are equal to minus one. The cross-price elasticities are clearly equal to zero. Hence, the demand matrix for this system is

$$\begin{bmatrix} \varepsilon_{11} & \varepsilon_{12} & \varepsilon_{1y} \\ \varepsilon_{21} & \varepsilon_{22} & \varepsilon_{2y} \end{bmatrix} = \begin{bmatrix} -1 & 0 & 1 \\ 0 & -1 & 1 \end{bmatrix}$$

Finally, we can substitute the demand functions back into the utility function to obtain the indirect utility function:

$$U^*(p_1, p_2, y) = \alpha_1 \log(\alpha_1 / p_1) + \alpha_2 \log(\alpha_2 / p_2) + \alpha \log(y / \alpha)$$

By differentiating $U^*(p_1, p_2, y)$ with respect to y, we confirm our interpretation of λ

$$\partial u^* / \partial y = \alpha / y = \lambda$$

It may be confirmed that the same demand functions would be found by optimizing $F(x_1, x_2)$ rather than $U(x_1, x_2)$. However, a different expression for λ would be obtained. As noted earlier, the solutions to an optimization problem are invariant with respect to monotonic-increasing transformations of the objective function; however, the Lagrangian multipliers will generally be changed by such transformations. Therefore, if the utility function is taken to be only of ordinal significance, then no significance can be attached to the value of λ.

Properties of Demand Functions

If one has a set of demand functions deriving from the utility maximization problem of the previous section, then several properties for such functions are implied. We will present some of these properties here. First, the following notation is needful:

$$\begin{aligned} \gamma &= \partial\lambda^* / \partial y \,(y / \lambda) \\ w_i &= p_i x_i / y \\ U_i &= \partial U / \partial x_i, \quad U_{ij} = \partial^2 U / \partial x_i \partial x_j \\ \phi_{ij} &= \partial U_i / \partial x_j \,(x_j / U_i) = U_{ij}(x_j / U_i) \\ \Phi &= \{\phi_{ij}\} \\ \{\phi^{ij}\} &= \Phi^{-1} \end{aligned}$$

Hence, γ is the elasticity of λ with respect to income. γ is sometimes called the *flexibility of money*. w_i is the expenditure proportion on the ith commodity. ϕ_{ij} is the elasticity of the ith marginal utility with respect to the jth commodity, and Φ is the nxn matrix consisting of such terms. The ϕ_{ij} are sometimes called *utility accelerators*. ϕ^{ij} is the (i, j) term in Φ^{-1}. The ϕ^{ij} are sometimes called *want elasticities*.

Although not proven here, utility maximization implies the following properties in the demand functions:

1. $\Sigma_j \varepsilon_{ij} + \varepsilon_{iy} = 0$.

2. $\sum w_i \varepsilon_{iy} = 1$
3. $\sum_i w_i \varepsilon_{ij} = -w_j$
4. $w_i \varepsilon_{ij} = w_j \varepsilon_{ji} + w_i w_j (\varepsilon_{jy} - \varepsilon_{iy})$
5. $\varepsilon_{ij} = \phi^{ij} - w_j \varepsilon_{iy} \varepsilon_{jy} / \gamma - w_j \varepsilon_{iy}$
6. $\varepsilon_{iy} = \gamma \sum_j \phi^{ij}$
7. $\gamma = 1 / (\sum_i \sum_j w_i \phi^{ij})$.

There is some degree of redundancy among these properties. That is, some properties are implied by others. For example, property four is implied by property five.

The first property is known as the *homogeneity condition*. The property implies and is implied by homogeneity of degree zero in the demand functions with respect to prices and income. The second property is known as the *Engel aggregation condition*. The third property is the *Cournot aggregation condition*, and the fourth property is the *Slutsky symmetry relation*. The fifth, sixth, and seventh properties have no generally accepted names.

Because of the above relationships between the elasticities, certain of the elasticities may be determined if other of the elasticities are known. For example, consider the following incomplete demand matrix corresponding to a system of three demand equations

-1	?	?	1
?	-2	1	-1
?	?	?	?

where "?" has been used to denote missing elasticities. Of the 12 elasticities in the demand matrix, seven are presently unknown. Let the expenditure proportions for the three goods be: $w_1 = 1/4$, $w_2 = 1/4$, and $w_3 = 1/2$. The properties of the elasticities may be used to find the missing elements as follows

1. Using the homogeneity condition, ε_{21} is found to be equal to 2.
2. The Slutsky symmetry relation may then be used to determine $\varepsilon_{12} = 1$.
3. The homogeneity condition may then be used to determine $\varepsilon_{13} = -1$.
4. Engel aggregation is used to determine $\varepsilon_{3y} = 2$.
5. Cournot aggregation may then be used to determine: $\varepsilon_{31} = -1$, $\varepsilon_{32} = 0$, and $\varepsilon_{33} = -1$.

Hence, the complete demand matrix is found to be

-1	1	-1	1
2	-2	1	-1
-1	0	-1	2

A system of n demand equations contains $n^2 + n$ elasticities, including both price elasticities and income elasticities. Of these, n are determined by the homogeneity

condition; n are determined by the Cournot aggregation condition and one is determined by the Engel aggregation condition. Therefore, if all but $2n + 1$ of the elasticities are known, the remaining elasticities may be found. It can be shown that the Slutsky symmetry condition is implied by the homogeneity, Cournot aggregation, and Engel aggregation conditions; consequently, the dimensionality of the problem is not further reduced by the inclusion of this restriction. However, in the next section, we show that the dimensionality of the problem can be further reduced using certain information concerning the structure of the utility function.

Separability

Recall that of the various elasticity relations implied by the utility maximization problem, we had the condition

$$\varepsilon_{ij} = \phi^{ij} - w_j \varepsilon_{iy} \varepsilon_{jy} / \gamma - w_j \varepsilon_{iy}$$

Observe that if $\phi^{ij} = 0$, then ε_{ij} may be calculated from income elasticities and the flexibility of money γ. Indeed, there will be a transformation of utility under which some of the ϕ^{ij} are equal to zero if the utility function is of the following form

$$U(x) = T[U^1(x^1) + U^2(x^2) + \ldots + U^g(x^g)]$$

where $x = (x^{1'}, \ldots, x^{g'})'$ and where $T(.)$ is an arbitrary monotonic increasing transformation. Here, the commodity bundle is divided into g groups, where x^i is the vector of commodities belonging to the ith group. If x_i belongs to a different commodity group than x_j, then x_i is said to be *strongly separable* from x_j. Accordingly, such utility functions are said to be *strongly separable*.

Let I be the set of all indices for commodities belonging to the ith group and define J accordingly, then it is easy to verify that the strongly separable function satisfies

$$\partial(U_i / U_j) / \partial x_k = 0; \qquad i \in I, j \in J, k \notin I, J$$

where $\in$ denotes *element of*. The above implies that if x_k belongs to a different group than those containing x_i and x_j, then the marginal rate of substitution between x_i and x_j is independent of x_k.

An important special case of strong separability occurs when each of the commodity groups contains only one commodity. In this case, the function takes the general form

$$U(x) = T[U^1(x_1) + U^2(x_2) + \ldots + U^n(x_n)].$$

Such functions are said to be *pointwise separable*. The pointwise separable function satisfies

$$\partial(U_i / U_j) / \partial x_k = 0; \qquad k \neq i, j$$

That is, the marginal rate of substitution between any two commodities is independent of all other commodities.

Because the demand functions and resulting elasticities are invariant with respect to monotonic-increasing transformations of the utility function, it becomes both proper and convenient to choose the particular transformation of utility that is most amenable to analysis. If the utility function is strongly separable, then there is a transformation under which the utility function takes the form

$$U(x) = U^1(x^1) + U^2(x^2) + \ldots + U^g(x^g)$$

This form is referred to as the *block-additive* representation of utility. In the case of pointwise separability, we have the *additive* representation, which is

$$U(x) = U^1(x_1) + U^2(x_2) + \ldots + U^n(x_n)$$

Henceforth, the analysis will be conducted using these forms.

While it is true that the elasticities are variant to the various transformations of utility, invariance does not hold for the want elasticities or the flexibility of money. Consequently, if these measures are to be used in actual calculations, it becomes necessary to specify the particular transformation to which the measures correspond. Henceforth, it will be understood that all want elasticities and the flexibility of money correspond to the block-additive or additive representations of utility.

Demand Matrix Construction Under Strong Separability

If the utility function is strongly separable, then under the block-additive representation, the matrix of utility accelerators Φ is block-diagonal where there are g blocks, each corresponding to a commodity group. Specifically, it can be said

$$\phi_{ij} = 0; \qquad i \in I, j \notin I$$

Because the inverse of a block-diagonal matrix is obtained by inverting each block, Φ^{-1} is also block diagonal with elements satisfying

$$\phi^{ij} = 0; \qquad i \in I, j \notin I$$

As a consequence of the block-diagonality of Φ^{-1}, the fifth property may be rewritten as

$$\varepsilon_{ij} = \phi^{ij} - w_j \varepsilon_{iy} \varepsilon_{jy} / \gamma + w_j \varepsilon_{iy}; \qquad i, j \in I$$
$$\varepsilon_{ij} = - w_j \varepsilon_{iy} \varepsilon_{jy} / \gamma - w_j \varepsilon_{iy}; \qquad i \in I, j \notin I$$

The second equation indicates that if one has (1) a full set of income elasticities, (2) γ, and (3) a full set of expenditure proportions, then all of the cross-price elasticities

between commodities in different groups can be calculated.

The second of the latter equations may also be used to calculate γ if one cross-group, cross-price elasticity is known. Specifically, if ε_{ij} is known, then the second equation implies

$$\gamma = -(w_j \varepsilon_{iy} \varepsilon_{jy}) / (\varepsilon_{ij} + w_j \varepsilon_{iy}) \tag{4.1}$$

An alternative specification for γ can be derived using properties two, five, and seven, and the fact that Φ^{-1} is block diagonal. Let

$$w^I = \Sigma_{i \in I} w_i; \qquad I = 1, 2, \ldots, g$$
$$\varepsilon^I = \Sigma_{i \in I} w_i \varepsilon_{iy}; \qquad I = 1, 2, \ldots, g$$
$$\sigma^I = \Sigma_{i \in I} \Sigma_{j \in I} w_i \varepsilon_{ij}; \qquad I = 1, 2, \ldots, g$$

then:

$$\gamma = \frac{[1 - \Sigma_I (\varepsilon^I)^2]}{\Sigma_I \sigma^I + \Sigma_I w^I \varepsilon^I} \tag{4.2}$$

As a consequence of the above, demand matrix estimation under strong separability can be accomplished with estimates available for the expenditure proportions, within-group price elasticities, and income elasticities. These estimates permit completion of the remainder of the matrix.

The above procedure poses difficulties in obtaining a set of estimates satisfying the homogeneity and Cournot aggregation properties. It is easy to confirm that the cross-group, cross-price elasticities automatically satisfy Slutsky symmetry. Consequently, if the within-group elasticities satisfy the same, then the resulting estimate for the demand matrix will be consistent with this property. Because Slutsky symmetry is a linear condition, it is not difficult to impose on least squares estimators for the within-group elasticities. Likewise, the Engel aggregation property is linear, and consequently, is easily imposed as a restriction. However, if the homogeneity or Cournot aggregation properties are to be satisfied, then complicated nonlinear restrictions must be imposed upon the estimators of the within-group price elasticities.

If compatibility with the homogeneity and Cournot aggregation properties is deemed necessary, then a possible alternative is to use a different estimate of γ for each row of the demand matrix. In particular, the estimate for γ could be chosen such that the homogeneity property is satisfied. It can be shown that if the Slutsky symmetry, Engel aggregation, and homogeneity properties hold, then the Cournot aggregation property must hold also. Consequently, an estimate of the demand matrix satisfying all properties is found by: (1) imposing the Slutsky symmetry property on the estimators of the within-group, cross-price elasticities, (2) imposing the Engel aggregation property on the estimators for the income elasticities, and (3) choosing a different estimate of γ for each

row, where in each case, the estimate is chosen such that the homogeneity property is satisfied. If this course is taken, then the appropriate estimate of γ for the ith row is:

$$\gamma_i = \frac{\varepsilon_{iy}\,(1 - \varepsilon^1)}{\sum_{j \in I} \varepsilon_{ij} + w^1\, \varepsilon_{iy}}; \qquad i \in I$$

Demand Matrix Construction Under Pointwise Separability

If the utility function is pointwise separable, then under the additive representation, Φ^{-1} is simply diagonal. Consequently, the fifth property becomes:

$$\begin{aligned} \varepsilon_{ii} &= \phi^{ii} - w_i\, \varepsilon_{iy}\, \varepsilon_{iy} / \gamma - w_i\, \varepsilon_{iy}; \\ \varepsilon_{ij} &= - w_j\, \varepsilon_{iy}\, \varepsilon_{jy} / \gamma - w_j\, \varepsilon_{iy}; \qquad i \neq j \end{aligned} \tag{4.3}$$

Also, the sixth property becomes:

$$\varepsilon_{iy} = \gamma\, \phi^{ii}$$

which implies $\phi^{ii} = \varepsilon_{iy} / \gamma$. Upon substituting this expression into the equation for ε_{ij}, one obtains:

$$\varepsilon_{ii} = \varepsilon_{iy} / \gamma - w_i\, \varepsilon_{iy}\, \varepsilon_{iy} / \gamma - w_i\, \varepsilon_{iy} \tag{4.4}$$

which involves only income elasticities, the flexibility of money, and expenditure proportions. The same may be said of the ε_{ij}; consequently, the entire demand matrix can be constructed if one has: (1) a full set of income elasticities, (2) γ, and (3) a full set of expenditure proportions. Using the same procedure as before, γ may be calculated from (4.1) if a single cross-price elasticity is known, or from (4.4) if a single own-price elasticity is known. It is not difficult to verify that if the estimates of the income elasticities satisfy the Engel aggregation property, then the resulting estimate of the demand matrix satisfies the Slutsky symmetry, homogeneity, and Cournot aggregation properties.

We now illustrate the procedure with an example. Later, we will imagine that the foregoing data and elasticities pertain to consumption in Pakistan; however, the data used here are purely hypothetical.

Suppose that the commodity bundle consists of the following goods, and is characterized by the indicated expenditure proportions and income elasticities:

Commodity	Expenditure Proportion	Income Elasticity
cotton	.07	1.25
sugarcane	.03	1.00
rice	.05	.25
wheat	.12	.25
misc crops	.09	.25
livestock	.14	1.20
nonagricultural	.50	1.30.

Suppose that the utility function is pointwise separable. Moreover, suppose that the own-price elasticity for cotton is known to be -1, then with use of (4.4), the flexibility of money is found to be $\gamma = -1.25$. Using both (4.3) and (4.4) and the data above, the demand matrix is found to be

	cotton	sugarcane	rice	wheat	misc crop	livestock	nonag	inc
cotton	-1	-.0075	-.050	-.1200	-.0900	-.00700	.025	1.25
sugarcane	0	-.8060	-.040	-.0960	-.0720	-.00560	.020	1.00
rice	0	-.0015	-.210	-.0240	-.0180	-.00140	.005	.25
wheat	0	-.0015	-.010	-.2240	-.0180	-.00140	.005	.25
misc crop	0	-.0015	-.010	-.0240	-.2180	-.00140	.005	.25
livestock	0	-.0072	-.048	-.1152	-.0864	-.96672	.024	1.20
nonagric	0	-.0078	-.052	-.1248	-.0936	-.00728	-1.014	1.30.

It is not difficult to confirm that the above matrix satisfies the homogeneity, Cournot aggregation, Engel aggregation, and Slutsky symmetry properties.

Summary

The classical theory of demand is based upon the assumption that consumers allocate income to the purchase of commodities such that the utility deriving from the allocation is maximized. Utility is generally understood to have only ordinal significance; consequently, the actual value assigned by the utility function to a particular commodity bundle is meaningful only insofar as it serves to rank commodity bundles according to preference. Utility so defined is said to be *ordinal*. Although there will be an infinite number of ordinal utility functions corresponding to any one consumer, all functions render the same optimal commodity combination. The demand functions are mathematically derived from the utility maximization problem, and are functions rendering the optimizing commodity combinations at various commodity prices and various levels of income when all other factors are held constant.

Utility maximization implies that certain relationships must hold between the

demand elasticities. As a consequence of these relationships, certain of the elasticities may be calculated if other of the elasticities are known. The number of elements requiring direct estimation is further reduced if the utility function is known or assumed to be strongly separable or pointwise separable.

If the utility function is strongly separable, then the cross-group, cross-price elasticities can be calculated using estimates for the expenditure proportions, income elasticities, and the flexibility of money. The flexibility of money may be estimated with (4.1) if a single cross-group, cross-price elasticity is known. The parameter may also be estimated with (4.2). If the Slutsky symmetry property is imposed upon the estimators of the within-group elasticities, then the resulting estimate for the demand matrix will be fully consistent with the Slutsky symmetry property. An estimate of the demand matrix satisfying the Slutsky symmetry, homogeneity, and Cournot aggregation properties may be had by (1) imposing Slutsky symmetry upon the estimators for the within-group price elasticities, (2) imposing Engel aggregation upon the estimators of the income elasticities, and (3) choosing a different estimate of the flexibility of money for the various rows of the demand matrix, where for each row the estimate is chosen so as to produce the homogeneity property.

If the utility function is pointwise separable, then an estimate for the demand matrix may be fully constructed using estimates for the income elasticities and expenditure proportions, and an estimate of the flexibility of money. If the income elasticity estimates satisfy the Engel aggregation property, then the resulting estimate for the demand matrix will satisfy the Slutsky symmetry, homogeneity, and Cournot aggregation properties.

ACTIVITIES

1. Suppose a commodity bundle consists of two goods. The expenditure proportions are $w_1 = w_2 = 1/2$. Find the missing elasticities in the following demand matrix:

$$\begin{matrix} -2 & ? & 1 \\ ? & ? & ? \end{matrix}$$

2. Suppose a commodity bundle consists of n goods. Let the following data pertain to the ith and jth goods: $w_i = 1/10$, $w_j = 1/4$, $\varepsilon_{iy} = 1/2$, $\varepsilon_{jy} = 1$, and $\varepsilon_{ij} = -1$. Find ε_{ji}.

3. Consider a commodity bundle consisting of three goods. Assume that the utility function is pointwise separable. ε_{11} has been estimated to be -1. The income elasticities and expenditure proportions have been estimated to be as follows:

commodity	expenditure proportion	income elasticity
1	.20	.5
2	.50	1.2
3	.30	1.0.

a. Are the income elasticities consistent with the Engel aggregation property?
b. Construct the demand matrix.
c. Confirm that the matrix obtained in part b satisfies homogeneity, Cournot aggregation, and Slutsky symmetry.

4. Consider a commodity bundle consisting of four commodities. The utility function is strongly separable with the first two commodities comprising one group and the last two commodities comprising the other. Each commodity represents one-fourth of total expenditures. Find the missing elasticities in the following demand matrix:

-1.0	?	.2	?	1
.5	-.5	?	?	?
?	?	-2.0	1.0	1
?	?	?	-.2	2

REFERENCES

Deaton, Angus and John Muellbauer. 1980. *Economics and Consumer Behavior*. New York: Cambridge University Press.

Frisch, Ragnar. 1959. *A Complete Scheme for Computing All Direct* and *Cross Elasticities in a Model with Many Sectors. Econometrica* 27: 117-196.

George, P. S. and G. A. King. March 1971. *Consumer Demand for Food Commodities in the United States with Projections for 1980*. Giannini Foundation Monograph No. 26. Berkeley: University of California.

Johnson, Stanley R., Zuhair A. Hassan, and Richard D. Green. 1984. *Demand Systems Estimation, Methods, and Applications*. Ames: Iowa State University Press.

Knudsen, Odin and Pasquale Scandizzo. 1979. *Nutrition and Food Needs in Developing Countries*. Staff Working Paper No. 328. Washington, DC: International Bank for Reconstruction and Development.

Philips, Louis. 1983. *Applied Consumption Analysis*. Revised and Enlarged Edition. New York: North Holland Publishing Company.

Tweeten, Luther. 1967. The Demand for United States Farm Output. *Food Research Institute Studies*, 7:343-69.

CHAPTER 4

MODULE 4

SUPPLY AND ELASTICITY ESTIMATION *)

*) Luther Tweeten, David Pyles and Shilda Henneberry, 1989. Chapter 5 in Luther Tweeten, ed. *Agricultural Policy Analysis Tools for Economic Development*, Westview Press, Colorado.

5. SUPPLY AND ELASTICITY ESTIMATION

by Luther Tweeten, David Pyles, and Shida Henneberry

The *supply curve* is a schedule of relationships between real prices of a commodity and quantities supplied by producers at each price for a given market per unit of time, other things equal. Many variables such as technology, weather, investment in infrastructure, and prices of related commodities and of inputs shift the supply curve. A *supply function* contains all of these variables and can be used to estimate the supply curve and sources of shifts in the supply curve.

Supply curves and functions are extremely useful to answer many questions often confronted in agricultural policy analysis. If supply price is raised or lowered, how will the quantity supplied of commodities respond? Is the response different for a short run of 1 - 2 years versus a long run of 10 years or more? Is it more effective and efficient to increase output by raising commodity prices to move along the supply curve or to shift the supply curve forward by investment in agricultural education, research, and extension? If price is raised for one commodity, how is the production of other commodities affected? Is a subsidy to fertilizer more effective than a commodity price increase in generating output?

OBJECTIVES

The objectives of this chapter are to:

1. Present briefly the conceptual framework for agricultural commodity supply curves and functions.
2. Present empirical models for estimating agricultural supply parameters, noting advantages and disadvantages of each.
3. Illustrate a new method for computing a complete matrix of supply parameters useful in classical welfare analysis and simulation presented in later chapters.
4. Show selected applications of supply response estimates.

KEY POINTS

1. Supply response both influences and is influenced by public policy, hence knowledge of supply response to price and other variables influenced by public policy is essential in a wide variety of policy analyses.
2. Measuring supply response parameters is often difficult, especially because data are inadequate. The sophisticated econometric engines of parameter estimation function poorly on the crude fuel of available data, hence there is a high premium on using simple econometric models least demanding of precise data.
3. Given estimates of a few key parameters from statistical models, remaining supply parameters in a complete matrix of supply parameters can be filled in using economic theory.
4. Supply response may differ for the short run versus long run, for rising prices and falling prices, and for a crop that occupies a large share of land versus a small share. Any one parameter estimation is unlikely to utilize all information and is subject to considerable error; the most reliable estimates of supply response will utilize not only direct econometric estimates at hand, but also results of previous estimates along with good judgment based on knowledge of circumstances.

CONCEPTS AND APPLICATIONS

Assuming producers act to increase profit, the *supply function* expresses supply quantity as a function of several variables:

$$O_{it} = f\left(\frac{P_i}{W}, \frac{P_j}{W}, I, T, G, X, \varepsilon\right) \qquad (5.1)$$

where O_i is production of commodity i; P_i is own-price of i; P_j is the price of competing or complementary commodities (represented by an index of prices received by producers or by separate price variables for each commodity); W is prices paid for inputs (represented by an index of prices paid for all inputs or by separate prices of fertilizer, machinery, labor, pesticides, and other inputs); I is fixed capital inputs or infrastructure such as public irrigation capacity; T is technology such as high-yielding varieties or productivity, which is often represented by a time trend; G is government programs such as extension education or supply controls; X is weather and other factors such as pests over which the producer has little or no control in the short run; and ε is unaccounted for error. Other variables such as the *variation* in past prices may also influence the supply quantity.

Elasticities are frequently used for convenience to express the supply response to price. The elasticity E shows the percentage change in one variable associated with the percentage change in another variable and hence is independent of the units of measurement. For example, the own-price elasticity of supply response is

$$E_{ii} = \frac{\Delta 0_i}{0_i} / \frac{\Delta P_i}{P_i} = \frac{d0_i}{dP_i} \frac{P_i}{0_i} = \frac{d \ln 0_i}{d \ln P_i},$$

the cross-price elasticity for related commodities is

$$E_{ij} = \frac{\Delta 0_i}{0_i} / \frac{\Delta P_j}{P_j} = \frac{d0_i}{dP_j} \frac{P_j}{0_i} = \frac{d \ln 0_i}{d \ln P_j},$$

and the elasticity of response to input prices is

$$E_{iw} = \frac{\Delta 0_i}{0_i} / \frac{\Delta W}{W} = \frac{d0_i}{dW} \frac{W}{0_i} = \frac{d \ln 0_i}{d \ln W},$$

where Δ is the change in price or quantity and d refers to a very small change. Elasticities are frequently measured at the mean of price and quantity. In theory, the sum of these elasticities is zero. That is, a proportional increase in all prices does not change output if farmers react to real (relative) prices as shown in equation 5.1 rather than to absolute (nominal) prices.

Expectation Models

Supply response elasticities can be estimated empirically by multiple regression statistical analysis utilizing data over time on the variables in equation 5.1. In doing so, it is important to recognize that when producers plant they ordinarily do not know what actual price will be when they sell their commodity. They plan based on expected prices. Numerous functional forms have been used to represent producers' expectations which cannot be observed directly. One widely used *adaptive expectations* form is from Nerlove and assumes that the change in price expectations in the current year (left side of equation 5.2) is some proportion β of the error made in formulating expectations last year (right side of equation 5.2) or

$$(P/W)^*_t - (P/W)^*_{t-1} = \beta[(P/W)_{t-1} - (P/W)^*_{t-1}] \qquad (5.2)$$

where the asterisk refers to expected price in year t or t-1. Suppose in a highly simplified explicit form of equation 5.1 that current output 0_t is a linear function of expected price with a long-term response γ_t plus a constant α and error μ_t or

$$0_t = \alpha + \gamma (P/W)^*_t + \mu_t \qquad (5.3)$$

Substituting equation 5.2 into equation 5.3 yields

$$0_t = \alpha\beta + \gamma\beta(P/W)_{t-1} + (1-\beta) 0_{t-1} + \mu_t + (1 - \beta)\mu_{t-1} \qquad (5.4)$$

The latter equation contains only observed variables 0_t, $(P/W)_{t-1}$, and 0_{t-1} and can be estimated by non linear autoregressive least squares or other regression procedure. The

short-run response of output to price is $\gamma\beta$ from statistically estimated equation 5.4. The long-run response γ is the short-run response divided by 1.0 minus the coefficient of O_{t-1} in equation 5.4.

Other forms of expectation models are sometimes used. If the coefficient of expectations β is 1.0, it is apparent from equation 5.2 that expected price is equal to price of the previous period. Such naive behavior gives rise to an adaptive expectation pattern of supply response or commodity cycle called the "cobweb" model. A high price begets a high quantity in the next period which, given a downward sloping demand curve, brings a low price which in turn brings a low quantity and high price in the next period.

Adaptive models form price expectations from weighting past prices such as

$$(Pi/W)_t^* = w_1 (P_i/W)_{t-1} + w_2 (Pi/W)_{t-2} + \ldots + w_n (Pi/W)_{t-n} \qquad (5.5)$$

where in the Nerlove or Koyck expectation models the weights are geometrically declining and are $1-\beta$ for t-1, $(1-\beta)^2$ for t-2 to $(1-\beta)^n$ for t-n where n approaches infinity. Another alternative is to insert a large number of past values for Pi/W for $(P/W)_t^*$ in equation 5.3 and let the regression equation determine weights w_i. Such methods break down because of multicollinearity defined as high correlation among two or more so called independent variables.

A useful approach is to assume a pattern of weights. Trial and error often is used but invalidates statistical tests of significance. Producers' expectations of price in year t may be formed from a weighted average of prices in previous years. For example, the expected real own-price $(P_i/W)^*$ for commodity i may be represented by

$$(P_i/W)_t^* = .50(P_i/W)_{t-1} + .33(P_i/W)_{t-2} + .17(P_i/W)_{t-3} \qquad (5.6)$$

which can be constructed from time series of past prices.

Finally, *rational expectations* presume producers make no systematic error such as production cycles noted in the adaptive expectations models above. All worthwhile information is accounted for in forming rational expectations. Use of future market quotes for the time of harvest as the expected price in equation 5.3 comes close to a rational expectations model, but such futures market data are often not available for developing countries.

Adjustment Models

Once producers are subjectively certain of price, they may adjust output slowly because of caution, inertia, or costs of making adjustments. The actual adjustment of supply quantity in one time period may be some proportion g of intended full adjustment to O_i^* as expressed below (Nerlove):

$$O_{it} - O_{it-1} = g(O_{it}^* - O_{it-1}) \qquad 0 < g < 1 \qquad (5.7)$$

A typical linear equation of long-run supply is of the form

$$O_{it}^* = a + b(P_i/W)_t^* + \varepsilon_t \tag{5.8}$$

where ε_t is error in year t. If the expected price is from equation 5.2, then ignoring the error term and substituting equation 5.8 into equation 5.7 yields the Nerlovian short-run supply equation

$$O_{it} = \beta ag + \beta bg\,(P/W)_{t-1} + (1-\beta)\,O_{it-1} - (1-\beta)(1-g)\,O_{it-2} \tag{5.9}$$

An equation such as (5.9) ordinarily cannot be estimated with reliability from time series data because of multicollinearity especially caused by two lagged values of the dependent variable. More reliable estimates are obtained using an expectation model such as equation 5.6. Then if the long-term model of supply is

$$O_{it} = b\,(P_i/W)_t^* + c\,I_t + e\,T \tag{5.10}$$

where I is infrastructure in year t and T is technology as represented by a time variable, the equation to be estimated is

$$O_{it} = ag + bg(P_i/W)_t^* + cgH_t + geT + (1-g)\,O_{it-1} \tag{5.11}$$

where the error terms are omitted to save space. This equation can be estimated by the autoregressive least squares multiple regression from time series data. The adjustment rate g is calculated from the coefficient 1-g on the lagged variable O_{it-1}. If (5.6) is used, then ordinary least squares often is used to estimate (5.4) and (5.11) but with loss of desireable statistical properties.

The short-run supply response to P_{it-1} is .5 times the short-run coefficient of bg from equation 5.11. The long-run response b to price is the short-run coefficient bg in equation 5.11 divided by the adjustment rate g. If the equations are in original values, the marginal response to price can be converted into elasticities by multiplying them by the appropriate ratios of price to quantity. If the variables are in logarithms, the coefficients in equation 5.11 will be elasticities. A typical empirical supply elasticity is .1 in the short run and 1.0 in many years if the price increase is maintained. Supply elasticities have been estimated and reported for a number of commodities and countries (Nerlove; Askari and Cummings; Henneberry).

Figure 5.1 illustrates the use of a supply curve for policy analysis. Output initially is q_s and price is p. An increase in the price to p_1 from an increase in demand, an increase in support price, termination of a tax, or from other sources raises the supply quantity to q_{s1}. If the increase in price is 10 percent and the supply elasticity is .1 in the short run and 1.0 in the long run, supply quantity is predicted to increase by 1.0 percent in the short run and by 10 percent in the long run if the higher price is maintained. If the original quantity q_s is 150 kilos and the original price p is 20 rupees, the long-run elasticity implies that a price increase of 2 rupees increases quantity 1.5 kilos in the short run and by 15 kilos if the price increase is maintained for several years.

If the price is decreased to p_2 from the initial price p, the quantity supplied falls to

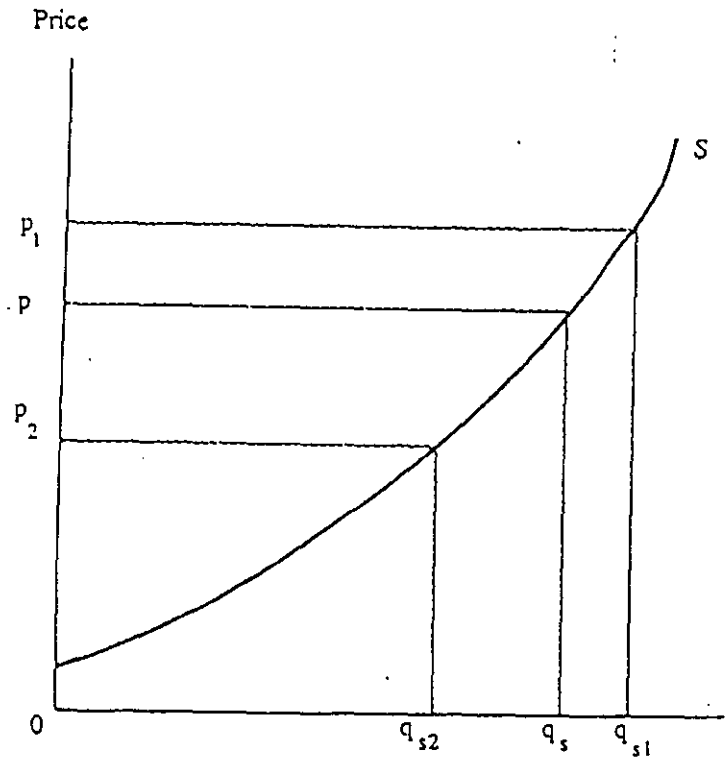


Figure 5.1. Illustration of Supply Curve S

q_{s2}. If the real price decrease from p is 20 percent and price is held at that lower level with the supply elasticity as above, the quantity supplied is expected to fall 2.0 percent in one year and 20 percent in many years.

Frequently, the analyst desires more information than just the supply response to price. Suppose it is useful to know the contributions of specific resources and of yield and area components to supply response. Supply response to price is a function of the physical response of output to use of inputs and the behavioral response of input use to price, the latter represented by the input elasticity of demand. The physical response of output to inputs is expressed by the production function

$$O_i = f(X_1, X_2, ..., X_n) \tag{5.12}$$

where $X_1, X_2, ..., X_n$ refer to inputs such as fertilizer, pesticides, irrigation water, land, labor, and other inputs. The production elasticity of output O_i with respect to any input X_k is

$$E_{ik} = \frac{\Delta O_i}{O_i} / \frac{\Delta X_k}{X_k} = \frac{dO_i}{dX_k} \frac{X_k}{O_i} = \frac{d \ln O_i}{d \ln X_k}$$

and the elasticity of input demand with respect to product price P_i is

$$E_{ki} = \frac{\Delta X_k}{X_k} / \frac{\Delta P_i}{P_i} = \frac{dX_k}{dP_i} \frac{P_i}{X_k} = \frac{d \ln X_k}{d \ln P_i}$$

It has been shown (Tweeten and Quance) that under specified assumptions:

$$E_{ii} = \sum_k E_{ik} E_{ki}$$

The elasticity of output supply is the input demand elasticity multiplied by production elasticity summed over all inputs. The contribution of input k to the elasticity of supply is $E_{ik} E_{ki}$.

Various methods can be used to estimate the production function. One method is ordinary least squares. A typical formulation is

$$\ln O_i = \ln b_0 + b_1 \ln X_1 + b_2 \ln X_2 + ... + b_n \ln X_n \tag{5.13}$$

where coefficients $b_1, b_2, ..., b_n$ are elasticities of production. Taking anti-logarithms, equation 5.13 is the Cobb-Douglas production function

$$O_i = b_0 X_1^{b1} X_2^{b2} ... X_n^{bn} \tag{5.14}$$

Because input quantities tend to move together through time, the high correlation among inputs often causes statistical problems in estimating equation 5.14 directly from time series. Indirect methods such as the "dual" discussed later are used.

In theory, the marginal product of input k is equal to the ratio of input price to product price

$$\frac{dO_i}{dX_k} = \frac{P_k}{P_i}$$

Multiplying both sides by the ratio of input quantity X_k to output, it is apparent that in competitive equilibrium

$$\frac{dO_i}{dX_k} \frac{X_k}{O_i} = \frac{P_k X_k}{P_i O_i}$$

and the elasticity of production can be measured by the factor share, the right hand side, which can be computed directly from secondary data sources. Because the elasticity of production equals the factor share only in competitive equilibrium, methods have been devised to estimate the elasticity of production from factor shares in an economy in disequilibrium (Tyner and Tweeten).

Input demand equations may be specified in a form similar to that for the supply equation 5.1 but with input quantity the dependent variable. Technology ordinarily will be a less prominent variable in the input demand equation. Suppose that the input elasticity of demand has been calculated and that the price elasticity of demand for input with respect to input price P_k is equal (sign reversed) to the elasticity of demand with respect to output price P_i. The contribution to supply elasticity of O_i is shown as:

Input	Elasticity of production	Short Run		Long Run	
		Elas.of input dem.	Cont. to sup.elas.	Elas.of input dem.	Cont. to sup. elas.
Fertilizer	.1	.5	.05	2.0	.20
Land	.3	.0	.00	.3	.09
Labor	.3	.1	.03	.5	.15
Machinery	.1	.0	.00	3.0	.30
Irrigation	.2	.1	.02	1.5	.30
	1.0		.10		1.04

A 1 percent increase in the price of commodity i increases fertilizer use by .5 percent in the short run and by 2.0 percent in the long run as indicated by the elasticity of input demand. Because fertilizer is a small proportion of all inputs, its elasticity of production is not large. But because demand for fertilizer is responsive to price, the contribution to supply elasticity of O_i is greater for fertilizer than for labor which has a larger elasticity of production.

Analysts may also find it useful to disaggregate supply response into area and yield components. It can be shown (Tweeten and Quance, p. 349) that the total supply elasticity E_{ii} can be expressed as

$$E_{ii} = E_{yi} + E_{ai}(1 + E_{ya}) \tag{5.15}$$

where E_{yi} is the elasticity of yield with respect to product price P_i, E_{ai} is the elasticity of crop area with respect to P_i, and E_{ya} is the elasticity of yield with respect to area. If crop area is expanded on marginal lands, E_{ya} is negative; if area is expanded on superior lands (say recently irrigated), E_{ya} is positive. If yield and area are independent, then the total

supply elasticity of O_i is a simple sum of the yield and area elasticities.

The tie between input demand and product supply is apparent from the following input demand equation

$$X_t = \alpha (P/W)^{\beta_{t-1}} S^{\gamma_{t-1}} \mu_t \qquad \text{(Input demand)}$$

where X_t is aggregate input, P/W is the ratio of output price to input price, S is the stock of relatively fixed assets such as public irrigation facilities and μ is error. Suppose the technology is measured by a productivity index $T = O_t / X_t$, or output per unit of farm inputs and is independent of price. Multiplying by sides of the input demand equation by productivity, the result is

$$X_t (O_t / X_t) = O_t = \alpha (P/W)^{\beta_{t-1}} S^{\gamma_{t-1}} T^{\delta} \mu_t \qquad \text{(Output supply)}$$

where δ estimated in a log-log ordinary least squares equation should be nearly 1.0.

Some problems with estimating the supply equation are apparent. The dependent variable O is also the numerator of the independent variable T, hence simultaneous equation or least squares bias is present. This is avoided by replacing the productivity variable T with a simple time trend, composed of say the last two digits of the current year in time series. But because productivity is the correct variable measured very imperfectly by the time trend, specification error is introduced and is a much more serious shortcoming than is simultaneous equation bias. The obvious way out of the dilemma is to estimate the input demand equation directly. By taking logarithms of the input demand equation

$$\ln X_t = \ln \alpha + \beta \ln P_{t-1} - \beta \ln W_{t-1} + \gamma \ln S_{t-1} + \ln \mu_t$$

and of the output supply equation

$$\ln O_t = \ln \alpha + \beta \ln P_{t-1} - \beta \ln W_{t-1} + \gamma \ln S_{t-1} + \delta \ln T + \ln \mu_t$$

it is apparent that the price elasticity of output supply is equal to the price elasticity of input demand with respect to product price or

$$\frac{\partial O_t}{\partial P_{t-1}} \frac{P_{t-1}}{O_t} = \frac{\partial \ln O_t}{\partial \ln P_{t-1}} = \frac{\partial X_t}{\partial P_{t-1}} \frac{P_{t-1}}{X_t} = \frac{\partial \ln X_t}{\partial \ln P_{t-1}} = \beta$$

which in turn is equal to the elasticity of input demand

$$\frac{\partial X_t}{\partial P_{t-1}} \frac{P_{t-1}}{X_t} = \frac{\partial \ln X_t}{\partial \ln P_{t-1}} = \frac{\partial X_t}{\partial P_{t-1}} \frac{P_{t-1}}{X_t} = \frac{\partial \ln X_t}{\partial \ln P_{t-1}} = -\beta$$

The statistically preferred method of estimating β is from the input demand equation but input data usually are unavailable. The second-best method of estimation is from the output

supply equation including a productivity variable, but such a variable also may be unavailable. The third-best statistical equation is output supply with a time trend. Although widely used, a time trend usually introduces sizeable specification error. Unfortunately, measures of input demand frequently are not available and supply response must be estimated from output -- whatever the pitfalls.

Finally, the simultaneity problem must be noted. If both supply and demand are functions of current prices, then price and quantity will be endogenous to the equilibration process. Then consistent estimation of the supply and demand function parameters will require a simultaneous equation technique. However, if supply quantity is predetermined by expected prices based on previous years' prices or other variables not related to current output, then single equation estimation techniques are appropriate.

The above output supply function is a short-run equation. S is fixed in the short run, but is variable and perhaps responsive to price in the long run. The response of S to price can be estimated separately in an adjustment model. The result can be substituted for S into the short-run supply function above. The long-run response of O to P through S then can be calculated.

The Duality Approach

The "Dual" method is another approach for estimating supply responses. This approach has become popular during the last ten years.

> A reason for the increasing popularity of the use of duality in applied economic analysis is that it allows greater flexibility in the specification of factor demand and output supply response equations and permits a very close relationship between economics and practice. The use of duality allows us to side-step the problems of solving first order conditions by directly specifying suitable minimum cost function or maximum profit function rather than production or transformation functions. An advantage of starting by specifying a cost or profit function rather than the underlying transformation function is that in order to derive the estimating factor demand and output supply responses there is no need to solve any complex system of first order conditions. The behavioral response equations are obtained by simple differentiation of the dual function with respect to input and/or output prices. The major advantage of this is that it implies less algebraic manipulations and, more importantly, it allows us to specify more complex functional forms which impose much less restriction on the estimating equations (i.e., we do not need to impose restrictions on the values of the elasticities of substitution, separability, homotheticity, etc.) [Lopez, p. 353].

The foundations for the dual approach are the indirect profit and cost functions which are obtained from profit maximization and constrained cost minimization (the primal problems).[1]

---

[1]Subsequent discussion of the dual is based on Beattie and Taylor, pp. 227 - 236.

1. The Profit Function Approach. From the primal solution, factor demand and product supply equations can be derived from profit maximization. Equation (5.16) represents the profit function for a single product (the direct profit function).

$$\pi = P \cdot Y - \sum_{i=1}^{n} r_i x_i \tag{5.16}$$

where

P = price of output
Y = the quantity of output
r_i = the price of input i
x_i = the quantity of input i, and

the production function is

$$Y = f(x_1, \ldots, x_n) \tag{5.17}$$

Duality theory uses an indirect profit function which is defined as the maximum profit associated with given output and input prices. One way to derive the indirect profit function is to obtain factor demand and product supply functions from primal solution, that is, from equation 5.16 (assuming one output and two inputs)

$$\frac{\partial \pi}{\partial x_1} = 0 \Leftrightarrow x_1 = x_1^* (P, r_1, r_2) \tag{5.18}$$

$$\frac{\partial \pi}{\partial x_2} = 0 \Leftrightarrow x_2 = x_2^* (P, r_1, r_2) \tag{5.19}$$

where x_1^* and x_2^* are factor demand functions. Substituting for x_1^* and x_2^* from (5.18) and (5.19) into (5.17) we obtain the profit maximizing level of output (Y^*)

$$Y^* = f(P, r_1, r_2) \tag{5.20}$$

and substituting x_1^*, x_2^*, and Y^* into (5.16) gives

$$\tilde{\pi} = P \cdot Y^* (P, r_1, r_2) - r_1 x_1^* (P, r_1, r_2) - r_2 x_2^* (P, r_1, r_2)$$

or

$$\tilde{\pi} = \tilde{\pi} (P, r_1, r_2) \tag{5.21}$$

Equation 5.21 is an indirect profit function. Note that this profit function shows profit as a function of prices only and not quantities. Here, it is assumed that prices are

determined exogenously. There is an advantage in estimating an indirect profit function that is a function of prices (and quantities of fixed factors of production) compared to estimating a production function (or revenue function) that expresses quantity of output as a function of quantities of all inputs. The advantage is that no endogenous variable (output or input levels) is included in the indirect profit function as an explanatory variable and therefore simultaneous equation problems are avoided in the econometric estimates (Lopez).

This becomes especially important when estimating output elasticities with respect to the fixed factors of production. The reduced form elasticities obtained from an indirect profit function (the duality approach) reflect the output supply response of a profit-maximizing, price-taking firm assuming prices of variable factors and quantities of other fixed factors remaining constant. However, unlike the production function elasticities, they do allow for the adjustment of the quantities of variable factors to an increase in the "fixed" factor. As the quantity of a fixed factor (such as capital) increases, the marginal productivity of all variable factors is expected to rise. This increase in the marginal productivity will shift the factor demand curves to the right, and as a result the profit maximizing firm will employ more of the variable factors. Under these conditions the *mutatis mutandis* elasticities obtained from the duality approach seem to be more appropriate in policy analysis than the *ceteris paribus* elasticities obtained from a direct product function (Lau and Yotopoulos, p. 17).

An important concept in duality is the Envelope Theorem. A notable result of the Envelope Theorem is that by taking partial derivatives of the indirect profit functions with respect to the price of output and the prices of inputs we obtain the output supply and input demand equations, that is

$$\frac{\partial \tilde{\pi}}{\partial P} = Y^*(P, r_1, r_2) \tag{5.22}$$

$$\frac{\partial \tilde{\pi}}{\partial r_i} = -x_i^*(P, r_1, r_2) \tag{5.23}$$

Equation 5.22 represents an output supply equation while equation 5.23 represents input demand equations.

> The convenience of duality should be apparent. If we know the indirect profit function we can get the unconditional factor demand and product supply functions by simple partial differentiation -- quite an analytical advantage, indeed [Beattie and Taylor, p. 226].

The following example from Lau and Yotopoulos is given for further clarification of the duality approach. Assume a firm's production function as

$$Y = f(x_1, \ldots, x_n; z_1, \ldots, z_m) \tag{5.24}$$

where

Y = quantity of output
x = quantity of variable inputs, and
z = quantity of fixed inputs.

Substituting (5.24) into (5.16) we will have

$$¶ = P \cdot f(x_1, \ldots, x_n; z_1, \ldots, z_m) - \sum_{i=1}^{n} r_i x_i \qquad (5.25)$$

where:

$¶$ = profit defined as current revenues less current total variable costs
P = unit price of output
r_i = unit price of the ith variable input.

Dividing both sides of equation 5.25 by P we have

$$¶' = \frac{¶}{P} = f(x_1, \ldots, x_n; z_1, \ldots, z_m) - \sum_{i=1}^{n} r_i' x_i \qquad (5.26)$$

where

$¶' = \frac{¶}{P}$ is defined as the unit-output-price (UOP) profit , and

$r_i' = \frac{r_i}{P}$ is the normalized price of the ith input.

By converting from profit function (¶) to the UOP profit function, we will have all functions used in the analysis in terms of relative prices.

Since input demand functions are homogenous of degree zero in input and output prices, we can write equations 5.18 and 5.19 as

$$x_i^* = f_i(r', z), \qquad i = 1, \ldots, n \qquad (5.27)$$

where

x_i^* = the optimal quantitie of variable input i
r' = the vector of normalized price of variable inputs, and
z = the vector of fixed inputs (fixed inputs are implicit within 5.18 and 5.19, though not shown).

By subsituting (5.27) into (5.25) we have

$$\tilde{¶} = P \cdot [f(x_1^*, \ldots, x_n^*; z_1, \ldots, z_m) - \sum_{i=1}^{n} r_i' x_i^*] \qquad (5.28)$$

Equation 5.28 gives the maximized value of the profit for each set of values for P, r_i, and z. Rewriting (5.28) as a function of r' and z (from 5.27)

$$\tilde{\pi} = P \cdot f^*(r_1', \ldots, r_n'; z_1, \ldots, z_m) \tag{5.29}$$

the UOP profit function is therefore given by

$$\tilde{\pi}' = \frac{\tilde{\pi}}{P} = f^*(r_1', \ldots, r_n'; z_1, \ldots, z_m) \tag{5.30}$$

From $\tilde{\pi}'$ (the UOP profit function) one can always find $\tilde{\pi}$ and visa versa. It is known that the UOP profit function is decreasing and convex in the normalized prices of variable inputs and increasing in quantities of fixed inputs and in the money price of the output.

From the Envelope Theorem

$$x_i^* = -\frac{\partial \tilde{\pi}'(r', z)}{\partial r_i'} \qquad i = 1, \ldots, n \tag{5.31}$$

$$Y^* = \tilde{\pi}'(r', z) - \sum_{i=1}^{n} \frac{\partial \tilde{\pi}'(r', z)}{\partial r_i} \cdot r_i' \tag{5.32}$$

where (5.32) is the supply function.

Derived input demand functions (equation 5.31) and the UOP (sometimes referred to as normalized) profit function (equation 5.30), or alternatively the supply function (equation 5.32) must be estimated jointly with cross-equation restrictions because of the existence of parameters that are common to both equations.

The advantages of working with the UOP profit function instead of the traditional production function are summarized as follows (Lau and Yotopoulos, pp. 12-13):

1. The input demand and output supply functions (equations 5.31 and 5.32) can be directly derived from an *arbitrary* normalized indirect profit function (UOP profit function) which is decreasing and convex in the normalized variable input prices and increasing in the fixed factors of production. Hence, explicit specification of the production function (equation 5.24) is not needed. And therefore, without solving for first order conditions for a profit-maximizing firm ($P \cdot \frac{\partial f}{\partial x_i} = r_i$ or $MP_i = r_i'$) the input demand functions can be derived. This provides flexibility in empirical analysis.

2. By the duality approach, because the derived factor demand and output supply functions are obtained from a profit function, the assumptions of profit maximization and competitive markets are assured.

3. As was mentioned before, the simultaneous equation bias is avoided because the profit, output supply, and input demand functions are explicitly written as functions of exogenous variables (output and variable input prices and quantities of fixed factors) which are considered to be determined independently of the firm's behavior.

The indirect profit functions associated with various single-output, multi-input production functions (Generalized Cobb-Douglas, Quadratic, CES) are given in Henneberry (1986).

2. *The Cost Function Approach.* This approach has been used to measure factor demand elasticities, elasticities of substitution and technical change in agriculture (Lopez, p. 354). In this method an indirect cost function is defined as the minimum cost required to produce a given level of output at given factor prices. Equation 5.33 represents an indirect cost function:

$$\tilde{c} = \tilde{c}\ (r_1, \ldots, r_n, y) \tag{5.33}$$

Another important result of the Envelope Theorem (usually referred to as Shephard's Lemma) is that by partial differentiating of the indirect cost function (equation 5.33) with respect to input prices we obtain the conditional input demand functions, that is:

$$\frac{\partial\, \tilde{c}}{\partial\, r_i} = X_i^c\ (r_1, \ldots, r_n, y) \tag{5.34}$$

where X_i^c is the conditional factor demand equation (conditional on the level of output), also:

$$\frac{\partial\, \tilde{c}}{\partial\, y} = MC(r_1, \ldots, r_n, y) \tag{5.35}$$

which is the marginal cost function. By equating 5.35 to price and solving for Y^* we obtain the product supply equation:

$$Y^* = Y^*\ (P, r_1, \ldots, r_n) \tag{5.36}$$

The indirect cost functions associated with various single-output, multi-input production functions (Cobb-Douglas, Quadratic, CES) are given by Henneberry.

3. *Limitations.* An important limitation of the cost function approach of the dual method is that:

> ... it assumes that output levels are not affected by factor price changes and, thus, the indirect effect of factor price changes (via output levels) on factor demands are ignored. Moreover, the inclusion of output

> levels as explanatory variables may lead to simultaneous equation biases if output levels are not indeed exogenous. The profit function approach allows one to overcome most of these problems although at the cost of requiring a stronger behavioral assumption. The profit maximization assumption may be substantially more difficult to support in agriculture than simple cost minimization because of risk related problems which are mainly related to the variability of output yields and price rather than to costs of production [Lopez, pp. 356-357].

Limitations of the application of the duality approach (indirect profit or cost functions) are:

1. The duality approach is best suited for the micro-firm level and it should be applied to data from a profit-maximizing individual firm. However, many of the empirical estimations in agricultural economics have applied the duality approach to aggregate data in order to derive output supply and input demand functions for a country or region. The appropriateness of the results is therefore questionable.

2. In most cases, it is difficult to determine whether the estimated elasticities from the dual method are short-run or long-run elasticities. One approach used to distinguish short- and long-run elasticities has been to estimate the indirect profit or cost functions with and without fixed factors of production. Including fixed factor presumably estimates short-run elasticities. If the indirect profit or cost functions do not include any fixed inputs, then the estimated elasticities are assumed to be long-run. The dilemma is that designation by the analyst of fixed and variable factors is arbitrary.

3. The dual approach assumes a profit maximizing or cost minimizing production unit. As a result, this approach may not be the appropriate to depict behavior of subsistence farmers in developing countries. These farmers may be risk minimizers rather than profit maximizers or cost minimizers.

4. Price expectations, lagged adjustment, and numerous supply shifter variables have not yet been incorporated into the dual approach. It is appropriate to include expected prices rather than current prices in the indirect profit function.

The dual method is conceptually elegant and has wide appeal to those analyzing supply. However, the dual must be used with caution for reasons listed above.

The Measurement of Interindustry Effects

A policy designed to directly affect one industry will typically have indirect effects upon others. Of course, policy analysts will frequently be interested in measuring these interindustry effects. Such effects will usually be transmitted along three channels. The first channel is the interdependencies of the output demands. If the demand for commodity

j is a function of the price of commodity i, then obviously a policy which affects the price of i will have an impact upon j. The second channel is the technical interdependencies in the production of the commodities. For example, if the ith output is used as an input in the production of the jth output, then policies affecting i will also affect j. Technical interdependencies may take other forms. For example, the production process for the ith output may generate by-products used in the production of the jth output. The third channel is the competition between industries for limited resources. If different industries use the same inputs, then a policy affecting factor utilization in industry i can also affect industry j. For example, a policy increasing the demand for the ith output will also increase the demand for inputs in the production of the ith output. If these inputs are of limited availability, then increases in input prices will result. These increases in input prices will then affect the production processes for all other industries using the inputs. Interindustry effects of this latter sort could exist even between industries producing technically independent outputs.

Unfortunately, the measurement of all interindustry effects will typically require a general equilibrium analysis, which will in turn require estimates for a comprehensive set of demand and supply functions. However, we can measure the interindustry effects deriving from competition for limited resources with relative ease, provided that certain assumptions hold. In this section, we present a model in which the interindustry effects of changes in output prices upon industry supplies may be measured under certain assumptions. The section illustrates how theory in conjunction with assumptions may often be used to simplify estimation problems in supply analysis.

Suppose an economy consisting of n technically independent industries. For the sake of simplicity, we assume that only one input is used over all production processes. Of course, we may view this one input as an aggregate variable consisting of many inputs. Input is assumed to be of fixed availability to the economy, but of variable availability to each industry in the economy, and hence also to all firms within industries. If the firms in each industry seek to maximize profits, and if all firms purchase input as though their purchases are inconsequential to input price, then we would expect input to be allocated across industries so as to maximize the marketable value of the output mix. This follows since each firm will attempt to equate its marginal value product of the input to the input price. Since a common input price is paid by all firms, this then implies that the marginal value products of the input will all be equal to each other. Hence, a reallocation of input from one firm to another or from one industry to another cannot increase the value of the total output mix, and therefore, the value of the output mix must be at a maximum.

The input allocation described above is the solution to the following optimization problem:

$$\text{maximize } (x_1, \ldots, x_n): \qquad \sum P_i O_i (x_i)$$

$$\text{subject to:} \qquad X = \sum x_i$$

where: P_i is the ith output price. O_i is the production function for the ith industry. x_i is

input allocation to the ith industry, and X is the fixed amount of input available to the economy. Let the Lagrangian to this problem be:

$$L(x_1, \ldots, x_n, \lambda) = \sum P_i O_i (x_i) + \lambda (X - \sum x_i)$$

The optimal solution is found by setting the derivatives of the Lagrangian equal to zero. Hence, inputs will be allocated such that:

$$\frac{\partial L}{\partial x_i} = P_i O_i' (x_i) - \lambda = 0; \qquad i = 1, \ldots, n \tag{5.37}$$

$$\frac{\partial L}{\partial \lambda} = X - \sum x_i = 0 \tag{5.38}$$

λ is the marginal contribution of input toward the value of the output mix. Since all firms equate marginal value product to input price, the equilibrium input price must be equal to λ. λ is therefore the aggregate price-dependent demand for input. The second condition requires that the sum of all input demands equal input supply, which is of course fixed at X.

Let the choice functions to the maximization problem be denoted by $x_i^* (P_1, \ldots, P_n, X)$ and $\lambda^* (P_1, \ldots, P_n, X)$. The x_i^* might be described as industry factor demands however, these differ from ordinary factor demands with respect to the underlying ceteris paribus assumptions. In particular, ordinary factor demands measure factor demanded at alternative output and input prices, whereas the present factor demands measure factor demanded at alternative output prices and alternative levels of total factor availability. Accordingly, the output-price elasticities of ordinary factor demands assume that input prices are held constant as the output price changes, whereas the output-price elasticities of the present factor demands allow input prices to vary as output price changes, but assume that total input availability is held constant. Hence, the elasticities of the $x_i^* (P_1, \ldots, P_n, X$ with respect to the output prices assume that a change in output price is accompanied by an equilibrating change in input prices. This explains why factor demand for the ith industry is a function of output price for the jth industry even though the outputs of these industries are technically independent. The transmission may be described thus: as output price in the jth industry increases, factor demanded by the jth industry increases also, which then increases factor price, which then decreases factor demanded in the ith industry.

Since there are n factor demands which are each functions of aggregate input and output prices, we can define n elasticities with respect to aggregate input and n^2 output price elasticities. An attractive feature of the present model is that computation of these elasticities requires a very limited amount of information. In the remainder of this section it is shown that all of the output price elasticities can be calculated if the aggregate input elasticities are known. Alternatively, all of the cross output price elasticities and aggregate input elasticities can be calculated if the own-price elasticities are known.

The elasticities for the present model are related by the following two equations:

$$E_{ii} = \frac{E_{ix}(r_i E_{ix} - 1)}{\gamma_x} \tag{5.39}$$

$$E_{ij} = \frac{r_i E_{ix} E_{jx}}{\gamma_x}; \qquad i \neq j \tag{5.40}$$

here: E_{ij} is the elasticity of the ith factor demand with respect to the jth output price. E_{ix} the elasticity of the ith factor demand with respect to aggregate input. γ_x is the elasticity f λ with respect to aggregate input. r_i is the proportion of total input allocated to the ith dustry; hence, $r_i = \frac{x_j}{X}$. From these equations it is clear that all of the output price asticities can be calculated if one has: γ_x, the input proportions, and the input elasticities. can also be calculated using the above equations if one output price elasticity is known.

The following is a brief outline of the derivation of 5.39 and 5.40: Calculate the rious derivatives of the first-order conditions in 5.37 and 5.38 with respect to output ices and aggregate input. After converting these derivatives to elasticity form, one should tain the conditions:

$$1 + \phi_i E_{ii} = \gamma_i \tag{5.41}$$

$$\phi_i E_{ij} = \gamma_j; \qquad i \neq j \tag{5.42}$$

$$\phi_i E_{ix} = \gamma_x \tag{5.43}$$

$$\Sigma_i r_i E_{ij} = 0 \tag{5.44}$$

$$\Sigma_i r_i E_{ix} = 1 \tag{5.45}$$

ere:

$$\phi_i = Q_i'' \frac{x_i}{Q_i}$$

$$\gamma_i = \frac{\partial \lambda}{\partial P_i} \left(\frac{P_i}{\lambda}\right)$$

stitute 5.43 into 5.45 to obtain:

$$\gamma_x = \left(\Sigma \frac{r_i}{\phi_i}\right)^{-1} \tag{5.46}$$

$$\gamma_j \sum_i \left(\frac{r_i}{\phi_i}\right) - \frac{r_j}{\phi_j} = 0$$

Substitute 5.43 and 5.46 into the latter to produce:

$$\gamma_j = r_j E_{jx} \tag{5.47}$$

Substitution of the last equation into 5.41 and 5.42 yields 5.39 and 5.40.

Implementation of 5.39 and 5.40 requires knowledge of the aggregate input elasticities. It will often be the case that estimates for these are not available. The more likely case is that the analyst has estimates for the own output price elasticities, but not for the cross output price elasticities or aggregate input elasticities. However, with use of one additional assumption, we can construct the full set of elasticities even under this latter circumstance. Observe that 5.39 implies:

$$r_i E_{ix}^2 - E_{ix} - \gamma_x E_{ii} = 0$$

which implies:

$$r_i E_{ix} = \frac{1 \pm [1 + 4 r_i \gamma_x E_{ii}]^{1/2}}{2} \tag{5.48}$$

We can resolve the $\pm$ sign in the last expression with an assumption. Observe that $r_i E_{ix} = \frac{\partial x_i^*}{\partial X}$. Assume that the allocation of a unit increase in aggregate input is such that no single industry receives over 1/2 of the allocation, that is, $\frac{\partial x_i^*}{\partial X} \leq 1/2$ for all i. With this assumption, the negative alternative in the last equation is known to pertain. If we sum this equation over i and substitute 5.45 into the sum, the following expression is obtained:

$$2 = n - \sum_i [1 + 4 r_i \gamma_x E_{ii}]^{1/2} \tag{5.49}$$

Since the r_i and E_{ii} are assumed to be known, the only unknown in the last equation is γ_x. We can solve the equation for γ_x using an algorithm designed to solve nonlinear equations. The Newton-Raphson algorithm would be a possible choice. After obtaining γ_x, the E_{ix} could be found using 5.48 with the $\pm$ term being replaced with -.

We now provide an example of the above procedure. Suppose an economy in which there are four industries. Let $r_i = 1/4$ for all i, and suppose that the own output price elasticities are estimated at:

$$E_{1x} = .4 \qquad E_{2x} = .8 \qquad E_{3x} = 1.2 \qquad E_{4x} = 1.6$$

The above may be substituted into (5.47) to obtain the γ_i. γ_i is the elasticity of the price-dependent aggregate input demand with respect to P_i. The γ_i are found to be:

$$\gamma_1 = .1 \qquad \gamma_2 = .2 \qquad \gamma_3 = .3 \qquad \gamma_4 = .4$$

Finally, 5.39 and 5.40 may be used to find the output price elasticities. These are found to be:

	P_1	P_2	P_3	P_4
x_1	.72	-.16	-.24	-.32
x_2	-.16	1.28	-.48	-.64
x_3	-.24	-.48	1.68	-.96
x_4	-.32	-.64	-.96	1.92

Suppose that a price support program were implemented for the fourth industry, ınd that the program raised industry output price by 10 percent. This increase in output ırice will lead to an increase in input demand in the fourth industry. In particular, input lemand for the fourth industry will increase by 19.2 percent. Since aggregate input supply s fixed, and since the elasticity of the price-dependent aggregate input demand with respect o P_4 is $\gamma_4 = .4$, the input price will increase by 4 percent. This increase in input price will ead to a reduction in input demand in all other industries. The percentage changes in the nput demands may be read from the last column of the matrix above. For example, input emand in the first industry will be reduced by 3.2 percent.

ACTIVITIES

1. Using revenue shares, own-price elasticities, and formulas as shown in Chapter 5, reproduce the cross-price elasticities and the entire matrix of Tables 5.1 and 5.2 on a spreadsheet.

2. Calculate the values of the constants in K_i and K_i assuming that each of the prices is 100 and OC = 50, OS = 75, OR = 25, OW = 60, OM = 100, OL = OT = 90 in Tables 5.1 and 5.2

(a) Would estimation in original values or logarithms be most appropriate?

(b) Is a distributed lag model appropriate? Why?

(c) What are advantages and disadvantages of using more years of time series data to estimate the supply equation?

(d) What criteria are appropriate for determining whether the estimated supply equation is a good representation of the true supply function? On what basis do you decide which empirical equation is "best"?

REFERENCES

Antle, John. 1984. The Structure of U.S. Agricultural Technology, 1910-78. *American Journal of Agricultural Economics*. 66:414-21.

Askari, Hossein and John Thomas Cummings. 1976. *Agricultural Supply Response. A Survey of the Econometric Evidence*. New York: Praeger Publishers.

Beattie, Bruce R., and C. Robert Taylor. 1985. *The Economics of Production*. Baltimore: John Wiley and Sons.

Jenneberry, Shida. 1986. A Review of Agricultural Supply Responses for International Policy Models. Agricultural Policy Analysis Background Paper B-17. Stillwater: Department of Agricultural Economics, Oklahoma State University.

Lau, Lawrence and Pan Yotopaulos. 1972. Profit, Supply, and Factor Demand Functions. *American Journal of Agricultural Economics*. 54: 11-18.

Lopez, Ramon E. 1982. Applications of Duality Theory to Agriculture. *Western Journal of Agricultural Economics*. 7:353-65.

Nerlove, Marc. 1958. *The Dynamics of Supply: Estimation of Farmer's Response to Price*. The Johns Hopkins University Studies in Historical and Political Science, Series LXXVI, Number 2.

Tweeten, Luther and Leroy Quance. 1969. Positive Measure of Aggregate Supply Elasticities: Some New Approaches. *American Journal of Agricultural Economics*. 51:342-52.

Tweeten, Luther, Mike Woods, Daryll Ray, and Greg Parvin. January 1981. Statistical Tests of the Hypothesis of Reversible Agricultural Supply. *North Central Journal of Agricultural Economics*. 3: 13-19.

Zuiner, Fred and Luther Tweeten. 1965. A Methodology for Estimating Production Parameters. *Journal of Farm Economics*. 47: 1462-67.

CHAPTER 5

MODULE 5

REGRESSION AND STATISTICAL METHODS *)

*) Daryll E. Ray, 1989. Chapter 2 in Luther Tweeten, ed. *Agricultural Policy Analysis Tools for Economic Development*, Westview Press, Colorado.

2. REGRESSION AND STATISTICAL METHODS

by Daryll E. Ray

Policy analysis often requires using two kinds of statistical techniques: Descriptive statistics and inferential statistics. The term *descriptive statistics* includes a wide range of activities. The most common descriptive statistics measure central tendency using sample means, medians, and modes. Descriptive statistics also measure dispersion using ranges, mean absolute differences, variances, standard deviations, and coefficients of variation. Also, classifying data, constructing frequency distributions and histograms, and drawing other kinds of graphs such as line, bar, or pie graphs are in the domain of descriptive statistics[1].

Inferential statistics uses information from selected observation units (say, 1,000 farms) to reach conclusions about the totality of the unit base (all farms in a given region). The selected observation units form the sample, and "the totality of the unit base" is referred to as the population. Thus, statistical inference deals with inferring about the population based on a (usually random) sample. Statistical inference allows researchers to make predictions based on sample information and to test hypotheses.

OBJECTIVES

The focus of this chapter is the subset of inferential statistics encompassing linear regression and its applications. Specifically, the objectives are to discuss the underlying assumptions of the classical regression model, the least squares estimation procedure, and the most common hypothesis tests. Extensions of the classical regression model are also presented including the use of alternative functional forms, and dummy or binary variables.

---

[1]For a comprehensive treatment of descriptive statistics and graphical representation of data see Hayslett (pp. 6-34), Huntsberger and Billingsley (pp. 1-56), and Moore (pp. 129-233).

Since the underlying assumptions of the classical model are often not fulfilled, some of the most common econometric techniques that can be used to overcome violation of assumptions are briefly summarized[2]. Some statistical theory and notation are used but the exposition favors intuitive explanation over mathematical sophistication.

KEY POINTS

Many economic relationships postulate that changes in one variable, say the supply quantity of a commodity, can be explained by changes in several other variables such as commodity price expectations, input prices, technology, and weather. Regression analysis provides a means to quantify this cause-and-effect behavioral or technical relationship. Regression and its econometric extensions are the primary statistical analysis tools for giving empirical content to economic relationships.

When using regression, the variable to be explained is identified as the dependent variable while the variables that do the explaining are called independent variables. The independent variables are the causes and the dependent variable the effect. An analyst may use a regression-estimated economic relationship in several ways: To quantify an economic parameter, such as an elasticity of supply or the marginal propensity to save, or to test a hypothesis concerning a parameter value or set of values. Often the estimated relationship is used to forecast the value of the dependent variable for given values of the independent variables. The same regression would be run in all cases but the results would be used or emphasized differently depending on the purpose of the analysis.

The first step in applying regression analysis includes specifying the explanatory variables and functional form of the model. But it also includes a set of assumptions regarding the randomness of disturbances and the dependent variable, linearity of parameters, and other properties of the disturbance term and independent variables.

Ordinary least squares provides estimates of the model coefficients that minimize the sum of squared deviations of the actual observations and the model predictions of the dependent variable. With the classical assumptions fulfilled, model coefficients estimated with ordinary least squares have desirable statistical properties including unbiasedness and efficiency. The total variation of the dependent variable can be split into two parts: the part explained by the regression and the part unexplained or due to error. This decomposition is summarized in an analysis of variance table and the coefficient of determination of R^2 value. R^2 is the proportion of the variation of the dependent variable explained by the regression.

Significance testing provides a procedure for judging if there is any statistical difference between estimated parameters and hypothesized values for population parameters. The t distribution is used to test hypotheses that involve only one parameter or linear combinations of parameters. The most common use of the t distribution is to test a single coefficient against a null hypothesis that the parameter is equal to zero. The t is also

---

[2]Books by Johnston, Kmenta, Maddala, and Pindyck and Rubinfeld are excellent references for those wanting additional information on the regression and econometric topics discussed in this chapter.

used to develop confidence intervals around individual model parameters and around forecasts of the dependent variable. The F distribution must be used to test hypotheses that involve setting more than one model parameter to specified values or involve more than one linear combination of the model parameters. Regardless of the specific hypothesis being tested, a standard set of procedural steps are followed.

Various functional forms are consistent with the statistical assumptions of the classical regression model. However, the estimation of elasticities and interpretations of coefficients vary from one functional form to another. Dummy or binary variables can be used whenever a set of observations can be separated into classes such as male and female or the various regions of a country. One of the most common applications of dummy variables is to account for seasonality such as allowing shifts in a function by quarter or season.

Violation of one or more of the assumptions of the classical model can cause difficulties in the use of the regression. Specification error means the wrong model was estimated. For example, if the wrong set of independent variables and/or functional form were used, the model estimates would no longer be unbiased. Also, model estimates are biased or ineffecient if (1) an independent variable is measured incorrectly, (2) the disturbances are correlated with one another, (3) the disturbances have different variances, or (4) an explanatory variable is correlated with the disturbances. Econometric procedures are available to address each of these difficulties.

CONCEPTS AND APPLICATIONS

Model Specification

The first step in regression analysis is to specify the general form of the model. In economic applications, the variable to be explained (dependent variable) y is specified as a function of K independent variables -- $x_1, x_2, x_3, \ldots x_K$. The independent variables are selected based on economic theory, knowledge about the economic phenomenon being investigated, and previous research. Ideally, during the specification stage, model construction should not be influenced by data availability or other constraints. The functional (mathematical) form must also be specified. Economic theory often provides little insight regarding functional form. Previous research and especially the researcher's knowledge about economic activity being investigated usually must be relied upon.

1. Meaning of Linear. The classical regression model requires the function to be linear in the parameters. That is, the true regression coefficients, referred to as ß's later on (e.g., equation 2.1), must have an exponent of one and must not be multiplied or divided by another. However, the independent variables or x's need not be linear. Thus, the researcher must decide, based on his conception of the *true* function, whether the x's should be used as they are measured or transformed, say, by taking logarithms of the independent variables or logarithms of both dependent and independent variables. Or, in addition to original x's, the researcher may decide to include the square (and cube) of certain variables to allow curvature, or the product of two variables to allow interaction.

Again, the specification represents the researcher's belief about the *true* set of independent variables and the functional form of the relationship explaining variation in the dependent variable.

2. *Random Nature of the Dependent Variable.* In contrast to the physical and engineering sciences where relationships tend to be precise, a regression relationship in the social sciences is usually less exact. The value of a dependent variable (say, family milk consumption) varies from one observation unit to another even though the x or independent variable *values are identical* (say, income, family size, family age and sex composition, cultural heritage, occupation(s), time of year, and price). Thus, there is a *distribution* of y values for *each set* of values for the K independent variables. Even if the x variables and functional form were known with certainty (and all other rules are met), the regression relationship is an estimate of the dependent variable's expected or average value. Put another way, the regression relationship estimates the mean of a distribution of y values that would be generated from multiple samples of the dependent variable *for identical values of x.*

More formally, the regression model assumes that for each set of values for the K independent variables, there is a distribution of y_t values such that the mean of the distribution is given by

$$E(y_t) = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \ldots \beta_k x_{tk} + \ldots + \beta_K x_{tK} \qquad (2.1)$$

where t represents one (say the 4th) of the T total number of observations in the sample (say, 153); $t = 1, \ldots, T$;

k represents one of the K total number of explanatory variables (including the intercept);

y_t denotes the t^{th} observation of the dependent variable;

x_t's denote the t^{th} observation of the K explanatory variables;

ß's are the *true* but *unknown* population parameters; β_k ($k = 2, \ldots, K$) is the slope of the relationship between the independent variable x_k and the dependent variable holding all other independent variables constant. β_1 is the intercept which represents the expected value of y when the all the remaining (nonintercept) variables are zero.

The inclusion of the intercept can be made explicit by defining $x_{t1} \equiv 1$ for $t = 1, \ldots, T$; then

$$E(y_t) = \beta_1 x_{t1} + \beta_2 x_{t2} \ldots + \beta_K x_{tK} \qquad (2.2)$$

The x_{t1} variable will be defined to be 1 for all t in subsequent discussion unless otherwise specified.

3. *Inclusion of Random Disturbances.* Equations 2.1 and 2.2 represent the theoretical relationship to explain the average value of y_t from repeated sampling with the x variables held constant. As an average, the equation is postulated to be accurate, but for a *single* observation of y_t the model must allow for imperfect prediction. This is done by including an error term

$$y_t = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \ldots \beta_k x_{tk} + \ldots + \beta_K x_{tK} + u_t \tag{2.3}$$

The error term u_t is the deviation of the value of y from its distribution mean. The error term summarizes the collective influence on y of many variables, each of which is assumed to be of little importance and may be difficult or impossible to quantify. The error term may be the result of unknowable disturbances, sampling imperfection, or variables left out of the equation. The latter source of *specification error* should be minimized by including all variables if possible.

Representations of the Model

The regression model can be represented in various ways. Three of the more common representations are presented in this section. The matrix notation version of the model is often used since it includes all the observations of the variables and yet is convenient to manipulate.

1. *Summation Notation.* Using only the t^{th} observations on y and the x's the model can be represented using summation notation as:

$$y_t = \sum_{k=1}^{K} \beta_k x_{tk} + u_t \tag{2.4}$$

2. *Vector Notation.* Because the summation part of equation 2.4 defines the vector multiplication of a row vector of the x values and a column vector containing the ß's, the model can also be written as

$$y_t = \underset{\underset{\sim}{x}}{[x_{t1}, x_{t2}, \ldots, x_{tK}]} \underset{\underset{\sim}{\beta}}{\begin{bmatrix} \beta_1 \\ \beta_2 \\ \cdot \\ \cdot \\ \cdot \\ \beta_K \end{bmatrix}} + u_t \tag{2.5}$$

Using the $\underset{\sim}{x}_t$ and $\underset{\sim}{\beta}$ definitions suggested in equation 2.5, the vector representation for the t^{th} observations of the y and the x's is

$$y_t = \underset{\sim}{x}_t \underset{\sim}{\beta} + u_t. \tag{2.6}$$

3. Matrix Notation. Suppose we write the relationship given by equation 2.5 for the first observation. Assigning t equal to 1 we have

$$t = 1 \qquad y_1 = [x_{11}, x_{12}, \ldots, x_{1K}] \begin{bmatrix} \beta_1 \\ \beta_2 \\ \cdot \\ \cdot \\ \cdot \\ \beta_K \end{bmatrix} + [u_1] \tag{2.7}$$

Continuing on, let t = 2 and add a second "row" to equation 2.7 to represent the second observations on y, the x's, and u. Doing similarly for t = 3, . . ., T results in a set of vectors and matrices that contain all the observations for all the variables in the model

$$\begin{bmatrix} y_1 \\ y_2 \\ \cdot \\ \cdot \\ \cdot \\ y_T \end{bmatrix} = \begin{bmatrix} x_{11} \cdots x_{1K} \\ x_{21} \cdots x_{2K} \\ \cdot \\ \cdot \\ \cdot \\ x_{T1} \cdots x_{TK} \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \cdot \\ \cdot \\ \cdot \\ \beta_K \end{bmatrix} + \begin{bmatrix} u_1 \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ u_T \end{bmatrix} \tag{2.8}$$

$\underset{\sim}{y}$ $\quad$ X $\quad$ $\underset{\sim}{\beta}$ $\quad$ $\underset{\sim}{u}$

or more compactly:

$$\underset{\sim}{y} = X \underset{\sim}{\beta} + \underset{\sim}{u} \quad \text{or simply} \quad y = X\beta + u \tag{2.9}$$

where

y is the Tx1 vector of observations on the dependent variable;
X is a TxK matrix of observations on the independent variable;
ß is a Kx1 vector of *true* but *unknown* parameters;
u is a Tx1 vector of *unknown* disturbances.

Assumptions

Certain assumptions must be met to estimate appropriately the population parameters and to conduct tests of hypotheses under the OLS framework. As noted previously, the correct independent variables and functional form must be used and the function must be linear in the parameters. Of course, the data on the y and x variables must be measured accurately. Other assumptions are listed below. Implications of violating

each of the critical assumptions are discussed later but are briefly noted here within parentheses.

1. For each set of observations, the mean value of the error term is 0. That is, for $x_{t1}, x_{t2}, \ldots, x_{tK}$, $Eu_t = 0$ for all t. (The regression estimate for the intercept β_1 is adversely affected if this assumption is invalid; estimates for the remaining β's are unaffected.)
2. For each set of observations, the error or disturbance term has a constant variance of σ^2, that is, $VAR(u_t) = \sigma^2$ for all t. (Disturbances are said to be *homoskedastic* when this assumption is valid; *heteroskedastic* when it is not. Regression parameter *estimates* do not have least variance when the assumption is invalid).
3. For any two sets of observations, the error or disturbance terms are uncorrelated, that is $COV(u_t, u_s) = 0$. (Disturbances are said to be nonautocorrelated when this assumption is fulfilled and autocorrelated when it is not. Regression parameter *estimates* do not have least variance when the assumption is invalid).
4. Each independent variable is uncorrelated with the disturbance term. Thus, for each x_k, $COV(x_k, u) = 0$. (The *averages* of regression parameter estimates *over many samples* are accurate or unbiased when the assumption is valid but biased when the assumption is invalid.)
5. No exact linear relationships exist among the independent variables. (Estimation is impossible if, for example, variable C is exactly equal to twice variable D minus one-fifth variable F, etc. "Perfect multicollinearity" is said to exist if this assumption is invalid.)
6. The number of observations must exceed the number of explanatory variables, including the intercept. That is, T must be greater than K. (Estimation is impossible if we have fewer years of observations than parameters to estimate.)
7. In repeated sampling of y and u for a given set of the K independent variables, the disturbance u_t has a normal distribution. This assumption is not necessary to compute regression parameter estimates, but it is necessary if tests of hypothesis based on t and F distributions are to be conducted.

Notation for Estimated Parameters and Variables

So far the equations and most of the discussion have focused on the *true* relationship between the dependent variable and the K independent variables in the *population*. The regression analysis technique is used to estimate the values of the true population parameters using data from a finite sample of size T taken from the population. To distinguish the population model from the estimated model, the estimated empirical model is written as:

$$\hat{y}_t = \hat{\beta}_1 + \hat{\beta}_2 x_{t2} + \hat{\beta}_3 x_{t3} + \ldots \hat{\beta}_k x_{tk} + \ldots + \hat{\beta}_K x_{tK} \tag{2.10}$$

where the *estimates* of the true values are designated by "hats". The right hand side of the equation provides the prediction of y given the x values and the ß estimates.

The estimated residual $\hat{u}$'s are the estimates of the population disturbance but also pick up the empirical slack between the actual observations on y and their predicted values. Thus

$$y_t = \hat{y}_t + \hat{u}_t \tag{2.11}$$

where the predicted part, $\hat{y}_t$, is defined as

$$\hat{y}_t = \hat{\beta}_1 x_{t1} + \hat{\beta}_2 x_{t2} + \ldots + \hat{\beta}_K x_{tK} \tag{2.12}$$

or using matrix notation the Tx1 vector $\hat{y}$ is computed as

$$\hat{y} = X\hat{\beta} \tag{2.13}$$

By rearranging equation 2.11, the estimated population disturbance or residual appears as

$$\hat{u}_t = y_t - \hat{y}_t \tag{2.14}$$

or using matrix notation, the T observations on $\hat{u}$ are

$$\hat{u} = y - \hat{y} = y - X\hat{\beta} \tag{2.15}$$

Ordinary Least Squares

The $\hat{\beta}$'s are estimated using the least squares criterion, commonly called ordinary least squares (OLS) regression. The procedure is called least squares because it finds the set of ß estimates that causes the sum of the square of the $\hat{u}$'s ($\hat{u}_t$, t=1 . . . T) to be the smallest. Any *other* set of estimates for ß would cause the corresponding sum of squared $\hat{u}$'s to have a larger value. Thus, ordinary least squares finds the values for $\hat{\beta}_1$, $\hat{\beta}_2$, . . ., $\hat{\beta}_K$ that minimize the sum of the squared residuals:

$$\sum_{t=1}^{T} \hat{u}_t^2 = \hat{u}'\hat{u} \tag{2.16}$$

Using the definition of $\hat{u}$, an equivalent way to express ordinary least squares is to say it finds those estimates for $\beta_1, \beta_2, \ldots, \beta_K$ that minimize the sum of the squared deviations of the actual and predicted observations on y, or

$$\sum_{t=1}^{T} (y_t - \hat{y}_t)^2 = \sum_{t=1}^{T} \hat{u}_t^2 \qquad (2.17)$$

Finding the $\hat{\beta}$s that minimize the sum of squared residuals does not require hit and miss guessing. Luckily, application of differential calculus provides exact formulas, which will be presented without derivation.

Simple Regression Estimation

In the case of a simple regression model containing only an intercept and one additional independent variable, $y_t = \beta_1 + \beta_2 x_{t2} + u_t$, the slope for x_2 is computed as

$$\hat{\beta}_2 = \frac{\Sigma(x_{t2} - \bar{x}_2)(y_t - \bar{y})}{\Sigma(x_{t2} - \bar{x}_2)^2} \qquad (2.18)$$

where the bar over a variable represents the variable's sample mean. The intercept is computed as $\hat{\beta}_1 = \bar{y} - \hat{\beta}_2 \bar{x}_2$

Multiple Regression Estimation

In general, using matrix notation, the K x 1 vector $\hat{\beta}$ (with the first element being the intercept) is computed as (Johnston, p. 171; Kmenta, pp. 350-353)

$$\hat{\beta} = (X'X)^{-1} X'y \qquad (2.19)$$

$(X'X)^{-1}$ corresponds to the denominator of equation 2.18 for the simple regression case and X'y corresponds to the numerator of equation 2.18. By including x_1 as a column of one's in the X matrix, the intercept is computed along with the slopes. Also, the column of one's allows the y and x variable values to be used directly without adjusting for means.

Each β Estimate Is From a Distribution

The $\hat{\beta}$ values are estimates of the population β parameters in the true model based on a *sampling of the population*. That is, given the observations for the x variables, the calculation of the $\hat{\beta}$'s are based on the specific sampling of the (T number of) y values. Due to the random component, the y observations from another sampling of size T would be different *even though the values for the x variables are the same*. A change in the y values changes the estimates for the $\hat{\beta}$'s. Thus, we can envision a distribution of estimates for each $\hat{\beta}_k$. For example the estimates for $\hat{\beta}_2$ from repeated regressions on fresh random samples on y of size T from the population will not be identical, but will be distributed around the overall mean value for $\hat{\beta}_2$.

The degree of variability of a $\hat{\beta}_k$ estimate about its mean can be measured as the estimated standard deviation of the sampling distribution. This estimate is known as the standard error and is denoted by a small "s" subscripted with the symbol for the estimated coefficient of interest $s_{\hat{\beta}_k}$. The true but unknown ß's, of course, have no distribution because they are fixed parameters or constants.

The estimated standard error for the simple regression case $\hat{\beta}_2$ is

$$s_{\hat{\beta}_2} = \sqrt{\frac{\sum_{t=1}^{T} (y_t - \hat{y}_t)^2 / (T-2)}{\sum_{t=1}^{T} (x_{t2} - \bar{x}_2)^2}} \qquad (2.20)$$

or

$$s_{\hat{\beta}_2} = \sqrt{\frac{s^2}{\sum_{t=1}^{T} (x_{t2} - \bar{x}_2)^2}} \qquad (2.21)$$

The s^2 in equation 2.21, defined as the numerator in equation 2.20, is the estimated residual variance or variance of $\hat{u}$. This can be seen by noting that $\hat{u}_t = y_t - \hat{y}_t$, and that the mean of the estimated residual, $\hat{u}_t$, is zero. Hence, the numerator of equation 2.20 corresponds to the usual formula for computing a variable's variance except the degrees of freedom (d.f.) and divisor is T - 2 rather than T - 1. The T - 2 divisor is required in case of simple regression because the d.f. or number of independent pieces of information to compute the variance is the number of observations minus 1 for the mean (intercept in the regression model) and 1 for the computing the coefficient on the independent variable x_2. For future reference note that, in general, the degrees of freedom and hence the divisor for computing the residual s^2 in a multiple regression model is T - K.

Thus, equation 2.21 indicates that the variability or dispersion of the $\hat{\beta}$'s is related to the estimated variance of the residuals and to the inverse of the variability of the x variable(s). This causal relationship is even more evident in the formula for estimating the standard errors for the *vector* of estimated coefficients in the general multiple regression case using matrix representation

$$s_{\hat{\beta}} = \sqrt{s^2 (X'X)^{-1}} \qquad (2.22)$$

The smaller the residual variance (or, in less precise terms, the smaller the errors in predicting the dependent variable) the smaller will be the standard errors of the $\hat{ß}$. Similarly, everything else equal, the greater the variation in the independent variables (individually), the smaller the $\hat{ß}$ standard errors. Also, although less obvious, the larger the sample size and the more *unrelated* the independent variables are to one another, the lower the standard errors.

Desirable Properties of Least Squares

One reason for the popularity of OLS is the desirable properties of the estimators. Specifically, the estimators for the population ß's are said to be unbiased and efficient. Unbiased means that *with repeated sampling* , the *average* of the parameter estimates for a given $ß_k$ (that is, the mean of the distribution for the estimated parameter) *equals* the *true* population *value* for the parameter. Unbiasedness does *not* ensure that any particular regression estimate is equal to its population counterpart. Coefficient estimates may be individually overestimated or underestimated in the application of least squares to a single sample of size T. Unbiasedness only requires averages of parameter estimates over many samples of size T be equal to their respective true values.

Being efficient and unbiased means that the ß estimates have the smallest standard errors (or variances) of any other unbiased estimators. The Gauss-Markov theorem proves that OLS estimators for the ß's are unbiased and efficient as long as the model is specified correctly and assumptions 1 through 6 are satisfied (Johnston, pp. 173-174). While unbiasedness and efficiency are "good properties" for estimators, it is important to remember that *any single estimate* could be in the tail of "a repeated sample distribution of the estimated parameter" and be far afield from the parameter's true value.

Decomposition of Total Sum of Squares

When using regression, a set of independent variables is used to explain variation in the dependent variable. Even under the best modeling conditions, only part of the variation is "explained" by the regression. Full explanation would require $y_t - \hat{y}_t = 0$ for all T observations. Thus, the unexplained portion occurs because the regression does not perfectly predict the dependent variable. The most common way to decompose the variability of the dependent variable into the portions explained and unexplained by the regression is to take the relationship $y_t = \hat{y}_t + \hat{u}_t$ and rewrite it as the sum of squared deviations about the respective means

$$\sum_{t=1}^{T} (y_t - \bar{y})^2 = \sum_{t=1}^{T} (\hat{y}_t - \bar{\hat{y}})^2 + \sum_{t=1}^{T} (\hat{u}_t - \bar{\hat{u}})^2 \qquad (2.23)$$

Two of the properties of ordinary least squares estimates can be used to simplify this equation somewhat. One property is that the mean of the estimated residuals is zero.

The other property of interest is that ordinary least squares forces the mean of the $\hat{y}$'s to be equal to the mean of the actual observations on y. Thus, by replacing $\bar{\hat{y}}$ with $\bar{y}$ in the middle term and omitting the $\bar{\hat{u}}$ and parentheses in the last term, equation 2.23 can be written as:

$$\sum_{t=1}^{T}(y_t - \bar{y})^2 = \sum_{t=1}^{T}(\hat{y}_t - \bar{y})^2 + \sum_{t=1}^{T}\hat{u}_t^2 \qquad (2.24)$$

Using TSS to represent the total sum of squares of the dependent variable about its mean, RSS to represent the sum of squares due to regression, and ESS to represent the sum of squares due to error, the decomposition of the total sum of squares of the dependent variable can be written as

$$TSS = RSS + ESS \qquad (2.25)$$

Analysis of Variance

The Analysis of Variance (ANOV) table provides a convenient vehicle for summarizing regression results (Table 2.1). In addition to the sum of squares, the ANOV lists the degrees of freedom (the number of independent pieces of information used to compute the sum of squares) for each of the three sum of squares. The last column of the table contains the mean square for the regression and mean square error. These mean squares are computed by dividing the sum of squares by corresponding degrees of freedom. Note that the mean square error (in the "Residual" row of the ANOV) is the definition of s^2 or estimated residual variance.

Goodness of Fit

The most common measure of goodness-of-fit for regression is R^2 or the coefficient of determination. It measures the *proportion* of the total sum of squares explained by the regression. Because RSS is defined as the sum of squares accounted for by the regression and TSS is the total sum of squares of the dependent variable, R^2 is simply the ratio of RSS to TSS. Alternatively, the ratio of ESS to TSS is the proportion of the variation *unexplained* by the regression, hence, 1.0 minus this ratio is another way to compute R^2:

$$R^2 = \frac{RSS}{TSS} = 1 - \frac{ESS}{TSS} \qquad (2.26)$$

Table 2.1. A Generalized Analysis of Variance Table.

Source	Sum of Squares	Degrees of Freedom	Mean Squares
Due to Regression	RSS or $\sum (\hat{y}_t - \bar{y})^2$	K-1	$\sum (\hat{y}_t - \bar{y})^2/(K-1)$
Residual	ESS or $\sum \hat{u}_t^2$ or TSS - RSS	T-K	$\sum \hat{u}_t^2 / (T-K)$
Total	TSS or $\sum (y_t - \bar{y}_t)^2$	T-1	

Because R^2 is defined as a proportion, its value can only range from 0 to 1. The R^2 computation assumes that the model includes an intercept term. (The intercept is required to compute the sum of squares about the means, i.e., TSS and RSS). R^2 is affected by the number of observations and independent variables used in the regression as well as the "explanatory power " of the independent variables. For example, R^2 increases as the number of independent variables approaches the number of observations, reaching a perfect value of 1 when they are equal. An adjusted R^2 is sometimes computed to correct for the effect of different combinations of K and T. It is defined as

$$\bar{R}^2 = 1 - \left[(1-R^2) \cdot \frac{T-1}{T-K}\right] \tag{2.27}$$

Tests of Significance

In addition to goodness-of-fit, researchers are often interested in judging if there is any statistical difference between estimated parameters and hypothesized values for population parameters. Significance testing provides a procedure for making such judgments. The basic approach is to specify a hypothesized value for a *population parameter*, say β_k, (or a collection of β's) and then determine if the estimated parameter(s) provides evidence to *refute* the hypothesis. Thus, a statistical hypothesis is a statement about a population *parameter*, or *parameters* -- NOT about the estimator(s) of the parameter(s).

1. The Concept of Null Hypothesis. Typically, in regression analysis, the hypothesis to be tested, called *null hypothesis*, is framed in what is thought to be a false statement. Hence, rejecting the null hypothesis is most often the expected outcome. For example, it is common to test null hypotheses in which a regression population parameter

or a set of parameters is specified to be zero. Rejecting these "zero" hypotheses, although not validating the estimated value itself, provides evidence that the independent variable of interest aids in the explanation of the dependent variable. Rejecting the zero null hypothesis does not suggest that the estimated coefficient "is correct" but that there is statistical evidence that the difference between the sample statistic and hypothesized parameter, zero in this case, is too great to be attributed to chance. We either *reject* or *fail to reject* a null hypothesis. We do not *accept* the null or any other hypothesis.

Unfortunately, inability to reject the null hypothesis such as $\beta = 0$ has led some to conclude that β in fact equals zero. Statistical inference biased towards zero by small samples and sampling error is avoided by using the approach suggested by Tweeten (p. 550) of using economic theory, the best previous empirical estimate, or an average of previous empirical estimates as the null hypothesis. Thus the null hypothesis is likely to be a true statement. Failure to reject it because our sample is too small will not tempt us to conclude that $\beta = 0$, and hence does not lead to biased statistical inference.

2. *Level of Significance.* We reject the null hypothesis if the chance of obtaining a larger value of the test statistic t or F is very small when sampling from a population in which the null hypothesis is true. That is, the difference between the sample statistic and hypothesized parameter is too great to be attributed to chance. The definition of what is too great to be attributed to chance is stated in terms of probability level attached to a test statistic such as a t or F. This probability level is called the *level of significance.* The significance or probability level establishes the threshold value from a known distribution that the computed test statistic must equal or exceed to reject the null hypothesis. The probability idea reflects recognition that even though a computed value of a test statistic, say the t, may have a large value (which suggests rejecting the null hypothesis), there will be times, despite the large t or F, that the null hypothesis is actually true.

The significance level reflects the average number of times out of 100 that a *fluke* will occur in the form of rejecting the null hypothesis when in fact it is true. Or viewed differently, one minus the significance level reflects the percentage probability that such a fluke will *not* occur. The *greater the significance level,* as loosely used in everyday language (but actually 1.0 minus the significance level), the larger is the tabled critical value of t or F that the computed test statistic must exceed for us to reject the null hypothesis. Hence, a conclusion to reject the null hypothesis will be correct 95 times out of 100 when the computed test statistic is greater than the tabled critical value representing the .05 or 5 percent significance level. Five times out of 100 the conclusion will be incorrect. If the significance level were .01, the critical value would be greater and the risk of rejecting the null hypothesis when it is true would decline to 1 out of 100.

The incorrect rejection of a true null hypothesis is called a Type I error. Hence, the level of significance and probability of a Type I error are the same. It is also possible, of course, to err by failing to reject a false null hypothesis. This error of failing to reject the null hypothesis when the alternative hypothesis is true is called a Type II error. The

probability of a Type II error is usually impossible to calculate because a specific value must be used in the alternative hypothesis, a procedure rare in social science research.

Use of t and F Distributions in Regression Analysis

In regression analysis, the t distribution can be shown to be an appropriate test statistic for hypotheses concerning individual ß's or a single linear combination of ß's. The t distribution is also used to construct confidence intervals around individual ß's and forecasts of the dependent variable. More complex hypotheses that involve setting several ß's to specified values, e.g., setting all ß's to zero, or that involve more than one linear combination of ß's require the F distribution. Only the most common hypothesis tests used in regression analysis are summarized.

1. Hypothesis Testing of an Individual ß with the t. Suppose we want to test the following generalized hypothesis for one of the ß's, say $ß_k$

$$\text{Null Hyp: } ß_k = ß_k^0 \tag{2.28}$$

$$\text{Alt. Hyp: } ß_k \neq ß_k^0 \tag{2.29}$$

The null hypothesis is that the population parameter $ß_k$ is equal to a specific value, represented in equation 2.28 as $ß_k^0$. The task is to determine if there is a difference between this specific hypothesized value for the population parameter $ß_k$ and its regression estimated counterpart $\hat{ß}_k$ that is too great to be due to chance factors. If the answer is yes, the null hypothesis is rejected; if the answer is no, we fail to reject the null hypothesis. The alternative hypothesis summarizes what can be said if the null hypothesis is rejected. Equation 2.29 is a *nondirectional alternative hypothesis* which means that a rejection of the null hypothesis would lead us to conclude that $ß_k$ does not equal the specified value $ß_k^0$ but we have no a priori basis to expect $ß_k$ to be smaller or greater than the $ß_k^0$. An alternative hypothesis which is directional will be discussed later.

In general the t test statistic is computed as

$$t = \frac{\text{Estimated Parameter - Hypothesized Value}}{\text{Standard Error of the Estimated Parameter}}$$

Hence, the t statistic for the current application is

$$t = \frac{\hat{ß}_k - ß_k^0}{s_{\hat{ß}_k}} \tag{2.30}$$

with T - K degrees of freedom which is the degrees of freedom of s^2.

The next step is to look up the critical value of the t distribution for T-K degrees of freedom with a *two-tailed*, say .05, significance level. A two-tailed test is used because the

alternative hypothesis is nondirectional. With a two-tailed t test, the area representing the level of significance is placed in each tail of the t distribution. The t distribution is similar to the bell-shaped normal distribution, especially as degrees of freedom become large. If the (absolute value of the) computed t statistic using equation 2.30 exceeds the tabled value, the null hypothesis is rejected in favor of the alternative hypothesis. If the tabled t value is larger, we fail to reject the null hypothesis.

2. Testing ß Against Zero. Although β probably should be the most likely true value based on theory or previous empirical estimates, as indicated earlier the most common null hypothesis for a single regression coefficient is

$$\text{Null Hyp: } ß_k = 0 \tag{2.31}$$

This hypothesis states that the individual coefficient in the population is zero. Alternatively stated, the test is to determine if the estimated coefficient is significantly different from zero. If the statistical testing procedure suggests rejection of this null hypothesis, the coefficient is said to be statistically different from zero (at a specified significance level). If the procedure gives the contrary result, we fail to reject the null hypothesis. (Technical reasons involving statistical theory and rules of logic preclude using the term "accept" in place of "fail to reject." See Henkel, pp. 40-41; Tweeten, p. 548.)

The alternative hypothesis could be nondirectional as in equation 2.29 or it may be directional as in equation 2.32. With a directional alternative hypothesis, a rejection of the null hypothesis is in favor of the alternative hypothesis in the indicated direction. For example, if the alternative hypothesis were as follows:

$$\text{Alt. Hyp: } ß_k < 0 \tag{2.32}$$

then rejecting the null hypothesis suggests that $\hat{ß}_k$ is not only significantly different from zero, it also has a negative sign. This test situation, or with the inequality reversed in the alternative hypothesis, is referred to as a one-tailed test.

The alternative hypothesis chosen for the test is usually determined by the amount of information the researcher has about the relationship being modeled. For example, if a supply equation is being estimated, the researcher will, based on theory and review of literature, be in a position to specify the signs of the coefficients. The parameter attached to the commodity's own price is expected to be positive; coefficients on prices of other commodities that compete for production resources are expected to be negative. In this case, with a null hypothesis equal to zero, the alternative hypothesis is for the coefficient on own price to be greater than zero and for each of the alternative hypotheses relating to the other prices to be negative.

On the other hand, if information about the relationship is minimal or either coefficient sign is conceivable, a nondirectional alternative hypothesis is appropriate. Researchers estimating parameters in economic and policy models usually have information on which to base sign expectations. Hence, most tests on individual coefficients from

economic relationships can be framed as one-tailed tests, even though two-tailed tests are commonly reported in the literature.

Having specified the zero null hypothesis and a one-tailed alternative hypothesis, the procedure is the same as discussed earlier but now the rejection region is all in one tail of the t distribution. After selecting the level of significance, the critical value is determined from the table for the "one-tailed" t statistic for T - K degrees of freedom. The critical value is compared with the computed t statistic. The computed t statistic is computed as before but because the hypothesized value is zero, the computation simplifies to:

$$t = \frac{\hat{\beta}_k}{s_{\hat{\beta}_k}} \tag{2.33}$$

If the absolute value of the computed t exceeds the tabled t, the null hypothesis is rejected. That is, the difference between $\hat{\beta}_k$ and the hypothesized value, 0, is so great that we cannot attribute the difference to chance factors in the sampling process. Hence, we reject the null hypothesis and conclude that $\hat{\beta}_k$ is significantly different from zero. If the computed t is less than the tabled t, we fail to reject the null hypothesis. In this case, the sample statistic, $\hat{\beta}_k$, is close enough to the hypothesized value, 0, that the difference between the two could be due to chance and, hence, there is no reason to doubt the null hypothesis. The probability is small that the null hypothesis is false.

When reporting regression analyses in a table or other format, researchers will often include a computed t statistic in parentheses below each $\hat{\beta}$. This reported t is computed as shown in equation 2.33. That is, it is the t for testing the zero null hypothesis. Occasionally, rather than the computed t's, the standard errors of the estimated coefficients are inserted in parentheses below the coefficient estimates. Either way, each coefficient's "t" and standard error can be read directly or be easily computed. Also, values identified as "t statistics or values" in computer regression or econometric programs are computed using the ratio in equation 2.33. A common practice with computerized statistical packages is to report the probability of a greater t value if the null hypothesis is true. An advantage of this approach is that it avoids chosing an arbitrary critical level for t, allowing the reader to select the critical level.

It is well to remember that statistical tests provide a useful tool for inferences about population parameters but they should not be used dogmatically. For example, if a price variable in a demand equation has the correct sign but is statistically insignificant, the researcher may leave the variable in the equation because theory and previous estimates strongly support including the variable. Omitting the variable under these circumstances would be a specification error which will be discussed later.

On the other end of the spectrum, finding a variable to be significantly different from zero does not always mean that it is important. Statistical significance does not necessarily imply economic, political, or social significance (Schroeder, Sjoquist, and Stephan, p. 53). The strength of the relationship may be so small, even though statistically significant, that the variable is of little consequence. A one unit change in an x variable

which causes a dollar change in a dependent variable measured in billions of dollars may not be economically significant even if it is statistically significant. Computations of elasticities or standardized coefficients from regression results, which are described in a later section, may more nearly identify economic importance by striping away units of measurement through using proportional changes.

3. Use of t in Confidence Intervals. Although not often reported in applied regression work, computation of a *confidence interval about the true β* illustrates the important fact that parameter estimation is subject to a margin of error, sometimes wide. The confidence interval (Lower Bound, Upper Bound) for β_k is computed as:

$$\text{Lower Bound} = \hat{\beta}_k - s_{\hat{\beta}_k} t_{\text{two-tail,T-K d.f.}}$$

$$\text{Upper Bound} = \hat{\beta}_k + s_{\hat{\beta}_k} t_{\text{two-tail,T-K d.f.}}$$

where $\hat{\beta}_k$ is the estimated regression coefficient, $s_{\hat{\beta}_k}$ is standard error of $\hat{\beta}_k$ and $t_{\text{two-tail,T-K}}$ is the critical value of the t-statistic found in the two-tailed t-table for the selected significance level with T - K degrees of freedom.

A 95 percent confidence interval for, say, β_3 means that if a large number of T-size samples from the population were drawn and a regression and confidence interval for β_3 were computed for each sample, then about 95 percent of the intervals would contain the true population value for β_3.

In computing the confidence interval for forecasts, a forecast value for y, y_F, is found by substituting forecast values for the regressors into equation 2.12, x_k, k = 2, ... ,K (x_1 always equals 1):

$$\hat{y}_F = \hat{\beta}_1 + \hat{\beta}_2 x_{F2} + \ldots + \hat{\beta}_K x_{FK} \tag{2.34}$$

A confidence interval for y_F is given by:

$$\text{Lower Bound} = \hat{y}_F - s_{\hat{F}} t_{\text{two-tail,T-K d.f.}}$$

$$\text{Upper Bound} = \hat{y}_F + s_{\hat{F}} t_{\text{two-tail,T-K d.f.}}$$

where the t is defined as before and $s_{\hat{F}}$ is the estimated standard error of the forecast. $s_{\hat{F}}$ is defined as the *square root* of:

$$s^2 + s^2 x_F'(X'X)^{-1}x_F \tag{2.35}$$

where x_F) is the K x 1 vector of forecast values for the regressors. The first term in this expression results from estimating (assuming) the error term as zero; the second term results from the use of OLS estimates rather than the true values (Kennedy, p. 211). Note

that the second term contains the estimated variance-covariance matrix of the estimated regressors, $s^2 (X'X)^{-1}$.

The interpretation is similar to that for confidence intervals for a ß: If a large number of T-size samples from the population were drawn, regressions were run for each sample and a 95 percent confidence interval for y_F were computed for each sample, then about 95 percent of the intervals would contain the actual value being forecast. The interval is smallest at the set of average x values used to estimate the regression parameters. The intervals become larger and larger as the values for the x variables are further and further from their average values used in the regression.

4. Use of F to Test Significance of all ß's Excluding Intercept. Probably the second most popular test of significance in regression analysis -- the t test to test a single population coefficient against zero is likely first -- is to determine if the joint effect of all nonintercept independent variables on the dependent variable is significantly different from zero. The null and alternative hypotheses are

$$\text{Null Hyp.: } \beta_2 = \beta_3 = \ldots = \beta_K = 0 \qquad (2.36)$$
$$\text{Alt. Hyp.: Not the Null}$$

As mentioned earlier, the t test statistic can only be used when the null hypothesis concerns only one population parameter or only one linear combination of population parameters. Hence, another test statistic must be used to complete the test in equation 2.36 because the null hypothesis includes statements about K - 1 population parameters: β_2 is hypothesized to be zero, β_3 is hypothesized to be zero and so on. It can be shown that the F distribution provides the appropriate test statistic when multiple coefficients are involved in the null hypothesis.

The test is based on unrestricted versus restricted models. The number of independent parts of the null hypothesis, such as K-1 in the current case, can be expressed as the number of restrictions imposed on the model by the null hypothesis. Viewed this way, the original or full model becomes the *unrestricted model.* The original model is unrestricted because coefficients are to be estimated by least squares with no constraints of any kind. A *restricted model* is the model that results when the null hypothesis is imposed on the original model.

For example, in (2.36) the hypothesis constrains all the coefficients, except the intercept, to be zero leaving the dependent variable as a function of only the intercept or for the t^{th} observation $y_t = \beta_1 + u_t$. This regression can actually be run by simply regressing y on x_1 where x_1 is, as previously defined, a column of "1's." The estimate for β_1 in this situation turns out to be the mean of the dependent variable. Thus, each of the predicted values for y or $\hat{y}$'s is equal to the mean of original y variable. Other statistics for this restricted model can also be computed. Having the $\hat{y}$'s, the $\hat{u}$'s can be computed; then the residual or error sum of squares (ESS) can be calculated. Now suppose we identify this error sum of squares, from what we have called the *restricted model*, as $ESS_{Restricted}$. The

error sum of squares of the original or *unrestricted model*, can be identified as $ESS_{Unrestricted}$. This is the ESS discussed earlier and that appears in the ANOV table.

In computation of the F statistic, the general form is

$$F = \frac{(ESS_{Restricted} - ESS_{Unrestricted}) / \text{No. of restrictions in null hyp.}}{ESS_{Unrestricted} / \text{d.f. of the } ESS_{Unrestricted}} \qquad (2.37)$$

Basically the F test as used in regression analysis compares the relative magnitude of the two error sum of squares — the ESS for the restricted model against the ESS for the unrestricted model.

This comparison of ESS's makes intuitive sense. For example, suppose the null hypothesis -- that all the nonintercept population coefficients are jointly zero in this particular application -- is true. Further suppose, for argument's sake, that the regression estimating the unrestricted or full model results in exactly zero coefficient estimates for the nonintercept variables. Hence, with this situation, the $\hat{y}$'s, the residuals errors or $\hat{u}$'s, and the error sum of squares of this unrestricted model reflect the situation in which the nonintercept variables provide no explanation of the dependent variable.

Now consider the restricted model. The dependent variable is regressed only on the intercept term which, by omitting the other independent variables, reflects the restrictions imposed by the null hypothesis. Of course, the regression statistics including the error sum of squares reflect no explanation of the dependent variable by the nonintercept regressors. But in this case, because the unrestricted model also resulted in no explanation by these regressors, there was no penalty for using the restricted model. The estimated coefficients are the same, the error sum of squares are the same and hence the computed F calculated using equation 2.37 is zero. Thus, the degree of correspondence between the set of hypothesized ß's and the estimated values from the regression is gauged by the difference in the error sum of squares of the restricted and unrestricted models. Ever increasing differences in the hypothesized values for the parameters and the estimated parameters result in ever larger differences in the error sum of squares of the restricted and unrestricted models.

The F test provides a means to determine if the error sum of squares of the restricted model, which represents the statements of the null hypothesis, is significantly different from the sum of squares of the unrestricted model -- the model in which the *error sum of squares is minimized* without constraints of any kind. The *difference* in the restricted and unrestricted error sum of squares is measured *relative to* the error sum of squares of the unrestricted model. Both the difference in the numerator and the unrestricted error sum of squares in the denominator are divided by their respective degrees of freedom. The d.f. in the numerator takes into account the number of restrictions imposed on the model by the null hypothesis and the d.f. in the denominator takes into account the number of observations and independent variables used to estimate the unrestricted error sum of squares. (T - K as specified in Table 2.1.)

All F tests in regression analysis can be posed using unrestricted and restricted models and their corresponding error sum of squares to compute the F value with equation

2.37. However, it is possible to use the TSS = RSS + ESS identity and the definition of R^2 to derive other equivalent representations of the F test statistic for specific applications. Also, note that the denominator of equation 2.37 is s^2 for the unrestricted model. It can be shown, for example, that for this particular null hypothesis, equation 2.37 is equivalent to the following two formulations:

$$F = \frac{RSS/(K-1)}{s^2} = \frac{R^2/(K-1)}{(1-R^2)/(T-K)} \tag{2.38}$$

As with the t test, the critical value for the test depends on the selected significance level and the degrees of freedom. Unlike the t, the distribution of the F is a function of two degrees of freedom numbers, one from the numerator and one from the denominator. Thus, the critical value is determined by finding the intersection of the two degrees of freedom numbers -- working with the numerator's d.f. along the top and the denominator's d.f. along the left side -- in a F table for the selected significance level. The conclusion from the test follows the same pattern as with the t test: The null hypothesis is rejected if the computed F is greater than the tabled F, and we fail to reject if the computed F is less than the tabled F.

Thus, if $ESS_{Restricted}$ is sufficiently close to $ESS_{Unrestricted}$ that the difference between the two can be considered to be due to chance, we have no basis for doubting the null hypothesis that the nonintercept ß's are jointly equal to zero and so we fail to reject. By failing to reject the null hypothesis, we are saying that there is *no statistical evidence* that independent variables taken together (exclusive of the intercept) aid in explaining the variation of the dependent variable. If the difference between $ESS_{Restricted}$ and $ESS_{Unrestricted}$ is so large that we cannot attribute the difference to randomness of sampling, we conclude that the difference is because the null hypothesis is false. That is, the coefficients are jointly significantly different from zero. By rejecting the null hypothesis, we are saying that the nonintercept independent regressors, taken together, do significantly aid in the explanation of the dependent variable.

5. Using F to Test a Subset of Coefficients. Another common procedure in regression analysis is to test if a subset of the K ß's is significantly different from zero. For notational convenience, suppose the last K-H ß's are to be jointly tested against zero. The null and alternative hypotheses are

$$\text{Null Hyp.: } \beta_{H+1} = \beta_{H+2} = \ldots = \beta_{K-1} = \beta_K = 0 \tag{2.39}$$
$$\text{Alt. Hyp.: Not the Null.}$$

The keys to using the F to test this hypothesis (and most hypotheses) are to determine (1) the unrestricted model, (2) the restricted model, and (3) the d.f. used as divisors in equation 2.37. After working through these preliminaries, completing the test is routine.

As always, the *unrestricted model* is the specification of the model that is not constrained by statements in the null hypothesis. Hence, the unrestricted model is

$$y_t = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \ldots + \beta_K x_{tK} + u_t \qquad (2.40)$$

The *restricted model* is the model that results when the constraints given by the null hypothesis are incorporated into the original model. In this case the constraints are that the last K - H ß's are zero. Those restrictions amount to omitting the last K - H independent variables. Hence, the resulting restricted model does not have K independent variables but H (K - H fewer) regressors

$$y_t = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \ldots + \beta_H x_{tH} + u_t \qquad (2.41)$$

For example, suppose the original model had five independent variables and the null hypothesis is that β_2 and β_4 are each and simultaneously equal to zero. The restricted model would contain the intercept, x_3, and x_5 while the unrestricted model would include all five independent variables.

The numerator *degrees of freedom* is the number of restrictions imposed on the original model by the null hypothesis. In the current application, K - H coefficients are restricted to zero in the null hypothesis. Hence, the degrees for freedom of the numerator of equation 2.37 is K - H. In our five regressor example, two coefficients were set to zero in the null hypothesis so the numerator d.f. would be 2.

The degrees of freedom of the denominator of the F is the degrees of freedom of the error sum of squares of the *unrestricted* model. Hence, the degrees of freedom for the denominator is T - K. If 30 observations were used to estimate the unrestricted model in the five regressor example, the d.f. for the denominator would be 25.

After using OLS to obtain the ESS estimates for the unrestricted and restricted models and completing calculations of equation 2.37, the standard procedure is followed: Find the critical value for the F with K - H and T- K degrees of freedom and the selected significance level, compare the critical value with the computed F, then reject the null if the computed F exceeds the tabled F and fail to reject otherwise.

Significance Test Summary

Examples have been given of the most common types of significance tests used in regression analysis. Many other significance tests can be performed but they all follow the same general format and the logic of the procedure is the same. Hence, it might be useful to briefly summarize the general procedure for completing tests of significance.

The central idea with significance testing is to compare the hypothesized parameter value with the estimate for the parameter in the case of the t, or compare the two error sum of squares in the case of the F -- in light of the amount of variation which can be expected on the basis of chance factors. The sampling distribution, t or F, gives the amount and "shape" of the variation expected on the basis of chance. The steps to properly use a test of significance are:

1. meeting the assumptions of the statistical technique being applied, in our case, meeting the list of seven assumptions discussed earlier required to use OLS;

2. knowing or deriving the appropriate test statistic formula and knowing its distribution (t or F);
3. calculating the test statistic; and
4. comparing the computed test statistic with the sampling distribution to determine if it is reasonable to attribute differences to sampling error:
   (a) *If the absolute value of the computed test statistic is less than the critical value* given in the table for the sampling distribution (with the appropriate d.f. and selected significance level), we fail to reject the null hypothesis. That is, the estimate of the parameter is close enough to the hypothesized parameter value (or the two ESS's are sufficiently close in case of F) that *the difference is considered to be due to chance factors* in the sampling process. Hence, there are no grounds for doubting the null hypothesis;
   (b) *If the absolute value of the computed test statistic is larger than the critical value*, the difference in the hypothesized value and estimated parameter or ESS's is so great that *the difference is unlikely to be accounted for by chance factors* from sampling. Because the discrepancy is too large to be attributed to chance, we conclude that the null hypothesis is false.

Interpreting Regression Results

Although numerous formats are used for presenting regression results, a common format is

$$\hat{y}_t = \underset{}{511.20} + \underset{(5.32)}{0.0435x_{2t}} + \underset{(2.65)}{305.64x_{3t}} \qquad (2.42)$$

$R^2 = 0.85 \quad \bar{y} = 4140.67 \quad ESS = 45.94 \quad T = 73 \quad DW = 1.75$

The intercept value estimates the expected or average value of y when x_2 through x_K are zero. In this case, the predicted value for y is 511.20 *when x_2 and x_3 are zero.* The estimates for the remaining ß's are usually of more interest. Each coefficient estimate (say $\hat{\beta}_2$) measures the expected change on y from a *one* unit change in the corresponding independent variable (x_2) *while holding the other independent variables constant.*

Suppose the dependent variable in equation 2.42 is dollars of family expenditures on food and x_2 is dollars of family income and x_3 is family size. Thus, *holding income constant*, average food expenditures are expected to increase by $305.64 when family size increases by one. A one dollar change in income with no change in family size is associated with a 4.35 cent change in food expenditures.

The numbers in parentheses are computed t statistics to test the null hypothesis that the corresponding ß equals 0. The t value of 5.32 in parentheses under the estimated coefficient for x_2 in equation 2.42 can be used to test $\beta_2 = 0$. The DW, or Durbin-Watson statistic, is used to gauge autocorrelation of the disturbances and is discussed in a later

section. Note that by giving the R^2 and error sum of squares values, the total sum of squares (TSS) and regression sum of squares (RSS) can be computed using the formulas for R^2.

Regression results can be used to compute *elasticities* for any nonintercept independent variable. Using regression terminology an elasticity is the percentage change in the dependent variable associated with a one percent change in the independent variable holding the values of all other independent variables constant. Because percentage changes are used, elasticities are unitless. The elasticity of y with respect to x_2 measured at the t^{th} observation is

$$\text{Elast } y, x_2 = \frac{\% \Delta y_t}{\% \Delta x_{2t}} = \frac{\frac{\Delta y_t}{y_t}}{\frac{\Delta x_{2t}}{x_{2t}}} = \frac{\Delta y_t}{\Delta x_{2t}} \cdot \frac{x_{2t}}{y_t} \qquad (2.43)$$

where Δ represents change. By letting Δ in x_2 be one, note that $\frac{\Delta y_t}{\Delta x_{2t}} = \hat{\beta}_2$. Thus

$$\text{Elast}_{y, x_2} = \hat{\beta}_2 \cdot \frac{x_{2t}}{y_t} \qquad (2.44)$$

Computed at the means of the dependent and the independent variable the elasticity is:

$$\text{Elast}_{\bar{y}, \bar{x}_2} = \hat{\beta}_2 \cdot \frac{\bar{x}_2}{\bar{y}} \qquad (2.45)$$

Hence, the estimated coefficient for income (x_2), 0.0435, from equation 2.42 and the mean of the food expenditures (y), 4,140.67, would be used to compute the elasticity of food expenditures with respect to income but the mean of the income variable would also be needed. If the mean of the income variable were 11,422.54, the elasticity would be

$$\text{Elast}_{\bar{y}, \bar{x}_2} = .0435 \cdot \frac{11,422.54}{4,140.62} = 0.12 \qquad (2.46)$$

Each 1 percent increase in income is associated with a .12 percent increase in food expenditures, everything else is held the same.

Occasionally, elasticities will be reported with the regression results. More often, the elasticities are discussed in the text portion of the article or displayed in a separate table.

Standardized regression coefficients frequently are used like elasticities to indicate the relative impact of an independent variable on the dependent variable. The procedure is the same as for computing the elasticity except the standard deviation for x is substituted for the mean of x and the standard deviation of y is substituted for the mean of y in equation

2.45. If s_{x2} / s_y is 3.2, each standard deviation change in income is associated with a .14 (.0435 x 3.2) standard deviation increase in food expenditures.

Alternative Specifications of the Regression Model

Thus far, the regression model has been assumed to be linear in the variables as well as in the parameters and the data on the variables have been assumed to be continuous. As already pointed out, regression analysis requires linearity of parameters but variables may be nonlinear. The next sections review a few of the most common nonlinear functions and briefly discuss the use of variables that only take on values of 1 or 0.

1. Functional Forms. The usual regression model in which y is regressed directly on x_1 through x_K results in constant slope values for all observations but the elasticities vary across observations. As noted, means of the y and x variables are often used to compute "representative" elasticities. Other functional forms imply other assumptions about regression parameters. Some of the most often used functional forms are reviewed. Goldberger (pp. 213 - 216) and Berry and Feldman (pp. 57-67) provide more detail.

The double-log form, a common alternative formulation, specifies that the elasticities rather than the slopes are constant. The exponential or "Cobb-Douglas" functional form provides this property:

$$y = e^{\beta_1} x_2^{\beta_2} x_3^{\beta_3} \ldots x_K^{\beta_K} e^{u} \tag{2.47}$$

where e is the base of the natural logarithms. By taking logarithms of the entire equation, the relationship can be transformed to an equation that is linear in the *parameters*:

$$\ln y = \beta_1 + \beta_2 \ln x_2 + \beta_3 \ln x_3 + \ldots + \beta_K \ln x_K + u \tag{2.48}$$

Because in this case $\beta_k = \Delta(\ln y)/\Delta(\ln x_k)$ and since $\Delta(\ln y) = \Delta y/y$ and $\Delta(\ln x_k) = \Delta x_k/x_k$, the β's directly turn out to be the elasticities and those elasticities remain constant over all observations. Hence, the estimate for β_3 indicates the percentage change in y for a 1 percent change in x_3.

Researchers will sometimes specify equation 2.47 as

$$y = \beta_0 x_2^{\beta_2} x_3^{\beta_2} \ldots x_K^{\beta_K} e^{u}. \tag{2.49}$$

This equation would be estimated as

$$\ln y = \ln\beta_0 + \beta_2 \ln x_2 + \ldots + \beta_K \ln x_K + u \tag{2.50}$$

The interpretation for the estimated relationship is the same except for the intercept which must be transformed by taking its antilog, i.e. $\beta_1 = \ln \beta_0$.

In a *semi-log form* the regressors may include the logarithmic transformation of one or more of the independent variables. This nonlinear function may be appropriate when the elasticity is thought to decrease in absolute value as y increases. In this case neither the slope nor the elasticity remains constant for changes in the independent variable. For example given

$$y = \beta_1 + \beta_2 \ln x_2 + \beta_3 x_3 + \ldots + \beta_K x_K + u \tag{2.51}$$

β_3 through β_K are interpreted as in the usual linear form. For the second independent variable, the slope $(\Delta y/\Delta x_2)$ is computed as β_2/x_2 and the elasticity of y with respect to x_2 is computed as β_2/y.

Another semi-log function allows estimating a relationship in which the researcher believes that a one unit change in an independent variable causes y to change by a constant percentage. The equation is in the form

$$y = e^{\beta_1 + \beta_2 x_2 + \ldots + \beta_K x_K + u} \tag{2.52}$$

and the estimation equation is

$$\ln y = \beta_1 + \beta_2 x_2 + \ldots + \beta_K x_K + u \tag{2.53}$$

The slope for the k^{th} independent variable is $\beta_k y$ and the elasticity is $\beta_k x_k$. Hence, the slope increases with y and if x_k changes by 1 unit, y will change by β_k percent.

Another method of handling nonlinear relationships is to allow the slopes to depend on the level of the independent variable itself. For example, a second-degree *polynomial form* in x_3 would be

$$y = \beta_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_3^2 + u \tag{2.54}$$

The slope for x_2 is unchanged from the strictly linear model but the slope of x_3 is $\beta_3 + 2\beta_4 x_3$. U-shaped curves are often fit with second-degree polynomials.

Including *interaction terms* for independent variables allows the influence of say x_2 on y to be influenced by the level of x_3. For example, the influence of nitrogen fertilizer on wheat yields may be different depending on the amount of phosphorus that is applied. Thus, a model might appear as

$$y = \beta_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_2 x_3 + u \tag{2.55}$$

The slope for x_2 becomes $\beta_2 + \beta_4 x_3$ and for x_3 becomes $\beta_3 + \beta_4 x_2$. In working with crop production functions, it is not uncommon to have interactions among the major fertilizer nutrients (as well as the squares of the nutrient variables) as part of the regressor set.

2. *Dummy Variables.* The independent variables have been implicitly assumed to be continuous and thus each can take on an infinite number of values. However, some

variables defy such quantification and can only be represented by binary or dummy variables.

Dummy variables can be used any time the set of observations can be separated into classes. For example, those who smoke and those who do not; men and women; under 30 and over 30, Eastern, Western, Southern, and Northern regions of the country; and B.S., M.S., and Ph.D. are all ways of classifying observations. A dummy variable has only two possible values, 0 and 1. It is assigned to be 1 if the attribute is present in the observation case and zero if it is not.

For example, an observation on income from a female would cause the researcher to insert a 1 for the corresponding observation for the female dummy variable and a zero for the male dummy variable and vice versa for an observation on a male. Since the intercept is always available to represent one of the categories in the classification system, the number of dummy variables actually included in the regression is *always* one less than the number of classes of data. Thus, if female and male dummy variables were initially constructed, only one, say the female dummy variable, would be included in the regression. The intercept includes the relationship for the male. The coefficient on the female dummy variable represents the difference between male and female (or *net affect* of being female on the average value of the dependent variable). Thus, the intercept for the female case is found by *adding* the coefficient on the female dummy variable to the intercept (which represents the constant for the male).

If more than one set of classifications is used in a regression problem, one dummy variable from each classification must be dropped. For example, if smokers and nonsmokers as well as female and male classifications are to be used, then, in addition to dropping one dummy from the male-female classification, one of the (two) dummy variables from the smoker-nonsmoker classification must also be dropped:

$$\hat{y} = \hat{\beta}_1 + \hat{\beta}_2 \text{female} + \hat{\beta}_3 \text{nosmoke} + \text{continuous variables, etc.} \qquad (2.56)$$

By choosing to drop the smoker dummy, the intercept applies to a male who smokes. The coefficient on the non-smoker variable measures the net effect of not smoking. To find the intercept value for a women who does not smoke, the coefficients for the female and non-smoker dummy variables, $\hat{\beta}_2$ and $\hat{\beta}_3$, (the net effects of being female and not smoking) would be added to the intercept as originally estimated, $\hat{\beta}_1$.

The usual significance tests can be applied -- t tests for a single coefficient (is β_2 significantly different from zero?) and an F for a test involving more than one parameter (are β_2 and β_3, taken together, significantly different from zero?).

One of the most common applications of dummy variables in economic analysis is to account for seasonality. If in addition to the usual causal variables such as price and income, demand for a product, say turkey, is thought to vary by quarter of the year, a set of (three or would it be four?) quarterly dummies could be included (that's right, three). The interpretation is the same as before: Each estimated quarterly dummy coefficient adjusts the *intercept* up or down from its "standardized" level (the level appropriate for the

quarter with no dummy variable). The significance level will vary depending on which quarter has no dummy variable, and hence is part of the intercept.

So far only adjustments in intercepts have been discussed. It is also possible to account for differences in the slope of, say, the price variable in a demand equation. The slope for a continuous variable is allowed to change by class of data by creating interaction terms between the dummy variables and the continuous variable. Thus, each of the three quarterly dummies would be multiplied times the price variable to allow differing price slopes by quarter.

If the winter dummy was initially dropped, the coefficient on the price variable would represent the slope for the winter quarter. The slope for the spring quarter would be the slope on the price variable (winter quarter slope) *plus* the coefficient on the spring-quarter-dummy-*times*-price regressor. A single regression equation could include dummy variables to allow intercept changes and interactions of the dummy variables with one *or more* continuous variables to pick up slope changes from one class of data to another.

Violation of Assumptions and Other Pitfalls in Regression

The computations, desirable properties, and tests associated with regression analysis all presuppose that (1) the correct model equation is being used, (2) the variables are measured accurately, and (3) the seven assumptions presented earlier are satisfied. Violation of any of the preconditions can cause problems. This section reviews some of the most common difficulties that can arise while using regression. In each case the violation will be *described*, the *consequences* of ignoring it on regression results will be identified, and, as appropriate, procedures on *how to deal with the problem* will be mentioned.

1. Specification Error. Specification error means the "wrong" model was estimated. The model may not contain the correct variables or have the correct functional form. The regression technique cannot discern a well specified model from a misspecified model. The analyst must rely on theory combined with previous research and his/her knowledge about the phenomenon being investigated.

Omitting a relevant independent variable causes the OLS estimates of the remaining coefficients to be biased. The only exception is if the observations of the omitted variable(s) are uncorrelated in the sample with the observations of the other independent variables. This so called *orthogonal* relationship between the omitted and other variables, which is rare in the social sciences, allows the slope coefficients to be unbiased but the intercept will generally be biased. In any case the coefficient standard errors are biased upward.

The inclusion of an irrelevant independent variable does not affect the unbiasedness properties of the OLS ß estimates or their standard errors. If the irrelevant variable is orthogonal to the other variables, the ß estimates and standard errors are unaffected. The assumption of orthogonality rarely holds, however.

The consequences of using the wrong functional form, i.e., omitting the square of a variable or neglecting to take logarithms when the true function requires it, are identical to omitting a relevant variable.

Economic theory, knowledge of the literature, introspection, and experience are the classical ways to guard against misspecification. Kennedy (pp. 69-72) reviews some techniques that have been suggested for selecting/testing for omitted independent variables and erroneous functional forms. None is very robust or much used.

2. Measurement Error. Measurement error, sometimes referred to as errors in variables, refers to inaccurate observation data for one or more variables. The cause could be inaccurate recording of observations , improper data collection techniques, or inaccurate responses to surveys or to the use of proxy variables to represent variables that have not or cannot be measured.

Errors in measuring the dependent variable are lumped into the disturbance term and cause no problems if randomly distributed. Measurement errors in the independent variable(s) cause the regression coefficients to be biased because the independent variables are no longer uncorrelated with the disturbance term. As specified with the correctly measured regressors, the model has a disturbance term that is uncorrelated with the independent variables. Replacing one of these variables with an improperly measured replacement creates a new disturbance term which includes the error component of the regressor. Thus, the error shows up in both the measured independent variable and the disturbance. Correlation of the two is now unavoidable, resulting in biased ß estimates.

Instrumental variables can be used in situations such as this where an independent variable is contemporaneously correlated with the disturbance. It involves replacing the independent variable with another variable (its instrument) which is highly correlated with the original independent variable and is uncorrelated with the disturbance term. An alternative formula which uses the original variables and instruments, called the instrumental estimator, is used to estimate the regression coefficients (Kmenta, pp. 308-315; Maddala, 296- 300). Because the procedure includes a type of proxy variable, the estimators are still biased. However, the estimates do converge to the true population parameters as sample size becomes very large, i.e., they are consistent.

Numerous problems attend using instrumental estimators. It is difficult to find a variable with the desired qualities -- correlated with the independent variable and uncorrelated with the disturbance. If one is found, it is not known if other more efficient variables could be found. It is difficult to determine if the instrument is uncorrelated with the disturbance. Because the instrument may have a low correlation with the independent variable, the coefficient standard errors may be excessively high. This forces the analyst to choose between consistency of the instrumental variable technique and lower coefficient variability of OLS. Typically, in the case of errors in variables, researchers will use OLS as "the least of two evils," but good research methodology requires informing the reader about suspected measurement errors and the implications.

3. Autocorrelated Disturbances. Autocorrelated disturbances mean that the disturbance for the current time period (observation number) is correlated with disturbances for one or more previous time periods. This is a direct violation of assumption three. Autocorrelated disturbances, which are more prevalent with time series data than cross-section data, can occur due to shocks that linger beyond one measurement period. A strike, export embargo, weather cycle, and other "random" events may not only affect the disturbance term of the current period but may also affect future disturbances. The shorter the period of observation the more likely disturbances are autocorrelated. Sometimes due to inertia, past actions influence current actions so that a disturbance in one period might be acted upon in another period. Some natural causes of autocorrelated disturbances can be addressed with procedures discussed later. The appearance of "autocorrelated disturbances" can be caused by omitting relevant variables, failure to use distributed lag forms, use of an inappropriate functional form, and data manipulation. But the culprit here is misspecification and should be addressed as such.

A plot of the residuals against observation number is often helpful in identifying possible autocorrelation of disturbances. A string of positive residuals followed by a string of negative residuals and so on is a strong indication of positive autocorrelation. A pattern characterized by individual residuals that alternate between positive and negative suggests negative autocorrelation. The most common formal test for detecting autocorrelated disturbances is the Durbin-Watson d statistic (Johnston, pp. 313-321; Kmenta pp. 294–297). It is calculated from the residual of the OLS regression and tests for first-order autocorrelation. The d statistic is 2.0 in the absence of autocorrelation. As the statistic moves closer to 0 below 2 and closer to 4 above 2, the less confident we can be that autocorrelation does not exist. Tabled values for the d statistic are available but unfortunately the exact distribution is unknown. That causes complications in its use that are beyond our discussion here. One approach is to consider remedies if the Durbin-Watson d is below 1.25 and above 2.75. Most computer packages routinely print the d statistic.

With autocorrelation the OLS estimates remain unbiased but are no longer the minimum variance estimators (Goldberger pp. 238-243; Johnston, pp. 310-313). If the parameter representing the degree of autocorrelation is known, then an alternative procedure called generalized least squares provides minimum variance unbiased estimates for the ß's. Because the OLS estimated variances and thus standard errors are biased when disturbances are autocorrelated, t and F tests are also invalidated. With positive autocorrelation, which is the most prevalent form, the *standard errors* of the estimated coefficients are often *underestimated.* Hence, *t tests will be too large* which could cause coefficients to be found significantly different from zero when in fact they are not.

The first thing to do when observing a d statistic below, say, 1.5 or above 2.5, is to convince yourself that the model is specified correctly. Any misspecification problems should be remedied before looking for a technique to address autocorrelated disturbances. If the disturbances are autocorrelated due to lingering affects, procedures are available which transform the dependent and independent variables using an estimate of the autocorrelation parameter (Johnston, pp. 323-325; Kmenta, pp 287-289). The Cochrane-

Orcutt procedure is the best known and is available with most econometric regression packages. Because the autocorrelation parameter is not known but must be estimated, the ß estimators turn out not to be unbiased but only consistent.

4. Heteroskedastic Disturbances. Assumption number two says the disturbances must have uniform variance which is also known as *homoskedastic* disturbances. If the disturbance variances are not constant, the disturbances are said to be *heteroskedastic*. The problem is more frequent in cross-sectional data than in time series data. Frequently disturbance variance varies with one of the independent variables. For example, if consumption is a function of income, the larger the income the larger may be the associated disturbance. Having satisfied the basic needs of life, consumers with large incomes may have very disparate spending habits. Some may spend it all, others may save a large percentage. Those with small incomes have no choice but to spend most of their income. Hence, disturbance variance may increase with income in such a relationship.
As with autocorrelated disturbances, visual inspection of the OLS residuals can be very helpful. In the case of heteroskedastic disturbances, the residuals are plotted against the variable that may be related to the disturbance variance. If the dispersion of points is comparable from small to large values for the independent variable, probably no heteroskedasticity exits. If the dispersion spreads out or narrows with changes in independent variables, heteroskedasticity is likely.

The consequences of using OLS in the presence of heteroskedastic disturbances are the same as using OLS in the presence of autocorrelated disturbances. The regression estimates are unbiased but inefficient. Heteroskedasticity affects the size of the standard errors and thus also affects hypothesis test results. The direction of bias of the standard errors depends on the cause and pattern of the heteroskedastic disturbances.

The first approach to heteroskedasticity is to make sure the specification is appropriate. For example, a double-logarithm function with proportional error may pose less difficulty than a linear equation with additive error. A form of generalized least squares can be used to overcome heteroskedasticity. A function of the independent variable that varies with disturbance variance is used to give differential weights to the observations which equalizes the disturbance variances. Here again, the ß estimates remain biased but converge to the true population parameters as sample size increases.

5. Multicollinearity. Multicollinearity occurs when two or more independent variables are highly correlated with one another. Multicollinearity is quite common in estimation of economic relationships, especially when using time series data, because many economic variables tend to move together. Multicollinearity is a data problem and is usually a matter of degree. Most regression models in the social sciences exhibit multicollinearity because it is extremely unlikely that the independent variables would be perfectly uncorrelated. Whether or not multicollinearity is a problem depends on its severity. In the extreme case where two regressor variables are perfectly correlated, it is impossible to estimate two coefficients from what is essentially one independent variable.

With multicollinearity, the OLS estimates remain unbiased. In fact, all desirable properties of the OLS estimates are retained even though in practice multicollinearity is one of the most pressing problems associated with using regression. High multicollinearity causes imprecise and unstable coefficient estimates and large coefficient standard errors. Adding another variable may cause coefficients to change markedly. When two or more variables are highly correlated, OLS has difficulty separating out the independent effects of each regressor on the dependent variable. Taken together the independent variables may explain a large proportion of the variation in the dependent variable, but individually the coefficients could have large standard errors and extremely low t statistics. Thus, an estimated relationship with a high R^2 *and* no significant regression coefficient probably is plagued with high multicollinearity. Simple correlations among pairs of independent variables and regressions of each independent variable on the other independent variables will often uncover the sources of the multicollinearity.

If the major use of the estimated relationship is forecasting and the same linear relationships among independent variables are likely to continue into the future, the estimated equation may be used to predict even though it was estimated in the presence of extreme multicollinearity. On the other hand, if the purpose of the analysis is to estimate parameters, alternative remedies should be considered. The problem is that most suggestions for reducing multicollinearity may not be feasible for the problem at hand or cause misspecification of the model. Suggestions include increasing sample size, obtaining another sample, explicitly specifying a linear relationship among regressors (or parameters), such as a weighted average of past prices in a supply equation, incorporating information from another study, or dropping one or more variables (Kmenta, pp. 380-391; Maddala, pp. 183-201).

6. Simultaneous Equations. Single equation multiple regression models assume a one-way causation -- the x's explain y. In many situations the dependency runs both ways. One of the x's may be dependent on y. To remedy this situation, a second equation is added to the original and the two equations become a simultaneous system of equations.

Using OLS to estimate equations from a system of simultaneous equations results in biased estimates and the bias remains as sample size increases. The difficulty is called *simultaneous equation bias.*

Numerous techniques are available for estimating coefficients of a simultaneous model. The most popular are two-stage least squares and three-stage least squares, both of which are readily available in many computer regression packages. Prior to applying an estimation technique, it must be determined if it is mathematically possible to calculate unique values for each of the model's parameters (Kmenta, pp. 531-585).

ACTIVITIES

1. Write the regression model using a) matrix notation, b) vector notation, and c) summation notation.

2. Write out the elements of the y, X, β, and u of the matrix representation of the regression model. Include the dimensions of each vector or matrix {let T = number of observations and K = number of independent variables (including a column of ones for the intercept)}.

3. What assumptions are usually associated with OLS?

4. OLS estimators for the population β's are said to be unbiased and efficient. Comment on the following statement: "Since OLS estimates are unbiased the estimates for a single regression are equal to the true population estimates."

5. Using the data below:

   Identify a) the y vector, b) the X matrix, what must be added if x_1 is to represent the constant term, c) the procedure for transposing the X matrix, and d) using matrix notation, the formulas for computing $\hat{\beta}$, $\hat{y}$, and $\hat{u}$.

Time Period	Milk Consumption Per Capita	Retail Price of Milk	Medium Family Income	Population Density
	(lbs.)	($/cwt)	(000$)	(People/Sq. km)
1	270	21.52	11.10	77
2	269	22.63	12.40	29
3	228	25.93	10.54	130
4	233	26.33	9.68	115
5	286	21.22	12.00	178
6	296	25.16	11.22	65
7	264	25.31	12.40	41
8	286	23.70	14.10	226
9	236	26.40	11.05	13
10	240	22.08	9.44	182
11	241	25.45	10.72	320
12	286	20.95	12.79	68
13	292	21.84	15.66	284
14	228	26.76	9.13	234
15	259	25.25	11.15	12
16	219	26.86	9.96	77
17	326	22.95	13.89	20
18	271	25.78	10.31	26
19	228	27.24	8.71	55
20	300	23.24	13.11	499

6. a) Enter the y vector and X matrix (including the extra column of "1's") into a spreadsheet program, b) using commands of the spreadsheet program compute X', $X'X$, $(X'X)^{-1}$, $X'y$ $\hat{\beta}$, $\hat{y}$, and $\hat{u}$.

7. Now perform this same regression using the regression command of the spreadsheet program. (What are the two ways to handle the computation of the constant term? Which did you use?)

8. Based on information from the regression output, test the hypothesis that coefficient on the price variable is equal to zero. Fully explain the result of the test.

9. Test the hypothesis that all the nonintercept coefficients are equal to zero.

10. a) What does R^2 mean; how is it computed?; b) interpret the meaning of the estimated coefficient in the retail milk price variable; c) compute the elasticity of per capita milk consumption with respect to the retail price of milk with all variables measured at their means; d) explain the purpose and applications of the Durbin-Watson d statistic.

11. Use micro TSP or another regression package to redo the above regression.

12. Give an example of how you might apply dummy variables in a regression model.

13. What is meant by autocorrelated disturbances? Is an OLS assumption violated? If yes, which one? How can autocorrelated disturbances be detected? What remedies are available?

14. Answer the questions in activity 13 for a) heteroskedastic disturbances, b) multicollinearity, and c) simultaneous equations.

REFERENCES

Berry, William D. and Stanley Feldman. 1985. *Multiple Regression in Practice.* Beverly Hills: Sage Publications, Inc.

Cassidy, Henry J. 1981. *Using Econometrics.* Reston, Virginia: Reston Publishing Co.

Goldberger, A. S. 1964. *Econometric Theory.* New York: John Wiley.

Hayslett, Jr., H. T. 1968. *Statistics Made Simple.* Garden City, NY: Doubleday & Company, Inc.

Henkel, Ramon E. 1976. *Tests of Significance.* Beverly Hills: Sage Publications, Inc.

Huntsberger, David V. and Patrick Billingsley. 1973. *Elements of Statistical Inference.* Boston, MA: Allyn and Bacon, Inc.

Johnston, J. 1984. *Econometric Methods.* New York: McGraw-Hill, 3rd edn.

Kennedy, Peter. 1985. *A Guide to Econometrics.* Cambridge: The MIT Press, 2nd edn.

Kmenta, J. 1971. *Elements of Econometrics.* New York: Macmillian

Maddala, G. S. 1977. *Econometrics.* New York: McGraw-Hill.

Moore, David. 1979. *Statistics: Concepts and Controversies.* San Francisco: W. H. Freeman and Company.

Pindyck, R. S. and D. L. Rubinfeld. 1976. *Econometric Models and Economic Forecasts.* New York: McGraw-Hill.

Schroeder, Larry D., David L. Sjoquist and Paula E. Stephan. 1986. *Understanding Regression Analysis: An Introductory Guide.* Beverly Hills: Sage Publications, Inc.

Tweeten, Luther. August 1983. Hypotheses Testing in Economic Science. *American Journal of Agricultural Economics.* 65:548-551.

CHAPTER 6

The marketing channel reflecting this equation can be examined in Figure 2. From Figure 2, two points should be emphasized. First, in less developed countries where most of the farmers are small producers and at a subsistence situation, the level of production allocated for consumption is critical. The second point that should be stressed is the considerable proportion of food production waste due to post harvest losses, transport losses, storage losses, and processing losses.

Implications for Policy Planning

a. The market aspect of the food distribution channel, in most countries, is governed by some form of tree enterprise. Hence, the institutions involved in the marketing process compete among themselves to protect their respective interests. The producers want higher proces for their products, traders want higher profit margins and consumers want lower prices. These are highly conflicting interests.

Theoritically, based on standard demand and supply theories, the consumers are the primary decision makers. Based on the prices they are willing to pay for the products, the producers would then produce the amount they are willing to supply at the given price and the traders would simply provide the channel to transfer the products from the producers to the consumers.

In reality, however, what governs the relationship among these sectors is their respective economic strengths. In most developing "capitalist" countries, it is the traders and they sell the produce to the consumers at dictated prices.

Consequently, the price system may not be able to achieve what is the desired relationship between producers, traders and consumers.

The role of the goverment should be to safeguard the interest of the majority. Hence, pricing policies have been standard policy measures to address food marketing and distribution problems. That is, to ensure that farm gate prices are firm enough to make farming profitable so that more production will be encouraged and at the same time, make food prices in the

market affordable enough to allow majority of the people to have acces to food.

b. It is common knowledge that the amount of food losses attributable to post harvest, processing ang transportation is quite substantial. Therefore, for purposes of food availability, planning should take this problem into consideration.

If proportions for food production targets should be made, then allowances for losses should be incoporated to make the targets more realistic at country level. The stages along a distribution channel at which food losses and wastage may be monitored and calculated for planning purpose are harvesting, processing, storage, handling/transportation and onto the level of housholds. Estimates may either be added to the requirement figures as an allowance or subtracted from the food availability figures as a loss. At the same time, efforts have to be extend to minimize losses.

c. Appropriate delivery systems to reach the nutritonally vulnerable groups and/or communities should be strengthened in public distribution systems. The use of nutrition indicators, e.g., birth weights, patterns of food consumption, etc., may serve as basis for the identification of targets to enable obtain the essential items of the diet.

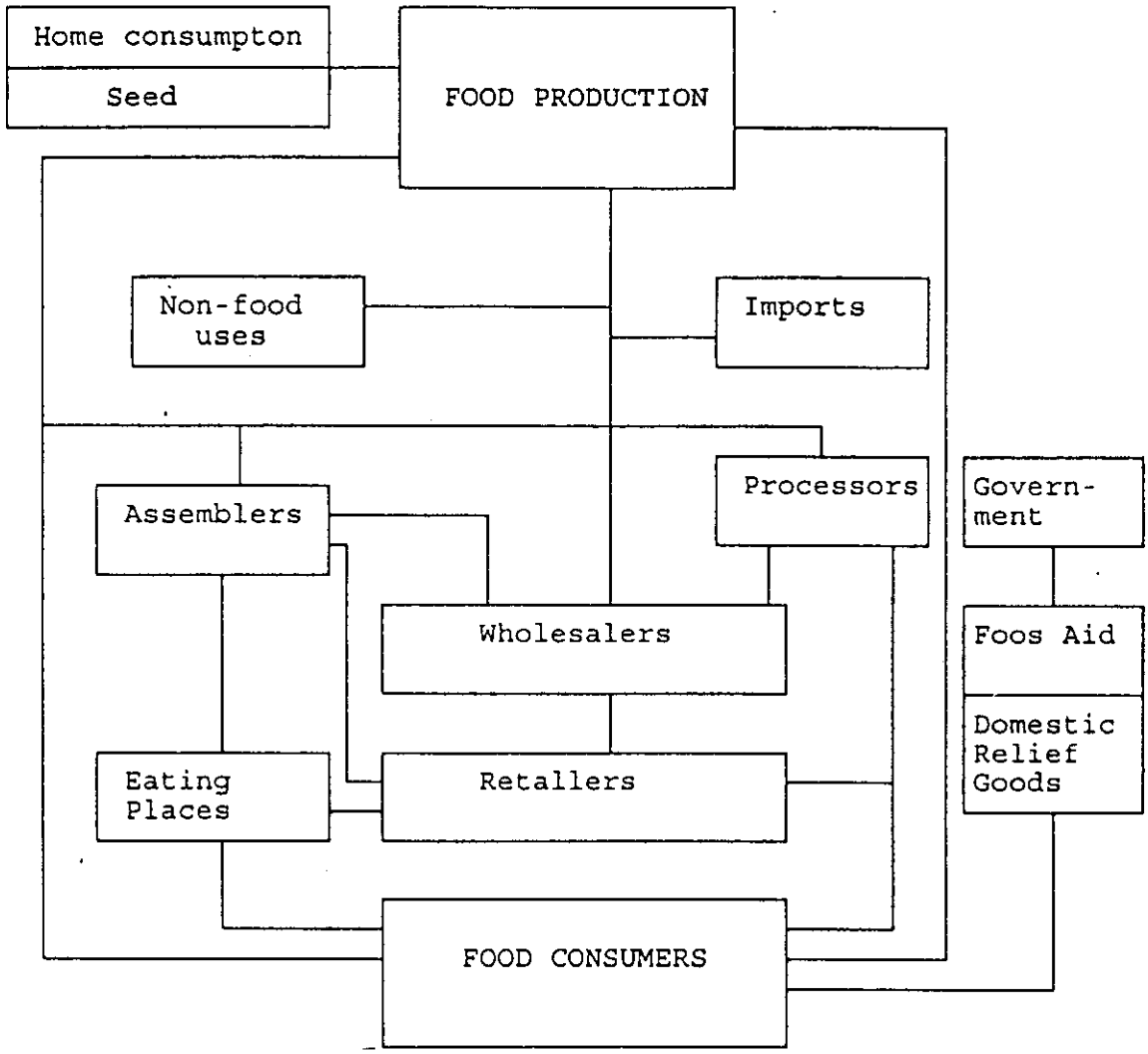


Figure 2. The Marketing and Distribution Channel

MODULE 6

FOOD CONSUMPTION *)

*) Based on Training Guidelines in *Training Guidelines in Food and Agriculture Planning for Nutritional Adequacy*, Regional-Office for Asia and Pacific, Food and Agriculture Organization of the United Nations.

FOOD CONSUMPTION

I. FACTORS AFFECTING CONSUMPTION

Food availability at the macro-level will not be of much help to food and nutrition planners and policy makes unless it is brought down to the consumption level. Consumption as used in this paper refers to effective demand.

Earlier, demand was defined to mean the willingness and ability of consumers to buy. The idea of willingness and ability is critical because food items may be available but the consumers do not have the ability to obtain food. Similarly, people may have the ability to buy specific food items but do not have the willingness to buy them.

Theoretically, demand is affected by several factors. However, in the context of food-policy planning, focus will be made on some specific variables. Effective demand is a function of : a). price of the commodity, b). prices of substitutes/complements, c). consumers income, d). population, e). taste and preference.

Price of the Commodity

Price elasticity is simply a measure of the quantity demanded to changes in the price of the commodity. Technically, price elasticity is measured as the ratio of the percebtage change in quantity demanded to the percentage change in price.

It is expected that price elasticities are negative. There is an inverse relation between price movements and quantity demanded.

However, the concept seems to reflect only consumers' behavior at the certain income level. When people's income is higher they tend to buy more of a commodity as the unit price increases. The logical explanation to this behavior is more social than economic.

Prices of Substitutes/Complements

Cross elasticity refers to the degree of responsiveness in the quantity demanded of one commodity to the change in price of another commodity.

Based on these concepts one can argue that the demand for a product is not only determined by its own price but also by prices of other related commodities. On one hand, a change in price of a product may result in its subtitution by onother product. If the price of pork goes up, demand for chicken could go up. Thus for substitute products, cross elasticity is positive. On the other hand, complementary foods like coffee and cream would exhibit negative elasticity. If the price of coffee goes up, the demand for cream goes down because of dcreased demand for coffee.

Consumer's income

Theoretically, if income rises then the quantity demanded for a certain food commodity also increases. This relationship is called income elasticity which technically refers to the ratio of the change in quantity demanded to change in income.

This indicator is critical to food policy planners because income, particularly for the urban population, is basically the source of the consumers' ability to obtain foods.

However, similar to the behavior of demand with respect to price changes, income elasticity behavior depends on the income level. Across income levels, income elasticity also varies. A classic example of this argument are those commodities which are considered "inferior goods". At some income level, goods like fish are considered inferior because as income rises consumers tend to buy less of this commodity.

Furthermore, experts argue that the marginal propensity to consume food items declines as income rises. In other words, as income rises the percentage of income spent on food declines (Engel's Law). Given these pecularities in income and income elasticities, it would be of helpto food policy makers and planners to understand some basic concepts on income distribution.

In moss less developed countries, income distribution are so skewed that only a minority share a major proportion of national income. In this context, it will help food planners to be aware of income inequality indicators.

a. The Lorenz Curve

This curve illustrates the distribution of the population in relation to income shares.

To illustrate, consider the following hypothetical example :

Cumulative % of income earners	Cumulative % of income share
10	2
20	4
30	7
40	11
50	16
60	23
70	35
80	53
90	77
100	100

Since line OA reflects perfect equality, he farther the Lorenz Curve is from Line OA, the greater is the inequality. The Lorenz Curve in the Figure indicates inequality. For instance, it indicates that about 70% of the population shares only about 35% of total income.

b. The Gini Ratio

To quantify the inequality shown by the Lorenz Curve, The Gini Ratio was developed. The Gini Ratio is simply (based on Figure 3):

$$\text{Gini Ratio} = \frac{\text{Area A}}{\text{Area (A+B)}}$$

From the formulation and based on the Lorenz Curve, Gini Ratio takes a value between zero and one. The smaller the value the lesser is the inequality. Or, conversely, the higher the value, the greater is the inequality.

Population

Theoretically, as population expands, demand for agricultural and nonagricultural goods will also expand. More specifically, population growth will eventually increase the demand for the basic necessities in life, such as food.

Taste and Preference

The demand for food items is also affected by shifting consumers' taste and preference. If consumers' preference shifts in favor of the commodity, demand expands.

II. IMPLICATIONS ON FOOD PLANNING POLICIES

1. Income Elasticity

Food requrements are developed from biological research on the diet needs of the human body. Income elasticities are statements of what consumers actually prefer to consume and how they would prefer to change their consumption with changes in income. These two different concepts complement each other in different ways.

Income elasticity may be used as basic for determining a policy intended to influence consumption patterns. One reason for cvering income elasticities of demand is to make projections and then use those projections as a basic for planning food production. Given the information concerning what is likely to happen and what is desirable under certain circumstances, policy may be chosen to mold what is likely to happen in the direction of what is desirable.

2. Income Distribution

Although argued earlier that food production can be influenced through appropriate pricing policies at the macro level, some arguments were also put forward about the varying response of quantities to price changes at different income levels. Therefore, food policy planners should take into account the income inequality conditions and try to effect complementary measures to iniciate the problem of income distribution alongside food policy measures. At the beginning, what can be done is to tailor food policies to specific income groups. Further, even if incomes, on the average, are incresing, food demand may not respond accordingly if income distribution is so skewed that only a small percentage of the people share most of the income.

3. Price Elasticity

Knowledge of price elasticity of demand is important if attempts are to be made to influence consumption patterns, or if the effect on prices of particular configuration of supply and demand are to be known.

4. Population Growth

It is often assumed that when population expends, the demand for food also expands. This assumption, however, is not quite accurate. If population expands but the total production and income do not increase correspondingly then the expected increase in demand due to population increase will be negated.

In efforts to plan for food production, population growth is an important consideration. It is quite possible that increases in food production may not effect food availability and consumption if population is growing faster than food production.

5. Food availability vs Actual Food Consumption

The desired improvement in the nutritional status of the people can be attained only if the food produced and made available to the people, is consumed by them.

In most developing contries where actual food consumption studies are being conducted, consumption levels are often reported to be below desirable levels even if food availability figures are high. This indicates two things : (1) food availability is not an ideal proxy to food consumption, (2) beside adequate purchasing power, enhancing consumption of different food items by different segments of the population needs nutritional awareness about the importance for increased quantity/quality of foods. Studies on food consumption should be strengthened as these research activities can facilitate appropriate action programmes in food and agriculture.

III. PATTERNS OF FOOD CONSUMPTION IN INDONESIA

a. Food Consumption

Table 1 shows that during the 1987-1993 period the consumption level of some food items tend to continuously increase i.e., fresh fish, vegetables oil, and sugar. Whlie the consumption level of remaining foods are relatively stable, but some of them fluctuating without clear pattern, such as rice, cassava, sweet potatoes, preserved fish, coconut, and brown sugar.

b. Expenditure Pattern

Food is a basic need of human for supporting their daily activities. However, as income increase, greater portion of income will be spent on non food, causing declining percentage of income spent on food. Naturally, food needs will reach a saturation point, while non-food needs are practically unsaturated. Thus, expend pattern can be used as a measurement of welfare. Use in national welfare assessment then percentage of from Table 2, it can be seen that food portion in total expenditure declined from 61.28 percent in 1987 to 60.36 percent in 1990, and

further to 56.86 percent in 1993. It means that the percentage spent on food in 1987-1990 period decline by 5.80 percent, but in 1990-1993 period decline by 1.50 percent. Table 3 shout the composition of expenditure on composite food commodities for 1987, 1990, and 1993. It can be seen that the largest portion of food expenditure was on cereal. Moreover there is an increased in 1990 cereal expenditure compared with 1987. In 1993 the consumption of cereal declined by 18.70 percent. The data do not suggest any drastic change. Therefare in the next period cereal consumption is expected to remain around 25 percent of total food expenditure. Tubers, though a cheap source of calories, tended to slightly decrease from 1.86 percent in 1987 to 1.66 percent in 1990 and futher 10 1.49 percent in Fish, meat, eggs and milk tended to increase. The increase of which is often interpreted as synonymous with welfare improvement, especially in adequacy of protein intake.

c. Expenditure distribution

Table 4 shows the percentage of expenditure made by various income brackets, namely, 40 percent of lowest income population, and 20 percent of highest income population, and the corresponding Gini Index, for 1987, 1990, and 1993.

According to world Bank criteria if the percentage of income of 40 percent of lowest income population is less than 12 percent, the level of ineguality is categorized as high between 12-17 percent moderate, 17 percent or more as low. Table 4 shows that for the three years examined is excess of 17 percent. Therefore, it follow that Indonesia as a whole was belonging to the category with low income distribution inequality.

d. Adequacy Standard of Calorie and Protein Intake

One of the Indicators which is frequently used, and with good reason, to depict the level of welfare of the population is nutritional adequaciy itself has many facets, however, two of its components, i.e., calorie and protein intakes are usually considered as foremost. The amounts of calories and protein intake are obtained by summing up the products of quantity consumed

of each food item by its calorie and protein content, respectively, over all food item consumed.

The standard for determining calorie and protein adequacy is 2000 kcals of energy and 45 grams of protein per capita per day. At national level average, the Susenas results show that calorie consumption of Indonesian still lies below the standard adequacy requirement where as protein consumption lies above. However, it is a note worthy of consideration, that, Susenas data only include food items prepared at home any prepared food bought. To obtain a more realistic picture calorie and protein content of consumed prepared food were estimated for presentation.

Table 5 shows the average value of daily per capita calorie and protein consumption by food items differentiated between those obtained from food prepared at home and those bought as prepared food.

The estimated value of calorie and protein consumption of prepared food for 1993 was 195.25 kcals and 4.73 grams, respectively. Both figures are strangely more than the corresponding values for 1990.

As can be seen on national average of daily per capita consumption of calorie and protein in 1993 after inclusion of those obtained from prepared food were 2064.77 kcals and 50.03 grams, respectively. Therefore, with reference to the standard used, it can be said that, roughly calorie consumption adequacy had been satisfied.

Table 1. Weekly Average per Capita Consumption of Several Food Items in Indonesia 1987, 1990 and 1993

Food Items	Unit or Quantity	1987	1990	1993
(1)	(2)	(3)	(4)	(5)
1. Rice	kg	2.24	2.27	2.23
2. Fresh with stalked corn	kg	0.04	0.04	0.03
3. Dry stalked corn	kg	0.01	0.01	0.01
4. Kernel corn	kg	0.16	0.12	0.10
5. Cassava	kg	0.28	0.30	0.24
6. Sweet potato	kg	0.14	0.09	0.11
7. Cassava chip	kg	0.04	0.04	0.03
8. Cassava flour	kg	0.00	0.00	0.00
9. Fresh fish 1)	kg	0.19	0.22	0.24
10. Preserved fish	0,1 kg	0.50	0.53	0.50
11. Cow/buffalo meat	kg	0.01	0.02	0.02
12. Chicken meat 2)	kg	0.04	0.04	0.04
13. Chicken egg 3)	kg	0.05	0.05	0.06
14. Duck egg	unit	0.18	0.16	0.16
15. Vegetable oil	Litre	0.12	0.14	0.16
16. Coconut	unit	0.32	0.33	0.30
17. Sugar	0,1 kg	1.47	1.52	1.56
18. Brown sugar	0,1 kg	0.28	0.30	0.27

Source : The 1987, 1990, and 1993 National Socio-economic Surveys

Notes :

1) Fresh fish included fresh water fish, sea fish and shrimp
2) One whole chicken is converted to weigh 0.825 kilogram
3) One egg is converted to weigh 1/16 kilogram

Table 2. Percentage of Average Monthly per Capita Expenditur on Food and non-Food in Indonesia 1987, 1990 and 1993

Expenditure Type	1987	1990	1993
(1)	(2)	(3)	(4)
1. Food	61.28	60.36	56.86
2. Non-Food	38.72	39.64	43.14
Total	100.00	100.00	100.00

Source : The 1987, 1990, and 1993 National Socio-economic Surveys

Table 3. Percentage of Monthly Average per Capita Expenditur by Commodity Groups in Indonesia 1987, 1990 and 1993

Commodity Groups	1987	1990	1993
(1)	(2)	(3)	(4)
1. Cereals	28.57	29.89	24.30
2. Tubers	1.86	1.66	1.49
3. Fish	8.76	9.38	9.15
4. Meat	4.67	4.84	5.22
5. Eggs and Milk	4.41	4.56	5.10
6. Vegetables	8.83	8.86	8.73
7. Legumes	3.95	4.06	3.93
8. Fruit	5.25	5.50	4.81
9. Other Items	14.85	14.88	14.87
10. Prepared food and drinks	10.59	8.40	13.51
11. Alcoholic beverages	0.18	0.20	0.19
12. Tobacco and betel-nut	8.09	7.77	8.70
Total	100.00	100.00	100.00

Source : The 1987, 1990, and 1993 National Socio-economic Surveys

Table 4. Distribution of per Capita Expenditure and Gini Index 1987, 1990 and 1993

Type of Area	Year	Income Bracket of 40% of lowest income population	40% of middle income population	20% of highest income population	Gini Index
(1)	(2)	(3)	(4)	(5)	(6)
Urban	1987	21.49	38.01	40.51	0.32
	1990	19.67	37.67	42.67	0.34
	1993	20.47	37.29	42.24	0.33
Rural	1987	24.29	39.26	36.44	0.26
	1990	24.41	39.22	36.36	0.25
	1993	25.13	38.42	36.45	0.26
Total	1987	20.87	37.48	41.65	0.32
	1990	21.31	36.75	41.94	0.32
	1993	20.34	36.90	44.76	0.34

Source : The 1987, 1990, and 1993 National Socio-economic Surveys

Table 5. Average Daily per Capita Consumption of Calorie and Protein by Commodity Groups in Indonesia 1987, 1990 and 1993

Commodity Groups	Calorie			Protein		
	1987	1990	1993	1987	1990	1993
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Cereals	12,450.03	1,247.20	1,210.42	24.14	24.08	23.26
2. Tubers	104.60	106.57	93.70	0.93	0.88	0.81
3. Fish	34.16	38.33	40.14	6.23	7.01	7.01
4. Meat	17.91	20.02	20.91	1.20	1.31	1.40
5. Eggs and Milk	22.35	21.53	27.79	1.36	1.33	1.67
6. Vegetables	40.10	40.33	37.75	2.87	2.85	2.63
7. Legumes	45.77	49.17	51.07	4.40	4.65	4.97
8. Fruit	39.49	42.88	37.83	0.46	0.51	0.43
9. Other Consumption	302.30	330.02	349.91	2.41	2.71	2.87
10. Prepared food	6.80	5.24	9.47	0.13	0.11	0.19
	127.64	*114.19*	*195.25*	*3.05*	*2.73*	*4.73*
11. Alcoholic beverages	0.13	0.15	0.14	0.00	0.00	0.00
Total	1,858.64	1,901.44	1,879.13	44.13	45.44	45.49
	1,979.35	2,010.24	2,064.77	47.05	48.06	50.03

CHAPTER 7

MODULE 7

FOOD PRODUCTION AND FOOD AVAILABILITY *)

*) Based on Training Guidelines in *Training Guidelines in Food and Agriculture Planning for Nutritional Adequacy*, Regional Office for Asia and Pacific, Food and Agriculture Organization of the United Nations.

FOOD PRODUCTION AND FOOD AVAIBILITY

I. FOOD PRODUCTION

Food production is at the core of the total food system. It refers to the domestic production of food. Domestic production may come from within the agricultural sector or outside it, that is, includes both commercial and non-commercial production from home gardens. In many developing countries, the production of food for the domestic economy dominates the agricultural sector. Thus, food production provides a critical basis for analyzing and planning food availability and its implications on food consumption.

However, food production functions in a complex food system. The question on what and show much food to produce, among a host of related questions, are best determinated in an economic system. In a market-oriented economy, consumer sovereignty predominates. For instance, the price consumer are willing and able to pay for food products will indicate what is to be produced. The other major participant in the economy is the producer. Producer determine what they are interested in and what they are capable of producing to meet the consumer demand in the marketplace. This leads to a set of physical factors such as soils, climate and fotography with which aproduction process must contend with.

Domestic Food Production

Among the components of the food Balance Sheet, domestic food production is most critical. Thus, it is worthy to discusssome basic concepts related to production and hopefully provide insights as to show food production can be influenced to effect desired changes in food availability.

The basic function of an economic system is to efficently allocate recources on the basic of four consideration :

1. What to produce
2. How much to produce
3. How to produce
4. For whom to produce

In standard economic concepts, specifically matket-oriented economic systems, the price mechanisme provide the guideline in allocating recources to address the four economic question. Demand is simply a schedule representing the various levels of commodity that consumers are willing and able to buy at various prices for a defined time period. Suppy on the other hand reflects the schedule of output levels that producers are willing and able to offer in the market at various prices in a given time frame.

Thus, under a purely competitive market, the equilibrium price is established when demand is equal to the supply. In a situation where there is surplus - supply exceeds demand , producers will have to lower their selling price to dispose of their excess inventory and the price moves back towards equilibrium. Conversely, when demand exceeds supply - when there is shotage, consumers will compete for the scarce commodity and bid up prices towards equilibrium.

The Theory of Production

A production function simply shows the relationship between inputs and outputs. It describes the rate at which resources are transformed into product.

Symbolically, a production function can be expressed as:

$$y = f(x_1, x_2, x_3 \ldots x_n)$$

Where y is the outputs and x_i are the inputs. The expresseion simply indicates that the output y is dependent upon the factors x_i.

Food production in agriculture is an enterprise based on the growth process of plants and animal. Hence, there are numerous input-output relationship because the growth process of plants and animal is affected by numerous factors like soil fertility and biological factors among other.

To have a clearer perspective of the input-output relationship involved in food production we need to employ a simple model. Theoretically, the behavior of the total product with respect to single input exhibits the law of diminishing returns. This principle indicates that at the start of the production process, the marginal productivity per unit change in input increases at in increasing rate, then the marginal productivity increases at a decreasing rate and eventually after some points, the marginal productivity declines - an additional input will decrease the output.

A good example of this principle is fertilizer as applied rice production. If only fertilizer quantity is change, at the initial level, adding more fertilizer will increase rice yiel. Added application will still increase yield but not as much as the previous additions. But beyond some point, any additional unit of fertilizer applied will result into a decline in rice yield.

The relevance of marginal productivity is reflected in the decision process in input utilization to minimize cost. If input prices are going up given the budget constraint of the producer, ouput will have to be reduced. Consequently, the price of inputs for food is critical in the determination of the level of food production.

Strategies in Food Production

Changes in food availability, either in quantity or quality, are essentially attributable to domestic food production. The need for continued stress on food are made on three accounts :

1. Although Asia-Pacific as a whole has substantially improved its level of domestic food production, a number of coutries in the Regional still do not meet its normative requirements in Energy terms.
2. In view of considerable unevenness in the purchasing power of the people and other distribution factors particularly in the market economy coutries, the overall level of food production should be higher than what is warranted by normative requirements.
3. The facus of food policy should shift from mere food self-sufficiency to nutritional adequacy.

Improved domestic food production may be carried out through one or a combination of the following strategies :

1. Promotion of agriculture through science and technology
   - Increase investment in agriculture and the yield per unit area of food production
   - Improve the production of animal husbandry
2. Readjustment of structures for food production
   - Increase land and output for specific food commodities
   - Enlarge the share of poultry in total meat
   - Stengthen the development of fish breeding
   - Set policies on land, price and subsidies favorable to the production of specific food commodities.
3. Guide people's consumption behavior
   - Readjust the current policies on tax, price income distribution
   - Strengthen nutrition education and extension activities

II. PROGRESS AND PROBLEMS IN FOOD PRODUCTION: THE INDONESIA CASE

Foodcrops

Foodcrops, especially paddy, is given high priority in Indonesia. In 1973-1993, paddy production increased 224 percent, while corn 175 percent and soybean 316 percent. Other crops experienced lower production increase (Table 1 - 3).

In 1984, Indonesia achieved self-sufficiency in rice. However, the production of paddy is still vulnerable to climate changes such as drought.

Estatecrops

Palm oil is one of the estatecrop commodities that experienced sound increase in production during 1973 - 1993. The production of palm oil in 1993 has surpassed the

production of coconut as the major source of cooking oil (Table 4). However, the domestic price of cooking oil is still fluctuated causing higher rate of inflation.

Livestock

The production of meat, egg and milk increased by 345 percent, 707 percent and 1006 percent, respectively, during 1973 -1993 (Table 6 - 9). These increases in production is still below the Desirable Dietary Pattern of Indonesia.

Fisheries

Production of tunas, skipjack and skipjack tuna increased 802 percent, 542 percent and 427 percent during 1973 - 1993, respectively (Table 10).

II. FOOD AVAILABILITY

Available food or food supply is a measure of the total food in the country availabel for human consumption. A combination of major food groups makes up the food basket. The food basket determines the dietary pattern of a population.

All food commodities that are edible, in principle, contribute to the food basket.

The Food Balance Sheet

A food balance sheet is an aggregate representation of the quantity of the food available to a population in given area. Components of the Food Balance Sheet are as follows:

Domestic Food Production. For primary commodities, production refers to the total domestic production whether inside or outside the agricultural sector, I.e., it includes non-commercial production.

Production of processed commodities refers to the total output of the commodity at the manufacturer level, irrespective of whether processing takes place in industrial plants or at the

village/household level. For these types of commodities, imported components should be properly accounted.

Changed in Inventory. This component comprises changes in stocks occurring during the reference period at all levels between the production and the retail levels, i.e., it comprises changes in government stocks, in stocks with manufacturers, importers, exporters, other wholesale and retail merchants, transport and storage enterprises and in stock farms.

Imports. This accounts for movements into the country of food items. This includes commercial trade and food aid granted on specific terms.

Exports. This includes all movements of food items out of the country under commercial trade or otherwise.

Feed. This comprises amounts of domestic animal feeds and of the edible commodities fed to livestock during the reference period, whether domestically produced or imported.

Seed. All amounts of seed used during the reference period for reproductive purposes, such as sugar cane planted, eggs for hatching and fish for bait, whether domestically produced or imported, fall under this classification.

Non-food. A distinction should be made between manufacture for food and manufacture for non-food use. Quantities of a commodity attributed to non-food purpuses are classified as non-food use.

Calculation of the Food Balance Sheet

Based on the major food groups, the domestic food supply is estimated by the formula:

Food Supply = Net Domstic Production + Imports - Export $\pm$ Change in Inventory,

where,

Net Domestic Production = Domestic Production - (Feed + Seed
+ Waste + Non-Food Use)

Issues and Implications to Food Planning Policies

Comparative advantage. The movement of food in and out of country is governed conceptually by the basic law of international trade. The early work on the theory of international trade and comparative advantage was made analogous to a household. Since every household finds it worthwhile to produce only some of its needs and to buy others with products it can sell, the same should apply to nations. Therefore, if a foreign country can supply us with a commodity cheaper than we ourselves can produce, it would be better to buy the commodity from them, with some part of our own industry employed in a way more advantageous to us.

To illustrate the theory of comparative advantage and gains from trade, let us consider two countries - Country A and Country B both producing food items banana and rice (This model is adopted from Lindert and Kindleberger, 1982).

Figure 1 indicates that in Country A, a kilogram of rice is valued at 1/2 kg of banana and in Country B, 1 kg of rice is equivalent to 1 1/2 kg of banana.

Without trade the two countries are forced to both produce and consume rice and banana. For simplicity, assume that both countries combine rice and banana at S_0 in Figure 1.

Suppose the two countries will trade, then Country A traders will find it profitable to sell rice to Country B at 1 1/2 kg of bananas per kilogram of rice. Rice will start coming to Country B from Country A in exchange for bananas. Soon, the expansion of trade will bring the price ratios in line. Trade between the two countries will be profitable only at a price ratio between Country A's no-trade commodity ratio (1/2 kg banana per kg rice) and Country B's no-trade commodity ratio (1 1/2 kg banana per kg rice).

It will be to the benefit of each side to specialize production of the commodity where one has the comparative advantage and trade for the other commodity. Country A can use all its resources to produce 50 kg of rice and B Country specialize to produce 100 kg of benanas.

If the price ratio is 1 kg of banana per kg of rice, then Country A can trade 20 kg of banana for rice allowing the country to product combination (S_i) 80 kg banana and 20 kg rice - a combination impossible to reach withaout trade. Likewise, Country A can have the 20 kg banana from Country B for 20 kg rice for combination of 30 kg rice and 20 kg banana at S_j - a combination superior than if there were no trade.

In the theoritical explorations of the theory of international trade, it was argued that trading based on comparative advantage is beneficial to both trading countries.

However, the trend of policies in agriculture, particularly in developed countries where their comparative advantage in agriculture has diminished, has become more political than economical. Most developed and developing countries in Asia like Japan and Taiwan and the developed countries of the West protect their agriculture for political reasons.

On the one hand, the less developed and developing countries import the needed food products from the developed countries in the name of free trade. On the other hand, the less developed countries find difficulty in exporting their agricultural products to developed countries due to both tariff and non-tariff barriers.

Economic Environment. While there is not much that one can do on the biological and/or physical environment of the agricultural production process, there is enough room to influence production and availability via the economic factors of production. As discussed earlier, given at product price, the agricultural producer can vary the output by changing the input mix depending on the input prices. Hence, food production can be increased if input prices are reduced. The same can be achieved if planners will make the appropriate pricing policies.

Land and Land Use Policy. Another critical issue that bears direct implications to food production, thus, food availability, is land and land use policy. In most under developed countries, there is no rational land use plan to direct the growth of the non-agricultural sector like housing, trade and industry, away from the productive agricultural lands. In countries like the Philippines, land use conversion from agriculture to non-agriculture use has been done in prime agricultural lands. Without a rational land use plan, conversion of prime agricultural lands

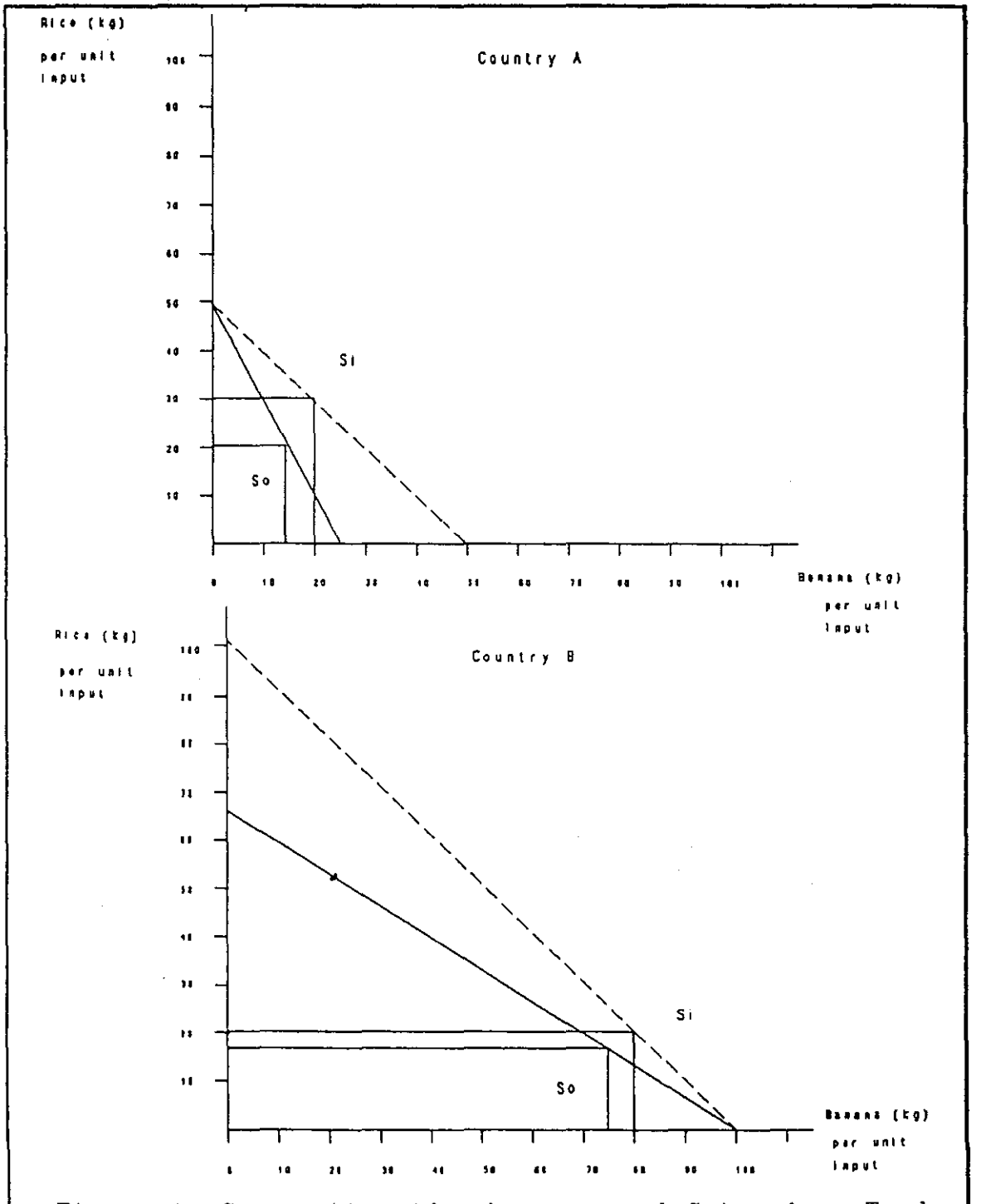


Figure 1. Comparative Advantage and Gains from Trade

will, in the long run, contribute to the problem of food production in a country.

Food Aid. There are countries with depend on food imports in the form of aid, and there are emergencies in which help must be given because one simply cannot allow others to starve. But if the idea is that the food problem can be solved by food aid, the dangers are great and lasting. Food aid has apparently led to a decrease in self-help. Food aid provides unfair competition to the producers in the recipient country. As a component of the Food Balance Sheet, it superficially covers up for a deficiency that should otherwise be addressed in the planning of domestic food production.

What is needed is to incorporate food aid in the overall food planning strategies to make use of its advantages and reduce its negative effects.

III. FOOD AVAILABILITY IN INDONESIA

Calories availability in Indonesia increased 2.27 percent per year during 1989 - 1993 (Table 11). Vegetables experienced the highest growth in the supplying calories, while sugar decreased 4.29 percent per year during the same period.

Table 11 shows proteins availability during 1989 - 1993. It is worth noting that cereals is still the major contributor of the proteins, namely 55 percent in 1993.

Table 1. Production, Harvested area and Productivity of Rice 1973 – 1993

Year	Production (Ton)	Index	Harvested (000 Ha)	Index	Productivity (Ton/Ha)	Index
1973	21 490 578	100	8 403 604	100	2,56	100
1974	22 476 073	105	8 508 598	101	2,64	103
1975	22 339 455	104	8 495 096	101	2,63	103
1976	23 300 939	108	8 368 759	100	2,78	109
1977	23 347 132	109	8 359 568	99	2,79	109
						0
1978	25 771 570	120	8 929 169	106	2,89	113
1979	26 282 663	122	8 803 564	105	2,99	117
1980	29 651 905	138	9 005 065	107	3,29	129
1981	32 774 176	153	9 381 839	112	3,49	137
1982	33 583 677	156	8 988 455	107	3,74	146
						0
1983	35 303 106	164	9 162 469	109	3,85	151
1984	38 136 446	177	9 763 580	116	3,91	153
1985	39 032 945	182	9 902 293	118	3,94	154
1986	39 726 761	185	9 988 453	119	3,98	156
1987	40 078 195	186	9 922 594	118	4,04	158
						0
1988	41 676 170	194	10 140 155	121	4,11	161
1989	44 725 582	208	10 531 207	125	4,25	166
1990	45 178 751	210	10 502 357	125	4,30	168
1991	44 688 247	208	10 281 519	122	4,35	170
1992	48 240 009	224	11 103 317	132	4,34	170
1993	48 181 087	224	11 012 776	131	4,38	171

Source : Directorate General of Food Crop and Horticulture

Table 2. Production of Secondary Food Crops in Indonesia, Year 1973 – 1993

(Ton)

Year	Corn	Index	Cassava	Index	Peanut	Index	Soybean	Index
1973	3 689 802	100	11 185 592	100	290 104	100	541 040	100
1974	3 010 781	82	13 030 674	116	309 166	107	589 239	109
1975	2 902 887	79	12 545 544	112	379 683	131	589 831	109
1976	2 572 139	70	12 190 728	109	341 052	118	521 777	96
1977	3 142 654	85	12 487 664	112	408 950	141	522 821	97
1978	4 029 201	109	12 902 011	115	445 812	154	616 599	114
1979	3 605 535	98	13 750 767	123	424 362	146	679 825	126
1980	3 990 939	108	13 726 336	123	469 808	162	652 762	121
1981	4 509 302	122	13 300 911	119	474 591	164	703 811	130
1982	3 234 825	88	12 987 891	116	436 822	151	521 394	96
1983	5 086 875	138	12 102 734	108	460 421	159	536 103	99
1984	5 287 825	143	14 167 090	127	534 815	184	769 384	142
1985	4 329 503	117	14 057 027	126	527 852	182	869 718	161
1986	5 920 374	160	13 312 119	119	641 878	221	1 226 727	227
1987	5 155 680	140	14 356 336	128	533 106	184	1 160 963	215
1988	6 651 917	180	15 471 111	138	589 265	203	1 270 418	235
1989	6 192 512	168	17 117 249	153	619 585	214	1 315 113	243
1990	6 734 028	183	15 829 635	142	650 560	224	1 487 433	275
1991	6 255 906	170	15 954 467	143	652 119	225	1 555 453	287
1992	7 995 459	217	16 515 855	148	739 050	255	1 869 713	346
1993	6 459 737	175	17 285 385	155	638 708	220	1 708 528	316

Source Directorate General of Food Crops

Table 3. Harvested Area of Secondary Food Crops in Indonesia, Year 1973 – 1993

(Ha)

Year	Maize	Index	Cassava	Index	Peanuts	Index	Soybean	Index
1973	3 433 164	100	1 428 813	100	415 831	100	743 657	100
1974	2 666 868	78	1 509 440	106	408 836	98	753 499	101
1975	2 444 866	71	1 410 025	99	474 519	114	751 689	101
1976	2 095 054	61	1 353 328	95	414 211	100	646 336	87
1977	2 566 509	75	1 363 552	95	507 249	122	646 121	87
1978	3 024 611	88	1 302 903	91	506 445	122	733 142	99
1979	2 593 621	76	1 439 315	101	473 246	114	784 489	105
1980	2 734 940	80	1 412 481	99	506 401	122	732 346	98
1981	2 955 039	86	1 387 536	97	507 958	122	809 978	109
1982	2 061 299	60	1 323 709	93	461 338	111	607 788	82
1983	3 002 227	87	1 220 808	85	480 514	116	639 876	86
1984	3 086 246	90	1 350 448	95	537 591	129	858 854	115
1985	2 439 966	71	1 291 845	90	510 037	123	896 220	121
1986	3 142 759	92	1 169 886	82	601 261	145	1 253 767	169
1987	2 626 033	76	1 222 151	86	550 754	132	1 100 565	148
1988	3 405 751	99	1 302 581	91	607 602	146	1 177 360	158
1989	2 944 199	86	1 407 880	99	620 817	149	1 198 096	161
1990	3 158 092	92	1 311 564	92	635 014	153	1 334 100	179
1991	2 909 100	85	1 319 143	92	628 256	151	1 368 199	184
1992	3 629 346	106	1 351 324	95	719 703	173	1 665 706	224
1993	2 939 534	86	1 401 640	98	624 289	150	1 470 206	198

PUSDATA

Source : Directorate General of Food Crops and Horticulture
Note Preliminary Figure Not Available

Table 4. Production of Estate in Indonesia by Selected Commodity, Year 1973 – 1994

(Ton)

Year	Commodities																			
	Coconut	Index	Palm Oil	Index	Palm Kernel	Index	Coffee	Index	Tea	Index	Cocoa	Index	Cloves	Index	Pepper	Index	Sugar Cane	Index	Tobacco	Index
1973	1 279 926	100	289 677	100	64 035	100	150 163	100	67 584	100	1 813	100	27 446	100	28 510	100	914 859	100	76 507	100
1974	1 343 411	105	347 676	120	73 085	114	149 811	100	65 017	96	3 191	176	14 998	55	27 492	96	1 234 726	135	78 071	102
1975	1 389 643	109	397 253	137	81 116	127	170 372	113	70 089	104	3 921	216	19 294	70	22 934	80	1 241 656	136	95 665	125
1976	1 534 641	120	431 006	149	82 821	129	193 377	129	73 785	109	3 909	216	20 032	73	36 854	129	1 318 374	144	89 798	117
1977	1 566 457	122	457 607	158	92 984	145	193 966	129	82 926	123	4 816	266	39 923	145	42 794	150	1 360 373	149	84 502	110
1978	1 578 242	123	501 284	173	94 605	148	222 689	148	92 110	136	5 496	303	21 554	79	46 159	162	1 496 968	164	82 466	108
1979	1 622 087	127	641 240	221	120 522	188	273 675	182	97 217	144	8 632	476	18 208	66	32 354	113	1 186 390	130	120 299	157
1980	1 666 073	130	721 172	249	127 949	200	294 973	196	106 175	157	10 264	567	34 218	125	36 626	128	1 259 950	138	85 487	112
1981	1 792 922	140	800 060	276	140 679	220	314 899	210	109 135	161	13 137	725	29 352	107	39 833	140	1 230 120	134	109 646	143
1982	1 603 045	125	886 820	306	157 028	245	281 251	187	92 732	137	17 260	952	32 809	120	39 647	139	1 626 802	178	106 802	140
1983	1 607 638	126	982 987	339	164 416	257	305 648	204	110 317	163	19 640	1 083	41 828	152	45 625	161	1 619 536	177	109 484	143
1984	1 750 488	137	1 147 190	396	247 361	386	315 489	210	126 443	187	26 502	1 462	48 886	178	46 050	162	1 810 373	198	107 825	141
1985	1 920 431	150	1 243 430	429	258 457	404	311 398	207	127 464	189	33 798	1 864	41 990	153	40 516	142	1 898 809	208	160 765	210
1986	1 974 642	154	1 350 729	466	283 526	443	356 822	238	129 481	192	34 327	1 893	50 628	184	46 373	163	2 014 574	220	101 235	132
1987	2 098 544	164	1 506 055	520	319 049	498	388 669	259	126 096	187	50 199	2 769	71 002	259	49 271	173	2 175 874	238	112 691	147
1988	2 143 987	168	1 713 335	591	342 667	535	391 095	260	133 600	198	79 335	4 376	81 224	296	65 276	229	2 004 051	219	116 917	153
1989	2 221 357	174	1 964 954	678	392 689	614	401 048	267	141 374	209	110 509	6 095	56 398	205	67 849	238	2 108 348	230	80 979	106
1990	2 331 570	182	2 412 612	833	503 803	787	412 767	275	155 919	231	142 347	7 851	66 912	244	69 699	245	2 119 585	232	156 432	204
1991	2 478 316	194	2 657 600	917	551 345	861	428 305	285	139 520	206	174 899	9 647	80 253	292	62 549	219	2 252 667	246	140 283	183
1992	2 475 264	193	3 266 250	1 128	559 274	873	436 930	291	153 701	227	207 147	11 426	73 124	266	65 014	228	2 306 484	252	111 655	146
1993	2 605 903	204	3 421 449	1 181	602 229	940	436 868	292	164 994	244	258 059	14 234	67 366	245	59 798	210	2 329 811	255	121 370	159
1994 *)	2 631 488	206	4 094 483	1 413	786 241	1 228	452 067	301	166 845	250	271 127	14 955	69 447	253	61 696	216	2 304 893	252	139 128	182

PUSDATA

Source : Directorate General of Estate Crops

Note : *) Preliminary Figure ...) Data not available

Table 5. Production of Meat, Egg and Milk
Year 1973 – 1992

(000 Ton)

Year	Meat	Index	Egg	Index	Milk	Index
1973	397,4	100	81,4	100	35,0	100
1974	433,1	109	98,1	121	56,9	163
1975	435,0	109	112,2	138	51,1	146
1976	448,9	113	115,6	142	58,0	166
1977	467,7	118	131,4	161	60,7	173
1978	444,6	112	151,0	186	62,3	178
1979	486,5	122	164,5	202	72,2	206
1980	571,3	144	262,6	323	78,4	224
1981	596,0	150	275,2	338	85,8	245
1982	628,5	158	297,0	365	117,6	336
1983	651,5	164	316,0	388	174,6	499
1984	742,7	187	355,3	436	179,0	511
1985	808,9	204	369,9	454	191,9	548
1986	879,0	221	437,2	537	220,2	629
1987	985,5	248	451,5	555	234,9	671
1988	937,0	236	443,1	544	264,9	757
1989	971,7	245	456,2	560	338,2	966
1990	1027,7	259	484,2	595	345,6	987
1991	1099,2	277	510,3	627	360,2	1 029
1992 *)	1385,5	349	575,3	707	352	1 006

PUSDATA

Source Directorate General of Livestock
Note *) Preliminary Figure

Table 6. Production of Meat by Kind of Livestock, 1973 – 1992

(000 Ton)

Year	Cattle	Index	Buffalo	Index	Goat	Index	Sheep	Index	Pig	Index	Horse	Index	Poultry	Index
1973	202,6	100	59,6	100	14,9	100	11,7	100	41,2	100	0,9	100	48,5	100
1974	212,8	105	62,3	105	15,4	103	12,0	103	44,5	108	0,9	100	85,2	176
1975	224,5	111	65,2	109	17,4	117	13,0	111	47,8	116	0,9	100	66,2	136
1976	225,3	111	64,6	108	19,4	130	8,4	72	51,2	124	1,5	167	78,3	161
1977	224,5	111	65,5	110	23,5	158	14,1	121	46,7	113	1,4	156	92,0	190
1978	225,4	111	64,2	108	26,3	177	14,3	122	47,7	116	1,4	156	95,3	196
1979	213,7	105	64,4	108	35,2	236	17,1	146	54,2	132	1,6	178	100,3	207
1980	220,8	109	65,4	110	36,3	244	17,6	150	57,3	139	1,6	178	172,3	355
1981	227,8	112	67,8	114	38,5	258	18,2	156	59,0	143	1,7	189	183,0	377
1982	235,5	116	70,2	118	40,2	270	18,8	161	60,8	148	1,7	189	201,3	415
1983	203,7	101	44,2	74	65,5	440	23,5	201	93,9	228	1,8	200	218,9	451
1984	216,4	107	48,2	81	48,3	324	28,8	246	119,1	289	1,7	189	279,7	577
1985	227,4	112	48,6	82	49,5	332	29,8	255	133,2	323	1,7	189	318,7	657
1986	227,8	112	49,4	83	61,8	415	31,7	271	163,7	397	1,3	144	343,3	708
1987	234,8	116	43,7	73	61,5	413	30,6	262	141,0	342	1,5	167	382,4	788
1988	238,1	118	41,7	70	66,2	444	31,0	265	154,3	375	1,6	178	404,1	833
1989	252,8	125	43,1	72	62,9	422	32,2	275	136,3	331	1,4	156	442,4	912
1990	259,2	128	44,3	74	58,3	391	31,7	271	123,3	299	1,7	189	508,7	1 049
1991	262,2	129	47,5	80	57	383	37,4	320	110,1	267	1,5	167	583,5	1 203
1992 *)	301,1	149	45	76	63,1	423	38,3	327	135,6	329	1,7	189	647,6	1 335

PUSDATA

Source Directorate General of Livestock

Note *) Preliminary Figure

...) Not Available

Table 7. Production of Egg in Indonesia, 1973 – 1992

(000 Ton)

Year	Native Chicken	Index	Layer	Index	Duck	Index	Total	Index
1973	35,4	100	15,6	100	30,4	100	281,4	100
1974	36,1	102	24,8	159	37,2	122	359,1	128
1975	41,2	116	28,0	179	43,0	141	408,1	145
1976	40,5	114	31,9	204	43,2	142	434,5	154
1977	43,4	123	39,4	253	48,6	160	131,4	47
1978	45,7	129	43,7	280	61,6	203	560,2	199
1979	48,0	136	50,3	322	65,6	216	621,9	221
1980	50,4	142	141,6	908	70,0	230	159,4	57
1981	53,0	150	151,7	972	70,5	232	275,2	98
1982	55,8	158	164,9	1 057	76,3	251	297,0	106
1983	58,0	164	176,6	1 132	81,4	268	316,0	112
1984	65,9	186	207,3	1 329	82,1	270	355,3	126
1985	65,4	185	227,2	1 456	77,3	254	369,9	131
1986	69,5	196	250,7	1 607	117,0	385	2 241	796
1987	70,7	200	259,0	1 660	121,8	401	2 311	821
1988	76,8	217	248,9	1 596	117,4	386	2 256	802
1989	80,4	227	262,0	1 679	113,8	374	2 363	840
1990	84,6	239	279,8	1 794	119,6	393	2 517	894
1991	87,8	248	303,8	1 947	118,8	391	2 706	962
1992 *)	92,2	260	354,2	2 271	128,9	424	3 106	1 104

PUSDATA

Source Directorate General of Livestock

Note *) Preliminary Figure

...) Not Available

Table 8. Population of Livestock in Indonesia, 1973 – 1994

(000 Head)

Year	Commodities													
	Dairy Cattle	Index	Beef Cattle	Index	Buffalo	Index	Goat	Index	Sheep	Index	Pig	Index	Horse	Index
1973	70	100	6 389	100	2 276	100	6 665	100	3 480	100	2 622	100	636	100
1974	86	123	6 380	100	2 415	106	6 517	98	3 403	98	2 906	111	600	94
1975	90	129	6 242	98	2 432	107	6 315	95	3 374	97	2 707	103	627	99
1976	87	124	6 237	98	2 284	100	6 904	104	3 603	104	2 947	112	631	99
1977	91	130	6 217	97	2 292	101	7 232	109	3 864	111	2 979	114	659	104
1978	93	133	6 330	99	2 312	102	8 051	121	3 611	104	2 902	111	615	97
1979	94	134	6 362	100	2 432	107	7 659	115	4 071	117	3 183	121	596	94
1980	103	147	6 440	101	2 457	108	7 691	115	4 124	119	3 155	120	619	97
1981	113	161	6 516	102	2 457	108	7 790	117	4 177	120	3 364	128	637	100
1982	140	200	6 594	103	2 513	110	7 891	118	4 231	122	3 587	137	658	103
1983	198	283	8 894	139	2 398	105	10 970	165	4 789	138	4 248	162	527	83
1984	203	290	9 236	145	2 743	121	9 025	135	4 698	135	5 112	195	659	104
1985	208	297	9 318	146	3 245	143	9 629	144	4 885	140	5 560	212	668	105
1986	222	317	9 432	148	3 496	154	10 738	161	5 284	152	6 216	237	715	112
1987	233	333	9 510	149	3 296	145	10 292	154	5 354	154	6 339	242	658	103
1988	263	376	9 776	153	3 194	140	10 606	159	5 825	167	6 484	247	675	106
1989	288	411	10 094	158	3 224	142	10 996	165	5 910	170	6 936	265	683	107
1990	294	420	10 410	163	3 265	143	11 298	170	6 006	173	7 136	272	683	107
1991	306	437	10 665	167	3 311	145	11 484	172	6 108	176	7 612	290	695	109
1992	312	446	11 211	175	3 342	147	12 062	181	6 235	179	8 135	310	678	107
1993 *)	315	450	11 356	178	3 370	148	11 502	173	6 697	192	8 635	329	653	103
1994 **)	369	527	11 696	183	3 408	150	11 640	175	6 911	199	9 122	348	646	102

PUSDATA

Source: Directorate General of Livestock

Note: *) Preliminary Figure

**) Estimation Figure

Table 9. Population of Poultry in Indonesia, 1973 – 1994

(000 Head)

Year	Commodities							
	Native Chicken	Index	Layer	Index	Broiler	Index	Duck	Index
1973	79 906	100	2 202	100	...		12 503	100
1974	89 650	112	3 450	157	...		13 620	109
1975	94 572	118	3 903	177	...		14 123	113
1976	97 504	122	4 878	222	...		15 182	121
1977	101 686	127	5 807	264	...		16 032	128
1978	108 916	136	6 071	276	...		16 032	128
1979	114 350	143	7 007	318	...		18 689	149
1980	126 310	158	22 940	1 042	...		21 078	169
1981	132 878	166	24 568	1 116	25 462	100	18 689	149
1982	139 787	175	26 312	1 195	28 110	110	22 420	179
1983	159 462	200	28 102	1 276	31 033	122	23 861	191
1984	166 815	209	29 559	1 342	110 580	434	24 694	198
1985	155 627	195	31 875	1 448	143 657	564	23 870	191
1986	162 991	204	38 689	1 757	173 795	683	27 002	216
1987	168 405	211	39 968	1 815	218 183	857	26 025	208
1988	182 879	229	38 413	1 744	227 044	892	25 080	201
1989	191 433	240	40 452	1 837	262 918	1 033	24 315	194
1990	201 366	252	43 185	1 961	326 612	1 283	25 553	204
1991	208 966	262	46 885	2 129	407 908	1 602	25 369	203
1992	222 530	278	54 146	2 459	459 097	1 803	27 342	219
1993 *)	259 321	325	54 736	2 486	526 960	2 070	27 657	221
1994 **)	280 058	350	59 101	2 684	627 672	2 465	28 577	229

PUSDATA

Source: Directorate General of Livestock

Note:
*) Preliminary Figure
**) Estimation Figure
...) Not Available

Table 10. Fisheries Production by Species, 1973 – 1992

(Ton)

Year	(Fish) Tunas	Index	Skipjack	Index	Skipjack Tuna	Index
1973	11 334	100	26 405	100	36 782	100
1974	11 236	99	28 060	106	47 116	128
1975	11 931	105	27 241	103	47 335	129
1976	9 354	83	30 851	117	52 235	142
1977	13 204	116	30 410	115	62 382	170
1978	13 412	118	33 515	127	55 244	150
1979	17 899	158	42 834	162	66 582	181
1980	20 898	184	51 818	196	76 797	209
1981	25 239	223	57 430	217	87 731	239
1982	28 080	248	61 577	233	106 012	288
1983	26 088	230	76 790	291	103 878	282
1984	30 697	271	80 658	305	103 179	281
1985	33 672	297	87 448	331	111 630	303
1986	39 563	349	85 188	323	114 234	311
1987	40 505	357	102 559	388	122 675	334
1988	42 979	379	127 543	483	117 898	321
1989	66 254	585	113 844	431	135 332	368
1990	88 666	782	114 168	432	139 967	381
1991	130 013	1 147	132 695	503	150 439	409
1992	90 931	802	143 178	542	156 974	427

Source Directorate General of Fishery

Note ...) Not Available

Table 11. Calories Availability, 1989 – 1993

No	Commodity	1989		1990		1991		1992		1993 a)		Growth rate (%)
		Cal	%	Cal	%	Cal	%	Cal	%	Cal	%	1989 – 1993
1	Cereal	1695	64,2	1 817	65,3	1 790	64,90	1 830	62,4	1 830	63,5	1,99
2	Starchy Food	192	7,27	165	5,93	186	6,67	215	7,31	201	6,96	1,94
3	Sugar	164	6,21	150	5,39	155	5,56	146	4,96	137	4,75	–4,29
4	Pulses Nuts and Oil Seed	253	9,58	286	10,28	290	10,30	308	10,4	296	10,2	4,19
5	Fruits	36	1,36	39	1,40	41	1,47	40	1,36	38	1,32	1,51
6	Vegetables	23	0,87	25	0,90	23	0,82	30	1,02	32	1,11	9,45
7	Meat	26	0,99	28	1,01	30	1,08	31	1,06	33	1,14	6,16
8	Egg	10	0,38	10	0,36	11	0,39	11	0,37	11	0,38	2,50
9	Milk	6	0,23	6	0,22	8	0,29	7	0,24	7	0,24	5,21
10	Fish	22	0,83	24	0,86	28	1,00	29	0,99	30	1,04	8,19
11	Oils & fats	213	8,07	231	8,31	227	8,14	288	9,79	268	9,28	6,66
	Total	2 640	100	2 781	100	2 789	100	2 935	100	2 883	100	2,27

PUSDATA

Source Food Balance Sheet In Indonesia, CBS

Note – Preliminary Figure

Table 12. Proteins Availability, 1990 – 1993

No.	Commodity	1990		1991		1992		1993 a)		Growth rate (%)
		Gram	%	Gram	%	Gram	%	Gram	%	1990–1993
1	Cereal	36,59	59,25	36,10	57,00	37,87	55,79	37,02	55,85	0,44
2	Starcy food	1,49	2,41	1,66	2,62	1,91	2,82	1,80	2,72	6,90
3	Sugar	0,05	0,08	0,05	0,08	0,05	0,07	0,04	0,06	–6,67
4	Pulses Nuts and Oil Seed	14,76	23,90	15,10	23,90	16,91	24,91	16,04	24,20	3,05
5	Fruits	0,47	0,76	0,49	0,77	0,48	0,71	0,44	0,66	–2,04
6	Vegetables	1,24	2,01	1,23	1,94	1,39	2,05	1,54	2,32	7,66
7	Meat	1,88	3,05	2,10	3,31	2,18	3,21	2,37	3,58	8,08
8	Egg	0,75	1,21	0,80	1,26	0,85	1,25	0,87	1,31	5,09
9	Milk	0,31	0,50	0,39	0,62	0,38	0,56	0,38	0,57	7,75
10	Fish	4,15	6,72	5,32	8,39	5,81	8,56	5,73	8,64	12,01
11	Oils & fats	0,07	0,11	0,07	0,11	0,05	0,07	0,06	0,09	–2,86
	Total	61,76	100	63,31	100	67,88	100	66,29	100	2,46

PUSDATA

Source Food Balance Sheet in Indonesia, CBS

Note Preliminary Figure

CHAPTER 8

MODULE 8

AGRICULTURAL MARKETING AND FOOD DISTRIBUTION *)

*) Based on Training Guidelines in *Training Guidelines in Food and Agriculture Planning for Nutritional Adequacy*, Regional Office for Asia and Pacific, Food and Agriculture Organization of the United Nations.

AGRICULTURAL MARKETING AND FOOD DISTRIBUTION

In order to understand the mechanisms and problems of food distribution it is first necessary to differentiate agricultural marketing from food distribution. The former is a process within the framework of the marketing system. The latter covers both the process within and outside the marketing system. It should be noted, however, that most of the available food is channeled through the market system.

By traditional definition, agricultural marketing refers to the process of moving agricultural products from the point of production to the point of consumption. The concept covers both domestic and imported agricultural products.

An institution, its functions and behavior in the entire process, are organized into a system that performs the basic activities of exchange (buying and selling), physical functions (storage, transport and processing), and facilitating functions (standardization, financing, and research).

The system can either be centralized or decentralized. The former is one in wich the producers load their products in large central markets. Brokers will then do the selling of the products. The latter is a channel where farmers directly sell their produce to the middlemen or to the consumers.

Food Distribution

The amount of food available for distribution both within and without the marketing system in the farm production minus those allocated for home consumption and the amount reversed for seeds and planting materials, as well as food imports including food aid. However, a portion of the sums of these two could be used for non-food processing. Thus, the food available for distribution is :

Available Food = [(Production-seed-home consumption)+imports]
- [food products used for non-food]

THE GROUP OF 77
New York
Office of the Chairman

L-0058/95 21 April 1995

SUB-CONTRACT AGREEMENT

Subject: INT/94/K04 - Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

Sub-contract Agreement between the Group of 77 and the Ministry of Agriculture, Indonesia

Excellency,

1. I wish to refer to the exchange of correspondence between the Office of the Chairman of the Group of 77, as executing agency for the above project and your organization, the Ministry of Agriculture, Indonesia, as sub-contractor based upon your development of the project. Hereafter, the Office of the Chairman of the Group of 77, executing agency, shall be referred to as G-77 and the Ministry of Agriculture, Indonesia, sub-contractor, shall be referred to as MAGRI.

2. In accordance with the relevant provisions of PGTF project document INT/94/K04 and its corresponding budget of (US)$70,000, we confirm our acceptance of the services to be provided by the MAGRI towards the implementation of this project under the following terms and conditions.

3. MAGRI shall provide the services and facilities described in Attachment 1 - Description of Services - of this sub-contract agreement and in accordance with the terms of reference included therein.

4. The G-77 shall retain the overall responsibility for the implementation of the PGTF-assisted project through its designated project coordinator.

5. Upon acceptance of this sub-contract agreement and pursuant

Country:	Interregional
Project Number:	INT/94/K04/A/95/99
Project Title:	Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

	Total $
Personnel (Consultants)	8,500
Travel (Asia & Africa Trainers)	45,500
Equipment	10,000
Miscellaneous	6,000
Project total	70,000

The Account Number to which the transfer of disbursement should be made is 108-04247517.

The name of Bank is Bank Bumi Daya (BBD), Pasar Minggu Branch, Jakarta Selatan, Indonesia.

to the project budget of the project document and the work plan, the G-77 will arrange with UNDP, the latter's remittances of advances of funds directly to the Ministry of Agriculture, Indonesia's account, with MAGRI incurring expenditure within the limits set out in Attachment 2 -Schedule of Services and Facilities- and making similar arrangements with UNDP for the reimbursement of expenditures to be incurred by the sub-contract as described in Attachment 2, subject to the following:

Within the budgetary limitations of the project document, the G-77 shall be responsible for providing miscellaneous services such as dissemination of the final report to the Member States.

6. A cumulative statement of expenditure shall be submitted by the MAGRI depending on the duration of the project, at 30 June and 31 December, during the life of the project. The statement, to be prepared in accordance with the format annexed to the project document, will be submitted to the G-77 within 30 days following those days. The G-77 will include its own expenditure against funds advanced by UNDP.

7. The MAGRI shall submit such reports relating to the project as may reasonably be required by the project coordinator in the exercise of his/her duties, as well as other reports required by the G-77 in connexion with its obligations to submit reports to UNDP.

8. Any amendment to these arrangements shall be affected by mutual agreement through an appropriate supplementary sub-contractual agreement which would require the prior concurrence of UNDP.

9. For any matters not specifically covered by this arrangement, the appropriate provisions of the project document and revisions thereof, and the appropriate provisions of the financial regulations and rules of the MAGRI shall mutatis mutandis apply.

10. All further correspondence regarding the implementation of this sub-contract agreement should be addressed to the Chairman of the G-77, United Nations, New York.

11. The G-77 and through it, MAGRI will keep the Special Unit for TCDC, UNDP, New York, fully informed of all actions undertaken by them in carrying out this sub-contract agreement.

12. If you are in agreement with the above, would you kindly sign and return to the office of the Chairman of the Group of 77 two copies of this sub-contract agreement. Your acceptance shall

thereby constitute the basis for MAGRI's participation in the implementation of the project.

Yours sincerely,

On behalf of the Group of 77,
the Executing Agency,

FELIPE MABILANGAN
Ambassador & Permanent Representative of
the Philippines to the United Nations
Chairman of the Group of 77
New York

On behalf of the sub-contracting agency,
Ministry of Agriculture, Indones ia (MAGRI),

H.E.Mr.Nugroho Wisnumurti
Ambassador and Permanent Representative of
Indonesia to the United Nations
New York, N.Y.

Attachment 1

Description of Services

Project Number: INT/94/K04/A/95/99

Project Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

Work to be performed by the Sub-contracting agency:

The development objective of the above-mentioned project is to improve policies and strategies of food security in Developing Countries of the NAM to achieve sustainable food security.

The immediate objectives of the project are to:

(a) Strengthen and improve the national capabilities of NAM's Developing Countries in analyzing and formulating policies and strategies of food security.

(b) Acquire from governments institutional and operational support as well as an effective national training programme on food security.

(c) Conduct training in the following areas: Single Equation Modeling of Food Supply, Demand and Prices; Regression Analysis; Regression Software; Changing of Simultaneous Equation Models; Computer Simulation Model of Food Security; Discussion of Model Simulation Results; and National Food Security Analysis and Policy Formulation Exercises.

Terms of reference:

1. Consultants and participants for training will be selected.

2. A computer simulation model will be developed by a consultant to be used by participants of the training.

3. Data will be collected by candidates of the participants of the training to be used in the training for preparing national food security strategies.

4. The host country (Indonesia) will provide project

preparation; office and facilities for the project; Training Center facilities and staff salary; Project staff salary; and Follow-up of national training programme and dissemination of model.

Attachment 2

SCHEDULE OF SERVICES AND FACILITIES
TO BE PROVIDED BY THE COOPERATING AGENCY

Country: Interregional

Project Number: INT/94/K04

Project Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

		(USD) Estimated Expenditure by Year		
		Total man-months	Total costs	1995
	Budget Line			$
Subcontract				
i.	Personnel			8,500.00
ii.	Travel			45,500.00
iii.	Equipment			10,000.00
iv.	Miscellaneous			6,000.00
	Project total			70,000.00

Attachment 3

STATEMENT OF EXPENDITURE

FOR THE DURATION OF THE PROJECT

Project Number: INT/94/K04/A/95/99

Project Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

		1995 $
40.	Subcontract	
41.	Subcontract with MAGRI	70,000
99.	Project Total	70,000

(For PGTF Funded Projects)

Excerpt from UNDP's & PPM (Sec. 30503, pp.24-41)

Modalities of Project Execution:
Government Execution

6.0 Accounting and financial reporting procedures

6.1 General

1. Governments designated "executing agency" (herein after referred to simply as "Governments") are responsible for the management of all UNDP resources allocated to a government-executed project. In this capacity, Governments are accountable to the Administrator for the entirety of UNDP resources under their management.

Governments are responsible for maintaining an accounting and recordkeeping system that reflects all financial transactions of a government-executed project. In addition, Governments are required to report on the receipt and disbursement of UNDP funds. Governments should not include unliquidated obligations in reports issued to UNDP.

2. The Resident representative has the responsibility for ensuring timely submission of financial reports by Governments and for ensuring that advances of UNDP funds to Governments and UNDP direct payments are made in accordance with the project document, within the limits of the project budget, and on the basis of a written request and certification from the Government.

3. The Accounts Section within the Division of Finance has the responsibility for maintaining an Operating Fund Account by project in which all advances to and disbursements made by a Government are recorded. The Accounts Section also has responsibility for issuing Combined Delivery Reports, in US dollars, for each government-executed project.

4. Co-operating agencies must maintain accounting records and report on funds disbursed by them for government-executed projects in accordance with the agreement entered into between the agency and the Government.

5. The procedures for government execution contained herein apply to all projects financed from UNDP sources of funds and UNDP-administered Trust Funds except for those projects funded from UNCDF. This fund has its own policies and procedures for government execution.

Questions concerning material in this section should be addressed to: Director, Division of Finance, Bureau for Finance and Administration.

(ii) Advances of funds equal to or less than US $10,000

1. In instances when an Advance Authorization is used for a project, requests from Governments for advances of funds that are equal to or less than US $10,000 can be granted by the resident representative provided that the following pre-conditions have been met:

- An Advance Authorization Document has been prepared that includes the authorized project budget (original or revised, as applicable);

- The written confirmations required by section 30108, subsection 3.0, have been provided by the Government;

- A Request for Advance of Funds from UNDP form containing the requisite certification has been submitted to the resident representative by the Government. The amount of funds requested should not exceed 60 days' cash requirements.

2. A sample Request for Advance of Funds from UNDP form is presented as Attachment 1, subsection 6.5, below, pages 36-37.

(iii) Advances of funds in excess of US $10,000

In instances when an Advance Authorization is used for a project, Governments may receive advances of funds that exceed US $10,000 provided that the pre-conditions listed in sub-section (ii), above, have been met and provided that written approval has been obtained from the Director, Division of Finance.

(c) Routine advances of UNDP funds to Governments

1. All requests for advances of UNDP funds to Governments require the approval of the resident representative as described in subsection 6.3 (a), below. Requests should be submitted to the resident representative on the request form referred to in subsection 6.2 (b)(ii), above, and the amount requested should not exceed the amount of funds required to cover disbursements for the next three months.

2. Requests should be submitted to the resident representative at least 15 calendar days prior to the beginning of each calendar quarter.

6. The accounting and financial reporting procedures contained herein define the requirements concerning government execution on a general level. More detailed instructions, forms, and explanations including audit requirements are found in the following documents which are contained in the Government Execution Operational Handbook:

Accounting and Financial Reporting Guidelines for Governments as Executing Agency (GEM)

Finance Manual (FM), section 522: Accounting and Financial Reporting Procedures for Government Execution

Audit Requirements for Government Execution of UNDP-funded Projects (PPM section 30503, subsection 8.0)

The Government Execution Operational Handbook must be made an integral part of every project document.

6.2 Governments as executing agency

(a) Banking arrangements

(i) Separate account for UNDP funds

Governments should establish and maintain separate bank accounts for the receipt and disbursement of UNDP funds. Governments should not commingle funds advanced by UNDP with any other funds.

(ii) Interest earned on UNDP funds

Interest earned on project bank accounts shall be refunded to UNDP annually. Each year, a remittance (in the currency of the advance) should be made to the resident representative within 60 days following 31 December, for all interest credited during the preceding year.

(b) Advances of UNDP funds made under an advance authorization

(i) General

Procedures governing advance authorizations are contained in section 30108, subsection 3.0, Special rule for government-executed projects. Governments should note that the special requirements for Advance Authorizations are in addition to the otherwise applicable government execution procedures.

- Made for goods or services that have been delivered to the satisfaction of the Government or will be delivered pursuant to the terms and conditions of the contract; and

- Made on the basis of original supporting documentation attached to the request."

(e) Accounting books and records

(i) General

1. Governments should maintain an accounting system that contains books, records, and controls sufficient to ensure the accuracy and reliability of project financial information. The project accounting system should also ensure that the receipt and disbursement of UNDP funds is properly identified and that budgetary categories approved in the project document are not exceeded.

2. The system of accounting and recordkeeping must include the advances received and disbursed, co-operating agency expenditures and direct payments made by UNDP. The project accounting system maintained by the Government should also be kept current, with all ledgers and journals "closed out" at the end of each month.

3. A budget control mechanism should be instituted to ensure that requests for direct payments will only be issued if funds are available in the project budget.

(ii) Non-expendable property ledger

Governments should maintain a non-expendable property ledger for the purpose of recording the acquisition and disposition of property and equipment used in a government-executed project. This ledger should contain information on all property and equipment, whether purchased directly by the Government from funds advanced to it, or by the UNDP or a co-operating agency on behalf of the Government.

(iii) Project files

Governments should keep all supporting documentation pertaining to project purchases and payments in a separate set of project files.

(d) Direct payments by UNDP

(i) General

1. UNDP may, upon request from a Government, pay suppliers of goods or services to government-executed projects directly on their behalf. It should be noted, however, that the primary responsibility for the payment process for a government-executed project belongs with the Government.

2. Accordingly, Governments should seek UNDP assistance for the payment of project inputs only when they are unable to do so completely on their own.

3. Requests from Governments for UNDP direct payments should be submitted to the resident representative in writing and signed by an authorized government official. A listing of the authorized government officials and their specimen signatures should be obtained and kept up to date by the resident representative. Payment instructions must contain the payee, bank name, address, account number, and other pertinent instructions. As in the case of advances, Governments should allow 15 days' processing time.

4. In addition, the original documentation must be attached to the request. This original documentation and certified payment request will be forwarded to UNDP headquarters together with the monthly accounts. The Governments should retain a copy of this documentation for their records.

(ii) Required certification

When Governments submit requests to UNDP to pay suppliers directly on their behalf, the authorized government official signing the request should include the following certification language:

"The undersigned authorized government official hereby certifies that the payment being requested has not previously been made and that it will be:

- Made in accordance with the project document;

(iii) Verification and certification of the Combined Delivery Report (CDR)

Upon receipt of the Combined Delivery Report (CDR) (see subsection 6.4 (c), below), which is issued three times a year by UNDP headquarters, Governments must verify the reports with their records and certify them. Any disrepancies should be reported to the resident representative. The CDRs should be returned to the resident representative within 30 days upon receipt.

(iv) Final project reports

When a government-executed project is financially complete (as defined in section 30107, subsection 6.0), Governments should issue final project reports. These reports are the same two described above and would reflect financial activity for the final quarter of the project. The reports should be clearly marked "FINAL" and a refund of any outstanding advance to UNDP should be attached with interest, if any, stated separately.

(g) IPF add-on funds

1. For purposes of accounting and financial reporting, IPF add-on funds received and disbursed by a Government are treated as if the funds were being used for a separate government-executed project. Thus, all accounting records and financial reports required for government-executed projects also are required for activities financed from IPF add-on funds.

2. IPF add-on funds that are earned by a Government and subsequently transferred to UNDP as extrabudgetary resources are no longer considered IPF add-on funds. When this happens, the government execution accounting and financial reporting provisions contained herein no longer apply to those transferred funds.

(h) Other sources of funding

1. Government-executed projects that contain multiple budgets, each financed from a different source of UNDP funds (i.e., IPF, SPR, SIS, SMF/LDCs, and GCCC), require a separate set of project reports for each source of funds. As an example, if a project is partially funded from IPF and partially from GCCC, and the Government is advanced funds from each of these sources, separate reports would have to be issued.

2. This "separate source, separate reports" principle also applies in the case of UNDP Administered Trust Funds that are used in conjunction with other UNDP sources of funds.

(f) Financial reporting

(i) General

Governments' reporting requirements are limited to those funds they actually receive and disburse.

(ii) Required periodic reports

1. Governments are expected to prepare the two financial reports indicated below and submit them to the resident representative within 30 days after the end of each quarter, in English, French, or Spanish. Reports issued in other languages should be accompanied by an official translation in English.

2. The financial reports have been designed to reflect the transactions of a project on a cash basis. Because of this, unliquidated obligations or commitments should not be reported to UNDP.

3. The information furnished on the reports forms the basis of a periodic financial review, and their timely submission is a prerequisite to the continuing funding of a project. Unless the financial reports are received, requests for advances of funds from UNDP will not be honoured by the resident representative.

a. Government disbursement report

1. The purpose of this report is to list the disbursements incurred by component/budget line on a monthly, quarterly, and cumulative basis. The report also is used to verify the balance available in the budget as of a given date.

2. Any refund received by a Government from a supplier should be reflected on this report as a reduction of disbursements on the component and budget line to which it relates.

3. This report is shown as Attachment 2, subsection 6.5, below, pages 38-39.

b. Reconciliation of outstanding UNDP advance/status of funds

1. This report reconciles the funds received from UNDP with the amount expended for budgetary control purposes. This exercise is undertaken in order to calculate the net amount owed to UNDP from the Government as of a given date.

2. This report is shown as Attachment 3, subsection 6.5, below, page 40.

Section, with the following information:

- Supplier's name and address;
- Supplier's bank name, address, and account number;
- Project name and number;
- Currency and amount required; and
- Component/budget line number and description.

2. In addition, the resident representative will confirm in the cable that the required certification from the Government in accordance with subsection 6.2 (d)(ii), above, has been received, that budget availability has been verified and that original documentation has been reviewed and adequately supports the payment request.

(iii) Source documentation and notification

When UNDP field offices pay suppliers directly on behalf of the Government, they must submit copies of all documentation to the Government and they should retain copies for their files.

(c) Recordkeeping

(i) General

Field offices should maintain a government-executed project control system designed to ensure that the resident representative can adequately monitor and control a project's financial activity and budget within the scope of his responsibilities.

(ii) Project financial files

a. Payment transactions

Field offices are expected to maintain an appropriate system of classifying payment transactions for government-executed projects. Such a system would separate advances to Governments from direct payments and would largely consist of files containing copies of disbursement vouchers and relevant documentation. Written requests and certifications from Governments should also be kept in the files.

b. Project financial reports

Field offices should keep copies of all project financial reports in files designated specifically for that purpose. Separate files should be kept for reports issued by the Government, UNDP Accounts Section, and the co-operating agency, if any.

6.3 UNDP field offices

(a) Advances of funds to Governments

(i) Advances in local currency

Local currency advances to the Government should normally be made by the resident representative. Field offices shall, upon receipt of a completed Request for Advance of Funds from UNDP form, verify budget availability and, if adequate, process a Government's request for project funds. Field offices should ensure that the amount requested does not exceed the amount of funds reasonably required to cover disbursements for three months.

(ii) Advances in other currencies

Advances to the Governments in US dollars should be made by the resident representative if this currency is available to him or her. Requests for advances in currencies not available to the resident representative should normally be transmitted to UNDP headquarters. If approved, DOF will make the advance and inform the resident representative by cable. Requests for advances in curencies available to other UNDP field offices should be forwarded thereto, as appropriate.

(iii) Release of funds contingent upon receipt of financial reports

Resident representative should not release or request the release of funds requested by a Government if the Government has failed to submit the two required financial reports described in subsection 6.2 (f), above.

(b) Direct Payments

(i) General

When a written request for direct payment is received along with the requisite original supporting documentation and certification in accordance with subsection 6.2 (d)(ii) from an authorized government official, field offices should verify budget availability and, if appropriate, process a Government's request for direct payment.

(ii) Field Office request for payment by headquarters

1. In instances where the field office requests headquarters to make a direct payment on behalf of a Government, the resident representative shall cable the Chief, Accounts

(b) Recording of payment transactions

(i) Operating Fund Account (OFA)

1. For each government-executed project, a separate Operating Fund Account (OFA) shall be maintained by the Accounts Section. All advances of UNDP funds to a Government are recorded in the OFA, as well as all project disbursements made by the Government (from the advances). Gains and losses resulting from fluctuations in the United Nations operational rate of exchange are also recorded in the OFA.

2. Although the OFA is kept in US dollars, a subsidiary local currency record will be maintained in order to facilitate project reconciliations and to ensure the existence of a complete audit trail.

3. A debit balance in the OFA is treated as a receivable from the Government. When financial assistance to a project is complete, any unspent balance should be refunded to UNDP by the Government.

(ii) Direct payments

Payments made by UNDP (whether by a field office or by headquarters) on behalf of Governments are not treated as advances of funds to Governments and accordingly are not recorded in an Operating Fund Account. These direct payments should be recorded as project disbursements on a budget line-item basis.

(iii) Disbursement of UNDP funds by Governments

Disbursements made by Governments from UNDP funds provided to them shall be recorded both as a reduction of the balance in the OFA and as project disbursements on a budget line-item basis. These disbursements must correspond to the amounts indicated on the Government Disbursement Report submitted each quarter by the Government. The amounts shown on this report are in the currency of the advance and any exchange rate translation is the responsibility of the Accounts Section.

(iv) Co-operating agency expenditures

Expenditure (i.e. unliquidated obligations plus disbursement) reported by operating agencies for a government-executed project shall be recorded as project expenditures on a budget line-item basis.

(d) Reporting

(i) To headquarters

a. Inter-Office Vouchers (IOVs)

1. All payments made by field offices for government-executed projects are to be recorded on a UNDP-GOVT Inter-Office Voucher (IOV) and forwarded in the usual fashion to UNDP Accounts Section each month. These payments include both advances made to Governments and direct payments made by the field office. Copies of disbursement vouchers and certified payment requests or 'Request for Advance of Funds' forms should be attached to the IOV.

2. Original DVs, supporting documentation and certified payment requests or 'Request for Advance of Funds' forms relating to field office and headquarters payments should be forwarded to the Accounts Section together with the monthly accounts.

b. Project financial reports

Field offices shall forward to UNDP Accounts Section the Quarterly Government Disbursement Report and the Reconciliation of Outstanding Advances/Status of Funds, financial reports issued by the Government, and retain copies for their files.

(ii) To Governments

a. Project reports

Field offices shall forward to the Government all project financial reports issued by UNDP Accounts Section and the co-operating agency.

6.4 UNDP headquarters - Accounts Section

(a) Direct payments

1. Requests from field offices for UNDP headquarters to pay suppliers directly on behalf of Governments are to be reviewed and approved for payment by the Accounts Section. Requests from the field office should contain the information referred to in sub-section 6.3 (b)(ii).

2. UNDP headquarters should confirm that the payment has been effected and the resident representative must inform the Government accordingly.

Attachment 1

GOVERNMENT OF: _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP

PROJECT TITLE: _____ PROJECT No. __/__/__/__/__/__

QUARTER: _____ CURRENCY: _____

Component/ Budget Line Number	Component/Budget Line Description	Total Amount for Quarter
10	Project Personnel	
11-99	International Professional	
12-99	OPAS	
13-99	Administrative Support Personnel	
14-99	UNV	
15-99	Official Travel	
16-99	Mission Cost	
17-99	National Professional	
19	Component Total	
29	Subcontracts	
39	Training	
49	Equipment	
59	Miscellaneous	
93*	Support Costs	_____
	TOTAL	

Plus: Estimate of Current Month's Cash Requirements
Less: Account Balance (Beginning of Current Month) ( )
Petty Cash On Hand (Beginning of Current Month) ( )

Total Advance Requested _____

VERIFICATION OF BUDGET AVAILABILITY

Annual Budget (from CDR)

Less: Total Advance Requested (from Above) ( )
Total Advances Received Against Current Year's Budget ( )

Amount Still Available in Budget _____

* Applicable to UNDP Trust Funds Only

(c) Reporting: Combined delivery report

1. Three times per year, the Accounts Section will issue a Combined Delivery Report to the Government through the resident representative for each government-executed project in the country's portfolio. This report shall contain disbursements made by the Governments, field offices, and UNDP headquarters for the periods ending 30 June, 30 September, and 31 December. The report shall also contain co-operating agency expenditures for the periods in which agencies report (semi-annually). A sample of this report is shown in Attachment 4 (see subsection 6.5, below, page 41).

2. Field offices should forward the CDR to the Government within two weeks of the date of receipt.

3. The CDR must be verified and certified by Governments within 30 days of receipt, returned to the resident representatives for on-forwarding to UNDP headquarters.

6.5 Co-operating agencies a/

(a) Funds required for government execution

Funds required by a co-operating agency for government execution will be provided as part of the total monthly remittance requested by the agency for the implementation of UNDP assistance to the projects. Agencies should include their cash requirements for projects in which they participate as co-operating agency in their statements of cash requirements submitted to UNDP Treasury Section.

(b) Reporting

Co-operating agencies having responsibility for certain components of a government-executed project should issue semi-annual expenditure statements in accordance with the letter of agreement entered into between the Government and the agency. The statements should reflect all expenditures by component/budget line and should be submitted to the Government through the resident representative within 30 days after 30 June and 31 December.

---

a/ Co-operating agency procedures are described in section 30503, subsection 5.0.

Attachment 2

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: _ _ _/_ _/_ _ _/_/_ _/_ _

CURRENCY: _____ _____

Component/ Budget Line	Component Budget/Line Description	Month 1	Month 2	Month 3	Total for Quarter
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	GPAS				
12-01	GPAS 1				
12-02	GPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
93*	Support Costs				
99	Total Budgetary Categories				

CERTIFICATION

The undersigned authorized government official hereby certifies that the budgetary disbursements shown above have been made in accordance with the project document, that an appropriate refund will be made to the UNDP in the event of any disallowances, and that information supporting the disbursements will be available for audit, if requested.

Date Submitted: _____

Name: _____

Title: _____

Signature: _____

*Applicable to UNDP Trust Funds only

GOVERNMENT OF: _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP
(BANK INFORMATION AND CERTIFICATION)

BANK INFORMATION

Bank Name: _____ Payment Advice To: _____

Account Number: _____ Contact Person: _____

Bank Address: _____

_____

Certification

The undersigned authorized government official hereby certifies that the projected cash requirements shown on page 1 and the resulting cash request, represent the best estimate of funds needed to cover disbursements for the period indicated. Any funds that are advanced but not disbursed for budgetary purposes will be refunded to UNDP in accordance with the terms and conditions of the project document.

Date: _____ Name: _____

Title: _____

Signature: _____

Attachment 3

GOVERNMENT OF: _____

RECONCILIATION OF OUTSTANDING UNDP ADVANCE/STATUS OF FUNDS
FOR PERIOD FROM _____ TO _____

PROJECT TITLE: _____ PROJECT No. ___/__/___/_/__/___

QUARTER: _____ CURRENCY: _____

STEP 1

Outstanding UNDP Advance (Beginning of year)		XXX
UNDP Advances Received This Quarter	XXX	
UNDP Advances Received in Prior Quarters (year-to-date)	XXX	
Total UNDP Funds Received (year-to-date)		XXX
Total UNDP Advance		XXX
Less: Total Disbursements (year-to-date)		(XXX)
Outstanding UNDP Advance		XXX

STEP 2

Account Balance at End of Quarter	
Add: Unresolved/Unreimbursed Disallowances	
Petty Cash on Hand	
Less: Interest Not Yet Refunded to UNDP	(XXX)
Outstanding UNDP Advance	XXX

Date Submitted: _____ Name: _____
Authorized
Government Official)

Title: _____

Signature: _____

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: ___/___/___/___/___/___

CURRENCY: _____ _____

Component/ Budget Line	Description	Annual Budget A	Disbursements for Quarter (from Page 2)	Year to Date B	Available Budget A-B
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	OPAS				
12-01	OPAS 1				
12-02	OPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
93*	Support Costs				
99	Total Budgetary Categories				

*Applicable to UNDP Trust Funds only

Institutional framework

The Office of the Chairman of the Group of 77, located on the 39th floor of the UN Secretariat Building, shall be the Executing Agency for the Project. The Executing agency shall subcontract project implementation to Ministry of Agriculture, Indonesia in accordance with the UNDP procedures. The subcontract shall be awarded within a month of signature of this document and shall be the basis of a separate document to be signed by the two parties. As executing agent for the project, the Office of the Chairman of the Group of 77 will be responsible for the financial reporting requirements foreseen under the UNDP's government execution procedures in annex to this document.

MONITORING EVALUATION AND REPORTS

Schedule of review

The review of the status of the implementation of the project will be undertaken by the Committee of Experts of the Perez-Guerrero Trust Fund (PGTF) for ECDC. The Committee's recommendations are submitted to an annual meeting of the Ministers of Foreign Affairs of the Group of 77 for endorsement as appropriate.

Progress and Terminal Reports

The final report and studies resulting from the project shall, for purposes of the project, be considered the terminal report.

United Nations Development Programme

To: Mr. Caspar Jan Kamp
Resident Representative
UNDP Jakarta
Indonesia

Fax No. (6221) 314 5251

Message No. (212) 906 6429

From: Denis Benn
Director
SU/TCDC

Date: 1 June 1995

Subject: INT/94/K04 - NAM Simulation Model for Food Security

In connection with the above-mentioned Perez-Guerrero Trust Fund (PGTF) project, the Office of the Chairman of the Group of 77 has requested the disbursement of US(70,000) to the subcontractor, the Ministry of Agriculture, Indonesia as follows:

Bank Bumi Daya (BBD), Pasar Minggu Branch
Account No. 108-04247517
Jakarta Selatan
Indonesia

Please find enclosed a copy of the project document and the Subcontract Agreement duly signed.

Please note that this disbursement to the Ministry of Agriculture, Indonesia should be charged to Allotment Code 3XF-INT-94-K04-4000-000. Kindly send your IOV to UNDP Accounts, Attention: Mr. Alan Potter, Chief, Accounts Section, DOF, Rm. FF-400, New York, N.Y.10017.

Thank you for your usual cooperation.

cc: Mr. Alan Potter
Chief, DOF/Accts.

Ms. Joan Archer
Mr. Bertram Goddard ✓

PEREZ-GUERRERO TRUST FUND

FOR ECONOMIC AND TECHNICAL COOPERATION

AMONG DEVELOPING COUNTRIES MEMBERS OF THE GROUP OF 77

PROJECT DOCUMENT

Country: Interregional

Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

Number: INT/94/K04/A/95/99

Submitted by: Ministry of Agriculture of the Republic of Indonesia

Beneficiaries: NAM Countries

Duration of Project: Six (6) months

Estimated starting date: March 1995

Perez-Guerrero Trust Fund Inputs: (US) $70,000

Total cost of the Project: (US) $70,000

This project is to be executed by the Office of the Chairman of the Group of 77 under UNDP's Government Execution arrangements with a subcontract to be awarded to the Ministry of Agriculture, Indonesia, as subcontractor within a month of signature of the project document.

F Mabilangan — 31 March 1995

FELIPE MABILANGAN — Date
Ambassador & Permanent Representative of the
Philippines to the United Nations
Chairman of the Group of 77

14 April 1995

DENIS BENN — Date
Director
Special Unit for TCDC
On behalf of UNDP

I. BACKGROUND AND JUSTIFICATION

Food Security was considered as a prime concern at the Tenth Summit Meeting of Non Aligned Movement (NAM) held in Jakarta in September 1992. During the meeting, the Heads of State or Government reviewed the food situation in the NAM and other developing countries. They approved the Resolution on Food Security which expressed a deep concern on the number of people plagued by hunger and malnutrition, which has increased in the past decade, despite the ability of the world to increase food output firstly.

In order to handle the pressing issues on the food security problems, general meetings had been conducted in Indonesia to support the preparation of a ministerial meeting on Food and Agriculture of the NAM on Food Security which was commenced by two informal meetings of Food Experts from NAM Countries and international organizations taken place in Rome in October 1992 and in Jakarta in February 1993. Ad-hoc Advisory Group of Experts on Food Security of the NAM countries had been conducted a meeting in Jakarta from 25 to 28 January 1994 and the results of the meeting had been submitted to the Conference of Ministers of Food and Agriculture of the NAM on Food Security convened in Bali-Indonesia in October 1994.

The problems of food security, despite low productivity, include the availabity of food with better qualities. Pricing policies on several food commodities can alter the availability and supply of food with various qualities. Therefore, the lack of ability to predict and create a model to ensure food security mechanisms is a serious issue to be overcome by the NAM member countries.

An appropriate pricing policies and the operation of National Food Authority become more challenging and need more detailed operating procedures. This is to ensure, not only the availability of food with better qualities, but to increase farmers' income as well.

Globalization and regional economic trend toward regional trade and economic cooperation are other recent issues which express the importance of strengthening South-South cooperation to ensure Food Security among members of the NAM and other developing countries. A series of proposed programmes had been recommended for enhancing food security and have been adopted by the Conference of Ministers of Food and Agriculture of the NAM on Food Security which are included : (1) Training and exchange of information on the design and management of relevant projects, (2) Technology Generation and Dissemination, (3) Input Supply and Production, (4) Institution Building through the decentralization and strengthening of national capacity, (5) Trade and (6) Political Cooperation, to galvanize the unutilized potential of NAM member countries to arrest the decline of interest in, and support for, agricultural development and food security in developing countries.

From the above-mentioned reasons and the availability of Peresz-Guerrero Trust Fund (PGTF) giving G-77 member countries an opportunity to develop their ability in creating a model for ensuring food security in each and among the member countries, Indonesia proposes : <u>Training on the Use of A Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM</u>.

Regarding the characteristics of a country's food security problems, the nature of the food insecure population, resources availability, institutional capabilities, and the possibility of regional food security research scheme,

first priority will be given to the developing countries of the NAM and members of G-77 such as : Senegal, Uganda, Sudan, Tanzania, Gambia, Nigeria, Zimbabwe, Kenya, Zambia, Ghana, Bangladesh, India and Indonesia. As a pilot project, this project could be widened to cover the NAM and other developing countries members of G-77 with larger regionalization whenever the outputs of the project can be implemented successfully.

II. OBJECTIVES

A. Development objective

Improved Policies and Strategies of Food Security in Developing Countries of the NAM to achieve sustainable food security.

B. Immediate objective

Strengthened and improved national capabilities of NAM's Developing Countries in analyzing and formulating Policies and Strategies of Food Security. This objective could be achieved if each government provides instutitional and operational support as well as effective national training programme on food security.

III. CONTENTS OF THE TRAINING

1. Introduction review
2. Single Equation Modeling of Food Supply, Demand and prices:

   - Model structure
   - Model of supply
   - Model of demand
   - Model of prices
   - Model of stock

3. Regression Analysis

   - Equations models

4. Regression software use time series package (TSP.)
   - data generate
   - graphs
   - regression analysis
   - exercises

5. Changing the model : Simultaneous equation models
   - Re-estimation of parameters
   - Determining policy parameters

6. Computer simulation model of Food security model
   - data input
   - specification
   - parameter changes
   - simulations and forecasts in Lotus
   - exercises

7. Discussion of model simulation results
   - model structure
   - applicability for policy use
   - improvements
   - Further action

8. National food security analysis and policy formulation exercises.

III. OUTPUT AND ACTIVITIES OF THE PROJECT

The main outputs and activities of the project are summarized below. The Matrix in Annex.1 provides a more detailed relation of this project activities and outputs.

A. Output 1. Computer simulation model of food security constracted.

Activities :

1. Selecting and oppointing consultants
2. Developing of computer simulation model by consultant to be used by participants of the training.
3. Collecting data by candidates of the participants of the training to used in the training for preparing national food security strategies.

B. Output 2. Trained food security planners of selected developing countries of NAM.

Activities :

1. Developing training curriculum and modules.
2. Sending information and invitation to participating countries.
3. Selecting participants of the training.

4. Procurement of training facilities.
5. Conducting 12 days training activities.
6. Evaluating training program.
7. Reporting training activities and outputs.

IV. INPUTS TO BE PROVIDED BY PGTF

1. Personnel
   National Consultants

2. Equipment
   Two personal Computers, printer and other equipment.

3. International Travel
   12 participants from Africa and Asia

4. Training
   Training facilities, accommodation, per diem allowance, field trip and instructor's honoraria

5. General Operating Expenses
   General operating expenses related to the project, including preparation, reproduction of documents, budget for secretariat assistance, local transportation and cost of communication.

6. Preparation and dissemination of report

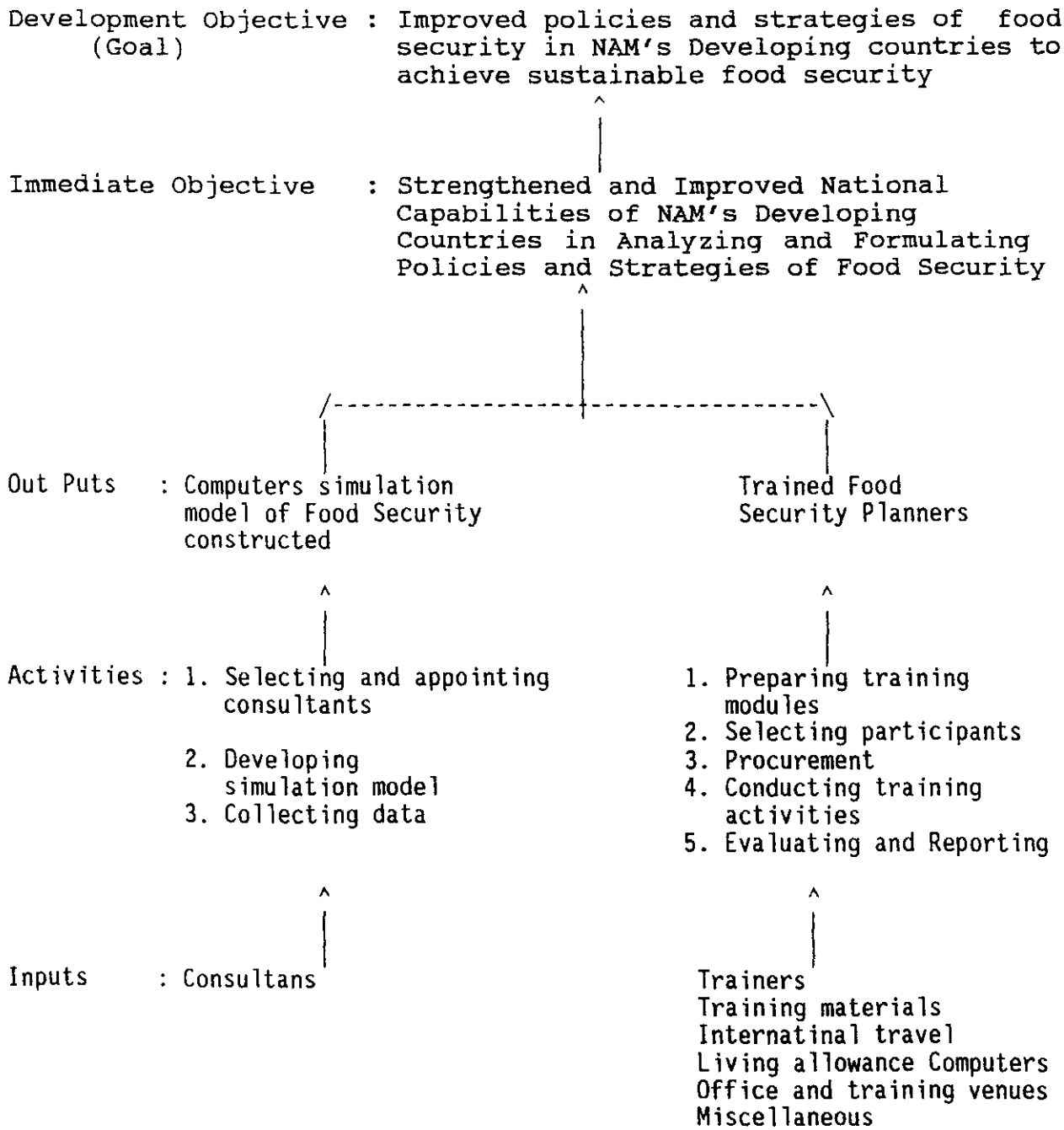
The workplan of the projects implementation and a detailed account of the projects input and budget is presented in Annex 2 and 3 respectively.

V. INPUTS TO BE PROVIDED BY HOST COUNTRY (INDONESIA)

1. Project preparation
2. Project's office and facilities
3. Training center facilities and staff salary
4. Project staff salary
5. Follow up national training program and dissemination of model.

Annex 1.a

INPUT - OUPUT - RELATIONSHIPS OF TRAINING OF THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN NAM'S DEVELOPING COUNTRIES



OVERVIEW OF PROJECT ACTIVITIES AND OUTPUTS

	Activities	Purpose of Activities	Duration	No of Participant	Source of Fund	Output
1	Notification to Asia & African Countries	To solicit agreements for participants from Asia & Africa Countries	2 months	-	-	List of countries willing to participate in the project
2	Appointment of Consultant	To hire consultant to construction of the model	2 months	-	-	Consultant hired
3	Procurement of hardware and software	This is needed for development of model	2 months	Project management	PGTF	Computer hardware and software installed
4	Data collection	To Construct of a Computer Simulation Model	2 months	5 participants from Indonesia	PGTF	Data production related to the Food, Stcok, Supply Demand and Price
5	Model Construction	To detailed description of the model	4 months	Consultant National	PGTF	Computer Simulation Model Construction
6	Training					
	6.1. Asia & Africa Training for Trainers	To train the trainers who will in turn train participants in their respective countries in the use of a Computer Simulation Model for forecasting supply, demand and price of Food	12 day	7 participants from Indonesia	PGTF	- Food Security (12 Trainers) - Trained Personnel who will be trainers in respective countries
	6.2. National Training for commodity analyst in respective countries	Enable the trainers to train other officers in respective countries		Varies according to the needs and resources of the countries	Local	- Food Security (120 officers)

Annex-2

WORKPLAN AND PRELIMINARY TIME SCHEDULE

No.	ACTIVITY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1	Administrative	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	- notification to Asia & Africa countries	.....	.....										
	- Appointment of consultants	.....	.....										
	- procurement		.....										
2	Data collection		.....	.....	.....								
3	Construction of the model by the consultnats		.....		.....	.....	.....	.....					
4	Issue of invitations		.....	.....	.....	.....							
5	Asia & Africa Training for Trainers						.....						
6	Dissemination of Report							.....					.....

SCHEDULE OF SERVICES AND FACILITIES TO BE PROVIDED BY THE SUB-CONTRACTOR

No.	Activities	Details of Expenditure	Amount ($US)	Source of Funding
1	Data Collection	Team members	2,500	PGTF
2	Construction of a Computer Simulation Model Implementation	Consultants		PGTF
	Local Consultant	2x4x US$ 750	6,000	
3	Asia & Africa Training for Trainers	- Airfare Participant from		PGTF
		(1) Bangladesh 1xUS$1,730	1,730	
		(2) India 1xUS$1,205	1,205	
		(3) Nigeria 1xUS$4,590	4,590	
		(4) Senegal 1xUS$4,475	4,475	
		(5) Sudan 1xUS$2,700	2,700	
		(6) Indonesia 7 xUS$150	1,050	
		- Accommodations (US$100/day/person) 12 x 12 x US$100	14,400	
		- Perdiem US$50/day/person 12 x 12 x US$50	7,200	
		- Local Travel US$3,000	3,000	
		- Training Facilities US$2,000	2,000	
		- Honorarium for Instructor (US$50/hour) 9 x 7 x US$50	3,150	PGTF
4	Procurement	- 2(Two) PC's- 486DX2 8MB RAM, 210MB HDD, 2 HD FDD, SVGA Monitor, Mouse, - 1(One) HP LaserJet 4+ , 1(One) Epson LQ-1070+ - 2(Two) UPS-ICA102B - 2(Two) Table & Chairs	10,000	PGTF
5	Secretariat		5,000	PGTF
6	Final Report	- Report (US$1,000)	1,000	PGTF
		Total PGTF contribution	70,000	

Country:	Interregional
Project Number:	INT/94/K04/A/95/99
Project Title:	Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

	Total $
Personnel (Consultants)	8,500
Travel (Asia & Africa Trainers)	45,500
Equipment	10,000
Miscellaneous	6,000
Project total	70,000

The Account Number to which the transfer of disbursement should be made is 108-04247517.

The name of Bank is Bank Bumi Daya (BBD), Pasar Minggu Branch, Jakarta Selatan, Indonesia.

Institutional framework

The Office of the Chairman of the Group of 77, located on the 39th floor of the UN Secretariat Building, shall be the Executing Agency for the Project. The Executing agency shall subcontract project implementation to the Ministry of Agriculture, Republic of Indonesia in accordance with the UNDP procedures. The subcontract shall be awarded within a month of signature of this document and shall be the basis of a separate document to be signed by the two parties. As executing agent for the project, the Office of the Chairman of the Group of 77 will be responsible for the financial reporting requirements foreseen under the UNDP's government execution procedures in annex to this document.

MONITORING EVALUATION AND REPORTS

Schedule of review

The review of the status of the implementation of the project will be undertaken by the Committee of Experts of the Perez-Guerrero Trust Fund (PGTF) for ECDC. The Committee's recommendations are submitted to an annual meeting of the Ministers of Foreign Affairs of the Group of 77 for endorsement as appropriate.

Progress and Terminal Reports

The final report and studies resulting from the project shall, for purposes of the project, be considered the terminal report.

Project Budget

The total budget of the project for six months has been estimated at US$70,000. The contribution from the Perez-Guerrero Trust Fund (PGTF) shall be US$70,000.

Country:	Interregional
Project No.:	INT/94/K04/A/95/99
Title:	Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

40	SUBCONTRACT	
	41 Subcontract	**US$ 70,000**
99	**PROJECT TOTAL**	**US$ 70,000**

Excerpt from UNDP's & PPM (Sec. 30503, pp.24-41)

Modalities of Project Execution:
Government Execution

6.0 Accounting and financial reporting procedures

6.1 General

1. Governments designated "executing agency" (herein after referred to simply as "Governments") are responsible for the management of all UNDP resources allocated to a government-executed project. In this capacity, Governments are accountable to the Administrator for the entirety of UNDP resources under their management.

Governments are responsible for maintaining an accounting and recordkeeping system that reflects all financial transactions of a government-executed project. In addition, Governments are required to report on the receipt and disbursement of UNDP funds. Governments should not include unliquidated obligations in reports issued to UNDP.

2. The Resident representative has the responsibility for ensuring timely submission of financial reports by Governments and for ensuring that advances of UNDP funds to Governments and UNDP direct payments are made in accordance with the project document, within the limits of the project budget, and on the basis of a written request and certification from the Government.

3. The Accounts Section within the Division of Finance has the responsibility for maintaining an Operating Fund Account by project in which all advances to and disbursements made by a Government are recorded. The Accounts Section also has responsibility for issuing Combined Delivery Reports, in US dollars, for each government-executed project.

4. Co-operating agencies must maintain accounting records and report on funds disbursed by them for government-executed projects in accordance with the agreement entered into between the agency and the Government.

5. The procedures for government execution contained herein apply to all projects financed from UNDP sources of funds and UNDP-administered Trust Funds except for those projects funded from UNCDF. This fund has its own policies and procedures for government execution.

Questions concerning material in this section should be addressed to: Director, Division of Finance, Bureau for Finance and Administration.

(ii) Advances of funds equal to or less than US $10,000

1. In instances when an Advance Authorization is used for a project, requests from Governments for advances of funds that are equal to or less than US $10,000 can be granted by the resident representative provided that the following pre-conditions have been met:

- An Advance Authorization Document has been prepared that includes the authorized project budget (original or revised, as applicable);

- The written confirmations required by section 30108, subsection 3.0, have been provided by the Government;

- A Request for Advance of Funds from UNDP form containing the requisite certification has been submitted to the resident representative by the Government. The amount of funds requested should not exceed 60 days' cash requirements.

2. A sample Request for Advance of Funds from UNDP form is presented as Attachment 1, subsection 6.5, below, pages 36-37.

(iii) Advances of funds in excess of US $10,000

In instances when an Advance Authorization is used for a project, Governments may receive advances of funds that exceed US $10,000 provided that the pre-conditions listed in sub-section (ii), above, have been met and provided that written approval has been obtained from the Director, Division of Finance.

(c) Routine advances of UNDP funds to Governments

1. All requests for advances of UNDP funds to Governments require the approval of the resident representative as described in subsection 6.3 (a), below. Requests should be submitted to the resident representative on the request form referred to in subsection 6.2 (b)(ii), above, and the amount requested should not exceed the amount of funds required to cover disbursements for the next three months.

2. Requests should be submitted to the resident representative at least 15 calendar days prior to the beginning of each calendar quarter.

6. The accounting and financial reporting procedures contained herein define the requirements concerning government execution on a general level. More detailed instructions, forms, and explanations including audit requirements are found in the following documents which are contained in the Government Execution Operational Handbook:

Accounting and Financial Reporting Guidelines for Governments as Executing Agency (GEM)

Finance Manual (FM), section 522: Accounting and Financial Reporting Procedures for Government Execution

Audit Requirements for Government Execution of UNDP-funded Projects (PPM section 30503, subsection 8.0)

The Government Execution Operational Handbook must be made an integral part of every project document.

6.2 Governments as executing agency

(a) Banking arrangements

(i) Separate account for UNDP funds

Governments should establish and maintain separate bank accounts for the receipt and disbursement of UNDP funds. Governments should not commingle funds advanced by UNDP with any other funds.

(ii) Interest earned on UNDP funds

Interest earned on project bank accounts shall be refunded to UNDP annually. Each year, a remittance (in the currency of the advance) should be made to the resident representative within 60 days following 31 December, for all interest credited during the preceding year.

(b) Advances of UNDP funds made under an advance authorization

(i) General

Procedures governing advance authorizations are contained in section 30108, subsection 3.0, Special rule for government-executed projects. Governments should note that the special requirements for Advance Authorizations are in addition to the otherwise applicable government execution procedures.

- Made for goods or services that have been delivered to the satisfaction of the Government or will be delivered pursuant to the terms and conditions of the contract; and

- Made on the basis of original supporting documentation attached to the request."

(e) Accounting books and records

(i) General

1. Governments should maintain an accounting system that contains books, records, and controls sufficient to ensure the accuracy and reliability of project financial information. The project accounting system should also ensure that the receipt and disbursement of UNDP funds is properly identified and that budgetary categories approved in the project document are not exceeded.

2. The system of accounting and recordkeeping must include the advances received and disbursed, co-operating agency expenditures and direct payments made by UNDP. The project accounting system maintained by the Government should also be kept current, with all ledgers and journals "closed out" at the end of each month.

3. A budget control mechanism should be instituted to ensure that requests for direct payments will only be issued if funds are available in the project budget.

(ii) Non-expendable property ledger

Governments should maintain a non-expendable property ledger for the purpose of recording the acquisition and disposition of property and equipment used in a government-executed project. This ledger should contain information on all property and equipment, whether purchased directly by the Government from funds advanced to it, or by the UNDP or a co-operating agency on behalf of the Government.

(iii) Project files

Governments should keep all supporting documentation pertaining to project purchases and payments in a separate set of project files.

(d) Direct payments by UNDP

(i) General

1. UNDP may, upon request from a Government, pay suppliers of goods or services to government-executed projects directly on their behalf. It should be noted, however, that the primary responsibility for the payment process for a government-executed project belongs with the Government.

2. Accordingly, Governments should seek UNDP assistance for the payment of project inputs only when they are unable to do so completely on their own.

3. Requests from Governments for UNDP direct payments should be submitted to the resident representative in writing and signed by an authorized government official. A listing of the authorized government officials and their specimen signatures should be obtained and kept up to date by the resident representative. Payment instructions must contain the payee, bank name, address, account number, and other pertinent instructions. As in the case of advances, Governments should allow 15 days' processing time.

4. In addition, the original documentation must be attached to the request. This original documentation and certified payment request will be forwarded to UNDP headquarters together with the monthly accounts. The Governments should retain a copy of this documentation for their records.

(ii) Required certification

When Governments submit requests to UNDP to pay suppliers directly on their behalf, the authorized government official signing the request should include the following certification language:

"The undersigned authorized government official hereby certifies that the payment being requested has not previously been made and that it will be:

- Made in accordance with the project document;

(iii) Verification and certification of the Combined Delivery Report (CDR)

Upon receipt of the Combined Delivery Report (CDR) (see subsection 6.4 (c), below), which is issued three times a year by UNDP headquarters, Governments must verify the reports with their records and certify them. Any disrepancies should be reported to the resident representative. The CDRs should be returned to the resident representative within 30 days upon receipt.

(iv) Final project reports

When a government-executed project is financially complete (as defined in section 30107, subsection 6.0), Governments should issue final project reports. These reports are the same two described above and would reflect financial activity for the final quarter of the project. The reports should be clearly marked "FINAL" and a refund of any outstanding advance to UNDP should be attached with interest, if any, stated separately.

(g) IPF add-on funds

1. For purposes of accounting and financial reporting, IPF add-on funds received and disbursed by a Government are treated as if the funds were being used for a separate government-executed project. Thus, all accounting records and financial reports required for government-executed projects also are required for activities financed from IPF add-on funds.

2. IPF add-on funds that are earned by a Government and subsequently transferred to UNDP as extrabudgetary resources are no longer considered IPF add-on funds. When this happens, the government execution accounting and financial reporting provisions contained herein no longer apply to those transferred funds.

(h) Other sources of funding

1. Government-executed projects that contain multiple budgets, each financed from a different source of UNDP funds (i.e., IPF, SPR, SIS, SMF/LDCs, and GCCC), require a separate set of project reports for each source of funds. As an example, if a project is partially funded from IPF and partially from GCCC, and the Government is advanced funds from each of these sources, separate reports would have to be issued.

2. This "separate source, separate reports" principle also applies in the case of UNDP Administered Trust Funds that are used in conjunction with other UNDP sources of funds.

(f) Financial reporting

(i) General

Governments' reporting requirements are limited to those funds they actually receive and disburse.

(ii) Required periodic reports

1. Governments are expected to prepare the two financial reports indicated below and submit them to the resident representative within 30 days after the end of each quarter, in English, French, or Spanish. Reports issued in other languages should be accompanied by an official translation in English.

2. The financial reports have been designed to reflect the transactions of a project on a cash basis. Because of this, unliquidated obligations or commitments should not be reported to UNDP.

3. The information furnished on the reports forms the basis of a periodic financial review, and their timely submission is a prerequisite to the continuing funding of a project. Unless the financial reports are received, requests for advances of funds from UNDP will not be honoured by the resident representative.

a. Government disbursement report

1. The purpose of this report is to list the disbursements incurred by component/budget line on a monthly, quarterly, and cumulative basis. The report also is used to verify the balance available in the budget as of a given date.

2. Any refund received by a Government from a supplier should be reflected on this report as a reduction of disbursements on the component and budget line to which it relates.

3. This report is shown as Attachment 2, subsection 6.5, below, pages 38-39.

b. Reconciliation of outstanding UNDP advance/status of funds

1. This report reconciles the funds received from UNDP with the amount expended for budgetary control purposes. This exercise is undertaken in order to calculate the net amount owed to UNDP from the Government as of a given date.

2. This report is shown as Attachment 3, subsection 6.5, below, page 40.

Section, with the following information:

- Supplier's name and address;
- Supplier's bank name, address, and account number;
- Project name and number;
- Currency and amount required; and
- Component/budget line number and description.

2. In addition, the resident representative will confirm in the cable that the required certification from the Government in accordance with subsection 6.2 (d)(ii), above, has been received, that budget availability has been verified and that original documentation has been reviewed and adequately supports the payment request.

(iii) Source documentation and notification

When UNDP field offices pay suppliers directly on behalf of the Government, they must submit copies of all documentation to the Government and they should retain copies for their files.

(c) Recordkeeping

(i) General

Field offices should maintain a government-executed project control system designed to ensure that the resident representative can adequately monitor and control a project's financial activity and budget within the scope of his responsibilities.

(ii) Project financial files

a. Payment transactions

Field offices are expected to maintain an appropriate system of classifying payment transactions for government-executed projects. Such a system would separate advances to Governments from direct payments and would largely consist of files containing copies of disbursement vouchers and relevant documentation. Written requests and certifications from Governments should also be kept in the files.

b. Project financial reports

Field offices should keep copies of all project financial reports in files designated specifically for that purpose. Separate files should be kept for reports issued by the Government, UNDP Accounts Section, and the co-operating agency, if any.

6.3 UNDP field offices

(a) Advances of funds to Governments

(i) Advances in local currency

Local currency advances to the Government should normally be made by the resident representative. Field offices shall, upon receipt of a completed Request for Advance of Funds from UNDP form, verify budget availability and, if adequate, process a Government's request for project funds. Field offices should ensure that the amount requested does not exceed the amount of funds reasonably required to cover disbursements for three months.

(ii) Advances in other currencies

Advances to the Governments in US dollars should be made by the resident representative if this currency is available to him or her. Requests for advances in currencies not available to the resident representative should normally be transmitted to UNDP headquarters. If approved, DOF will make the advance and inform the resident representative by cable. Requests for advances in curencies available to other UNDP field offices should be forwarded thereto, as appropriate.

(iii) Release of funds contingent upon receipt of financial reports

Resident representative should not release or request the release of funds requested by a Government if the Government has failed to submit the two required financial reports described in subsection 6.2 (f), above.

(b) Direct Payments

(i) General

When a written request for direct payment is received along with the requisite original supporting documentation and certification in accordance with subsection 6.2 (d)(ii) from an authorized government official, field offices should verify budget availability and, if appropriate, process a Government's request for direct payment.

(ii) Field Office request for payment by headquarters

1. In instances where the field office requests headquarters to make a direct payment on behalf of a Government, the resident representative shall cable the Chief, Accounts

(b) Recording of payment transactions

(i) Operating Fund Account (OFA)

1. For each government-executed project, a separate Operating Fund Account (OFA) shall be maintained by the Accounts Section. All advances of UNDP funds to a Government are recorded in the OFA, as well as all project disbursements made by the Government (from the advances). Gains and losses resulting from fluctuations in the United Nations operational rate of exchange are also recorded in the OFA.

2. Although the OFA is kept in US dollars, a subsidiary local currency record will be maintained in order to facilitate project reconciliations and to ensure the existence of a complete audit trail.

3. A debit balance in the OFA is treated as a receivable from the Government. When financial assistance to a project is complete, any unspent balance should be refunded to UNDP by the Government.

(ii) Direct payments

Payments made by UNDP (whether by a field office or by headquarters) on behalf of Governments are not treated as advances of funds to Governments and accordingly are not recorded in an Operating Fund Account. These direct payments should be recorded as project disbursements on a budget line-item basis.

(iii) Disbursement of UNDP funds by Governments

Disbursements made by Governments from UNDP funds provided to them shall be recorded both as a reduction of the balance in the OFA and as project disbursements on a budget line-item basis. These disbursements must correspond to the amounts indicated on the Government Disbursement Report submitted each quarter by the Government. The amounts shown on this report are in the currency of the advance and any exchange rate translation is the responsibility of the Accounts Section.

(iv) Co-operating agency expenditures

Expenditure (i.e. unliquidated obligations plus disbursement) reported by operating agencies for a government-executed project shall be recorded as project expenditures on a budget line-item basis.

(d) Reporting

(i) To headquarters

a. Inter-Office Vouchers (IOVs)

1. All payments made by field offices for government-executed projects are to be recorded on a UNDP-GOVT Inter-Office Voucher (IOV) and forwarded in the usual fashion to UNDP Accounts Section each month. These payments include both advances made to Governments and direct payments made by the field office. Copies of disbursement vouchers and certified payment requests or 'Request for Advance of Funds' forms should be attached to the IOV.

2. Original DVs, supporting documentation and certified payment requests or 'Request for Advance of Funds' forms relating to field office and headquarters payments should be forwarded to the Accounts Section together with the monthly accounts.

b. Project financial reports

Field offices shall forward to UNDP Accounts Section the Quarterly Government Disbursement Report and the Reconciliation of Outstanding Advances/Status of Funds, financial reports issued by the Government, and retain copies for their files.

(ii) To Governments

a. Project reports

Field offices shall forward to the Government all project financial reports issued by UNDP Accounts Section and the co-operating agency.

6.4 UNDP headquarters - Accounts Section

(a) Direct payments

1. Requests from field offices for UNDP headquarters to pay suppliers directly on behalf of Governments are to be reviewed and approved for payment by the Accounts Section. Requests from the field office should contain the information referred to in sub-section 6.3 (b)(ii).

2. UNDP headquarters should confirm that the payment has been effected and the resident representative must inform the Government accordingly.

Attachment 1

GOVERNMENT OF: _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP

PROJECT TITLE: _____ PROJECT No. __/__/__/__/__/__

QUARTER: _____ CURRENCY: _____

Component/ Budget Line Number	Component/Budget Line Description	Total Amount for Quarter
10	Project Personnel	
11-99	International Professional	
12-99	OPAS	
13-99	Administrative Support Personnel	
14-99	UNV	
15-99	Official Travel	
16-99	Mission Cost	
17-99	National Professional	
19	Component Total	
29	Subcontracts	
39	Training	
49	Equipment	
59	Miscellaneous	
93*	Support Costs	
TOTAL		

Plus: Estimate of Current Month's Cash Requirements

Less: Account Balance (Beginning of Current Month) ( )

Petty Cash On Hand (Beginning of Current Month) ( )

Total Advance Requested _____

VERIFICATION OF BUDGET AVAILABILITY

Annual Budget (from CDR)

Less: Total Advance Requested (from Above) ( )

Total Advances Received Against Current Year's Budget ( )

Amount Still Available in Budget _____

* Applicable to UNDP Trust Funds Only :

(c) Reporting: Combined delivery report

1. Three times per year, the Accounts Section will issue a Combined Delivery Report to the Government through the resident representative for each government-executed project in the country's portfolio. This report shall contain disbursements made by the Governments, field offices, and UNDP headquarters for the periods ending 30 June, 30 September, and 31 December. The report shall also contain co-operating agency expenditures for the periods in which agencies report (semi-annually). A sample of this report is shown in Attachment 4 (see subsection 6.5, below, page 41).

2. Field offices should forward the CDR to the Government within two weeks of the date of receipt.

3. The CDR must be verified and certified by Governments within 30 days of receipt, returned to the resident representatives for on-forwarding to UNDP headquarters.

6.5 Co-operating agencies a/

(a) Funds required for government execution

Funds required by a co-operating agency for government execution will be provided as part of the total monthly remittance requested by the agency for the implementation of UNDP assistance to the projects. Agencies should include their cash requirements for projects in which they participate as co-operating agency in their statements of cash requirements submitted to UNDP Treasury Section.

(b) Reporting

Co-operating agencies having responsibility for certain components of a government-executed project should issue semi-annual expenditure statements in accordance with the letter of agreement entered into between the Government and the agency. The statements should reflect all expenditures by component/budget line and should be submitted to the Government through the resident representative within 30 days after 30 June and 31 December.

---

a/ Co-operating agency procedures are described in section 30503, subsection 5.0.

Attachment 2

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: _ _ / _ _ / _ _ _ / _ / _ _ / _ _

CURRENCY: _____ _____

Component/ Budget Line	Component Budget/Line Description	Month 1	Month 2	Month 3	Total for Quarter
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	OPAS				
12-01	OPAS 1				
12-02	OPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
93*	Support Costs				
99	Total Budgetary Categories				

CERTIFICATION

The undersigned authorized government official hereby certifies that the budgetary disbursements shown above have been made in accordance with the project document, that an appropriate refund will be made to the UNDP in the event of any disallowances, and that information supporting the disbursements will be available for audit, if requested.

Date Submitted: _____

Name: _____

Title: _____

Signature: _____

*Applicable to UNDP Trust Funds only

GOVERNMENT OF: _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP
(BANK INFORMATION AND CERTIFICATION)

BANK INFORMATION

Bank Name: _____ Payment Advice To: _____

Account Number: _____ Contact Person: _____

Bank Address: _____

_____

Certification

The undersigned authorized government official hereby certifies that the projected cash requirements shown on page 1 and the resulting cash request, represent the best estimate of funds needed to cover disbursements for the period indicated. Any funds that are advanced but not disbursed for budgetary purposes will be refunded to UNDP in accordance with the terms and conditions of the project document.

Date: _____ Name: _____

Title: _____

Signature: _____

Attachment 3

GOVERNMENT OF: _____

RECONCILIATION OF OUTSTANDING UNDP ADVANCE/STATUS OF FUNDS
FOR PERIOD FROM _____ TO _____

PROJECT TITLE: _____ PROJECT No. __/__/__/__/__/__

QUARTER: _____ CURRENCY: _____

STEP 1

Outstanding UNDP Advance (Beginning of year)		XXX
UNDP Advances Received This Quarter	XXX	
UNDP Advances Received in Prior Quarters (year-to-date)	XXX	
Total UNDP Funds Received (year-to-date)		XXX
Total UNDP Advance		XXX
Less: Total Disbursements (year-to-date)		(XXX)
Outstanding UNDP Advance		XXX

STEP 2

Account Balance at End of Quarter	
Add: Unresolved/Unreimbursed Disallowances	
Petty Cash on Hand	
Less: Interest Not Yet Refunded to UNDP	(XXX)
Outstanding UNDP Advance	XXX

Date Submitted: _____ Name: _____
Authorized

Government Official)

Title: _____

Signature: _____

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: _ _ _ /_ _ /_ _ _ /_ /_ _ /_ _

CURRENCY: _____ _____

Component/ Budget Line	Description	Annual Budget A	Disbursements for Quarter (from Page 2)	Year to Date B	Available Budget A-B
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	GPAS				
12-01	GPAS 1				
12-02	GPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
95*	Support Costs				
99	Total Budgetary Categories				

*Applicable to UNDP Trust Funds only

Attachment 4

COMBINED DELIVERY REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: ___/__/___/__/__/__

CURRENCY: _____

Component/ Budget Line	Component/Budget Line Description	Annual Budget A	EXPENDITURE				Combined Year to Date B	Available Budget A-B
			UNDP Field Office	UNDP Headquarters	Government	Cooperating Agency		
10	Project Personnel:							
11	International Professional							
11-01	International Professional 1							
11-02	International Professional 2							
11-99	Subtotal							
12	OPAS							
12-01	OPAS 1							
12-02	OPAS 2							
12-99	Subtotal							
13	Admin. Support Personnel							
14	Law							
14-01	Volunteer 1							
14-02	Volunteer 2							
14-99	Subtotal							
15	Official Travel							
16	Mission Cost							
17	National Professional							
17-01	National Professional 1							
17-02	National Professional 2							
17-99	Subtotal							
19	Component Total							
20	Subcontracts:							
21	Subcontracts							
29	Component Total							
30	Training:							
31	Individual Fellowships							
32	Group Training							
33	In-Service Training							
39	Component Total							
40	Equipment:							
41	Expendable Equipment							
42	Non-expendable Equipment							
43	Premises							
49	Component Total							
50	Miscellaneous:							
51	Miscellaneous							
52	Reports							
53	Surveys							
59	Component Total							
93*	Support Costs							
99	Total Budgetary Categories							

*Applicable to UNDP Trust Funds only

THE GROUP OF 77
New York
Office of the Chairman

L-0058/95

21 April 1995

SUB-CONTRACT AGREEMENT

Subject: INT/94/K04 - Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

Sub-contract Agreement between the Group of 77 and the Ministry of Agriculture, Indonesia

Excellency,

1. I wish to refer to the exchange of correspondence between the Office of the Chairman of the Group of 77, as executing agency for the above project and your organization, the Ministry of Agriculture, Indonesia, as sub-contractor based upon your development of the project. Hereafter, the Office of the Chairman of the Group of 77, executing agency, shall be referred to as G-77 and the Ministry of Agriculture, Indonesia, sub-contractor, shall be referred to as MAGRI.

2. In accordance with the relevant provisions of PGTF project document INT/94/K04 and its corresponding budget of (US)$70,000, we confirm our acceptance of the services to be provided by the MAGRI towards the implementation of this project under the following terms and conditions.

3. MAGRI shall provide the services and facilities described in Attachment 1 - Description of Services - of this sub-contract agreement and in accordance with the terms of reference included therein.

4. The G-77 shall retain the overall responsibility for the implementation of the PGTF-assisted project through its designated project coordinator.

5. Upon acceptance of this sub-contract agreement and pursuant

to the project budget of the project document and the work plan, the G-77 will arrange with UNDP, the latter's remittances of advances of funds directly to the Ministry of Agriculture, Indonesia's account, with MAGRI incurring expenditure within the limits set out in Attachment 2 -Schedule of Services and Facilities- and making similar arrangements with UNDP for the reimbursement of expenditures to be incurred by the sub-contract as described in Attachment 2, subject to the following:

> Within the budgetary limitations of the project document, the G-77 shall be responsible for providing miscellaneous services such as dissemination of the final report to the Member States.

6. A cumulative statement of expenditure shall be submitted by the MAGRI depending on the duration of the project, at 30 June and 31 December, during the life of the project. The statement, to be prepared in accordance with the format annexed to the project document, will be submitted to the G-77 within 30 days following those days. The G-77 will include its own expenditure against funds advanced by UNDP.

7. The MAGRI shall submit such reports relating to the project as may reasonably be required by the project coordinator in the exercise of his/her duties, as well as other reports required by the G-77 in connexion with its obligations to submit reports to UNDP.

8. Any amendment to these arrangements shall be affected by mutual agreement through an appropriate supplementary sub-contractual agreement which would require the prior concurrence of UNDP.

9. For any matters not specifically covered by this arrangement, the appropriate provisions of the project document and revisions thereof, and the appropriate provisions of the financial regulations and rules of the MAGRI shall mutatis mutandis apply.

10. All further correspondence regarding the implementation of this sub-contract agreement should be addressed to the Chairman of the G-77, United Nations, New York.

11. The G-77 and through it, MAGRI will keep the Special Unit for TCDC, UNDP, New York, fully informed of all actions undertaken by them in carrying out this sub-contract agreement.

12. If you are in agreement with the above, would you kindly sign and return to the office of the Chairman of the Group of 77 two copies of this sub-contract agreement. Your acceptance shall

thereby constitute the basis for MAGRI's participation in the implementation of the project.

Yours sincerely,

On behalf of the Group of 77,
the Executing Agency,

FELIPE MABILANGAN
Ambassador & Permanent Representative of
the Philippines to the United Nations
Chairman of the Group of 77
New York

On behalf of the sub-contracting agency,
Ministry of Agriculture, Indones ia (MAGRI),

H.E.Mr.Nugroho Wisnumurti
Ambassador and Permanent Representative of
Indonesia to the United Nations
New York, N.Y.

Attachment 1

Description of Services

Project Number: INT/94/K04/A/95/99

Project Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

Work to be performed by the Sub-contracting agency:

The development objective of the above-mentioned project is to improve policies and strategies of food security in Developing Countries of the NAM to achieve sustainable food security.

The immediate objectives of the project are to:

(a) Strengthen and improve the national capabilities of NAM's Developing Countries in analyzing and formulating policies and strategies of food security.

(b) Acquire from governments institutional and operational support as well as an effective national training programme on food security.

(c) Conduct training in the following areas: Single Equation Modeling of Food Supply, Demand and Prices; Regression Analysis; Regression Software; Changing of Simultaneous Equation Models; Computer Simulation Model of Food Security; Discussion of Model Simulation Results; and National Food Security Analysis and Policy Formulation Exercises.

Terms of reference:

1. Consultants and participants for training will be selected.

2. A computer simulation model will be developed by a consultant to be used by participants of the training.

3. Data will be collected by candidates of the participants of the training to be used in the training for preparing national food security strategies.

4. The host country (Indonesia) will provide project

preparation; office and facilities for the project; Training Center facilities and staff salary; Project staff salary; and Follow-up of national training programme and dissemination of model.

Attachment 2

SCHEDULE OF SERVICES AND FACILITIES
TO BE PROVIDED BY THE COOPERATING AGENCY

Country: Interregional

Project Number: INT/94/K04

Project Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

	Budget Line	(USD) Estimated Expenditure by Year Total man-months	Total costs	1995 $
Subcontract				
i.	Personnel			8,500.00
ii.	Travel			45,500.00
iii.	Equipment			10,000.00
iv.	Miscellaneous			6,000.00
	Project total			70,000.00

Attachment 3

STATEMENT OF EXPENDITURE

FOR THE DURATION OF THE PROJECT

Project Number: INT/94/K04/A/95/99

Project Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

		1995 $
40.	Subcontract	
41.	Subcontract with MAGRI	70,000
99.	Project Total	70,000

Country: Interregional

Project Number: INT/94/K04/A/95/99

Project Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

	Total $
Personnel (Consultants)	8,500
Travel (Asia & Africa Trainers)	45,500
Equipment	10,000
Miscellaneous	6,000
Project total	70,000

The Account Number to which the transfer of disbursement should be made is 108-04247517.

The name of Bank is Bank Bumi Daya (BBD), Pasar Minggu Branch, Jakarta Selatan, Indonesia.

Excerpt from UNDP's & PPM (Sec. 30503, pp.24-41)
Modalities of Project Execution:
Government Execution

6.0 Accounting and financial reporting procedures

6.1 General

1. Governments designated "executing agency" (herein after referred to simply as "Governments") are responsible for the management of all UNDP resources allocated to a government-executed project. In this capacity, Governments are accountable to the Administrator for the entirety of UNDP resources under their management.

Governments are responsible for maintaining an accounting and recordkeeping system that reflects all financial transactions of a government-executed project. In addition, Governments are required to report on the receipt and disbursement of UNDP funds. Governments should not include unliquidated obligations in reports issued to UNDP.

2. The Resident representative has the responsibility for ensuring timely submission of financial reports by Governments and for ensuring that advances of UNDP funds to Governments and UNDP direct payments are made in accordance with the project document, within the limits of the project budget, and on the basis of a written request and certification from the Government.

3. The Accounts Section within the Division of Finance has the responsibility for maintaining an Operating Fund Account by project in which all advances to and disbursements made by a Government are recorded. The Accounts Section also has responsibility for issuing Combined Delivery Reports, in US dollars, for each government-executed project.

4. Co-operating agencies must maintain accounting records and report on funds disbursed by them for government-executed projects in accordance with the agreement entered into between the agency and the Government.

5. The procedures for government execution contained herein apply to all projects financed from UNDP sources of funds and UNDP-administered Trust Funds except for those projects funded from UNCDF. This fund has its own policies and procedures for government execution.

Questions concerning material in this section should be addressed to: Director, Division of Finance, Bureau for Finance and Administration.

(ii) Advances of funds equal to or less than US $10,000

1. In instances when an Advance Authorization is used for a project, requests from Governments for advances of funds that are equal to or less than US $10,000 can be granted by the resident representative provided that the following pre-conditions have been met:

- An Advance Authorization Document has been prepared that includes the authorized project budget (original or revised, as applicable);

- The written confirmations required by section 30108, subsection 3.0, have been provided by the Government;

- A Request for Advance of Funds from UNDP form containing the requisite certification has been submitted to the resident representative by the Government. The amount of funds requested should not exceed 60 days' cash requirements.

2. A sample Request for Advance of Funds from UNDP form is presented as Attachment 1, subsection 6.5, below, pages 36-37.

(iii) Advances of funds in excess of US $10,000

In instances when an Advance Authorization is used for a project, Governments may receive advances of funds that exceed US $10,000 provided that the pre-conditions listed in sub-section (ii), above, have been met and provided that written approval has been obtained from the Director, Division of Finance.

(c) Routine advances of UNDP funds to Governments

1. All requests for advances of UNDP funds to Governments require the approval of the resident representative as described in subsection 6.3 (a), below. Requests should be submitted to the resident representative on the request form referred to in subsection 6.2 (b)(ii), above, and the amount requested should not exceed the amount of funds required to cover disbursements for the next three months.

2. Requests should be submitted to the resident representative at least 15 calendar days prior to the beginning of each calendar quarter.

6. The accounting and financial reporting procedures contained herein define the requirements concerning government execution on a general level. More detailed instructions, forms, and explanations including audit requirements are found in the following documents which are contained in the Government Execution Operational Handbook:

Accounting and Financial Reporting Guidelines for Governments as Executing Agency (GEM)

Finance Manual (FM), section 522: Accounting and Financial Reporting Procedures for Government Execution

Audit Requirements for Government Execution of UNDP-funded Projects (PPM section 30503, subsection 8.0)

The Government Execution Operational Handbook must be made an integral part of every project document.

6.2 Governments as executing agency

(a) Banking arrangements

(i) Separate account for UNDP funds

Governments should establish and maintain separate bank accounts for the receipt and disbursement of UNDP funds. Governments should not commingle funds advanced by UNDP with any other funds.

(ii) Interest earned on UNDP funds

Interest earned on project bank accounts shall be refunded to UNDP annually. Each year, a remittance (in the currency of the advance) should be made to the resident representative within 60 days following 31 December, for all interest credited during the preceding year.

(b) Advances of UNDP funds made under an advance authorization

(i) General

Procedures governing advance authorizations are contained in section 30108, subsection 3.0, Special rule for government-executed projects. Governments should note that the special requirements for Advance Authorizations are in addition to the otherwise applicable government execution procedures.

- Made for goods or services that have been delivered to the satisfaction of the Government or will be delivered pursuant to the terms and conditions of the contract; and

- Made on the basis of original supporting documentation attached to the request."

(e) Accounting books and records

(i) General

1. Governments should maintain an accounting system that contains books, records, and controls sufficient to ensure the accuracy and reliability of project financial information. The project accounting system should also ensure that the receipt and disbursement of UNDP funds is properly identified and that budgetary categories approved in the project document are not exceeded.

2. The system of accounting and recordkeeping must include the advances received and disbursed, co-operating agency expenditures and direct payments made by UNDP. The project accounting system maintained by the Government should also be kept current, with all ledgers and journals "closed out" at the end of each month.

3. A budget control mechanism should be instituted to ensure that requests for direct payments will only be issued if funds are available in the project budget.

(ii) Non-expendable property ledger

Governments should maintain a non-expendable property ledger for the purpose of recording the acquisition and disposition of property and equipment used in a government-executed project. This ledger should contain information on all property and equipment, whether purchased directly by the Government from funds advanced to it, or by the UNDP or a co-operating agency on behalf of the Government.

(iii) Project files

Governments should keep all supporting documentation pertaining to project purchases and payments in a separate set of project files.

(d) Direct payments by UNDP

(i) General

1. UNDP may, upon request from a Government, pay suppliers of goods or services to government-executed projects directly on their behalf. It should be noted, however, that the primary responsibility for the payment process for a government-executed project belongs with the Government.

2. Accordingly, Governments should seek UNDP assistance for the payment of project inputs only when they are unable to do so completely on their own.

3. Requests from Governments for UNDP direct payments should be submitted to the resident representative in writing and signed by an authorized government official. A listing of the authorized government officials and their specimen signatures should be obtained and kept up to date by the resident representative. Payment instructions must contain the payee, bank name, address, account number, and other pertinent instructions. As in the case of advances, Governments should allow 15 days' processing time.

4. In addition, the original documentation must be attached to the request. This original documentation and certified payment request will be forwarded to UNDP headquarters together with the monthly accounts. The Governments should retain a copy of this documentation for their records.

(ii) Required certification

When Governments submit requests to UNDP to pay suppliers directly on their behalf, the authorized government official signing the request should include the following certification language:

"The undersigned authorized government official hereby certifies that the payment being requested has not previously been made and that it will be:

- Made in accordance with the project document;

(iii) Verification and certification of the Combined Delivery Report (CDR)

Upon receipt of the Combined Delivery Report (CDR) (see subsection 6.4 (c), below), which is issued three times a year by UNDP headquarters, Governments must verify the reports with their records and certify them. Any disrepancies should be reported to the resident representative. The CDRs should be returned to the resident representative within 30 days upon receipt.

(iv) Final project reports

When a government-executed project is financially complete (as defined in section 30107, subsection 6.0), Governments should issue final project reports. These reports are the same two described above and would reflect financial activity for the final quarter of the project. The reports should be clearly marked "FINAL" and a refund of any outstanding advance to UNDP should be attached with interest, if any, stated separately.

(g) IPF add-on funds

1. For purposes of accounting and financial reporting, IPF add-on funds received and disbursed by a Government are treated as if the funds were being used for a separate government-executed project. Thus, all accounting records and financial reports required for government-executed projects also are required for activities financed from IPF add-on funds.

2. IPF add-on funds that are earned by a Government and subsequently transferred to UNDP as extrabudgetary resources are no longer considered IPF add-on funds. When this happens, the government execution accounting and financial reporting provisions contained herein no longer apply to those transferred funds.

(h) Other sources of funding

1. Government-executed projects that contain multiple budgets, each financed from a different source of UNDP funds (i.e., IPF, SPR, SIS, SMF/LDCs, and GCCC), require a separate set of project reports for each source of funds. As an example, if a project is partially funded from IPF and partially from GCCC, and the Government is advanced funds from each of these sources, separate reports would have to be issued.

2. This "separate source, separate reports" principle also applies in the case of UNDP Administered Trust Funds that are used in conjunction with other UNDP sources of funds.

(f) Financial reporting

(i) General

Governments' reporting requirements are limited to those funds they actually receive and disburse.

(ii) Required periodic reports

1. Governments are expected to prepare the two financial reports indicated below and submit them to the resident representative within 30 days after the end of each quarter, in English, French, or Spanish. Reports issued in other languages should be accompanied by an official translation in English.

2. The financial reports have been designed to reflect the transactions of a project on a cash basis. Because of this, unliquidated obligations or commitments should not be reported to UNDP.

3. The information furnished on the reports forms the basis of a periodic financial review, and their timely submission is a prerequisite to the continuing funding of a project. Unless the financial reports are received, requests for advances of funds from UNDP will not be honoured by the resident representative.

a. Government disbursement report

1. The purpose of this report is to list the disbursements incurred by component/budget line on a monthly, quarterly, and cumulative basis. The report also is used to verify the balance available in the budget as of a given date.

2. Any refund received by a Government from a supplier should be reflected on this report as a reduction of disbursements on the component and budget line to which it relates.

3. This report is shown as Attachment 2, subsection 6.5, below, pages 38-39.

b. Reconciliation of outstanding UNDP advance/status of funds

1. This report reconciles the funds received from UNDP with the amount expended for budgetary control purposes. This exercise is undertaken in order to calculate the net amount owed to UNDP from the Government as of a given date.

2. This report is shown as Attachment 3, subsection 6.5, below, page 40.

Section, with the following information:

- Supplier's name and address;
- Supplier's bank name, address, and account number;
- Project name and number;
- Currency and amount required; and
- Component/budget line number and description.

2. In addition, the resident representative will confirm in the cable that the required certification from the Government in accordance with subsection 6.2 (d)(ii), above, has been received, that budget availability has been verified and that original documentation has been reviewed and adequately supports the payment request.

(iii) Source documentation and notification

When UNDP field offices pay suppliers directly on behalf of the Government, they must submit copies of all documentation to the Government and they should retain copies for their files.

(c) Recordkeeping

(i) General

Field offices should maintain a government-executed project control system designed to ensure that the resident representative can adequately monitor and control a project's financial activity and budget within the scope of his responsibilities.

(ii) Project financial files

a. Payment transactions

Field offices are expected to maintain an appropriate system of classifying payment transactions for government-executed projects. Such a system would separate advances to Governments from direct payments and would largely consist of files containing copies of disbursement vouchers and relevant documentation. Written requests and certifications from Governments should also be kept in the files.

b. Project financial reports

Field offices should keep copies of all project financial reports in files designated specifically for that purpose. Separate files should be kept for reports issued by the Government, UNDP Accounts Section, and the co-operating agency, if any.

6.3 UNDP field offices

(a) Advances of funds to Governments

(i) Advances in local currency

Local currency advances to the Government should normally be made by the resident representative. Field offices shall, upon receipt of a completed Request for Advance of Funds from UNDP form, verify budget availability and, if adequate, process a Government's request for project funds. Field offices should ensure that the amount requested does not exceed the amount of funds reasonably required to cover disbursements for three months.

(ii) Advances in other currencies

Advances to the Governments in US dollars should be made by the resident representative if this currency is available to him or her. Requests for advances in currencies not available to the resident representative should normally be transmitted to UNDP headquarters. If approved, DOF will make the advance and inform the resident representative by cable. Requests for advances in curencies available to other UNDP field offices should be forwarded thereto, as appropriate.

(iii) Release of funds contingent upon receipt of financial reports

Resident representative should not release or request the release of funds requested by a Government if the Government has failed to submit the two required financial reports described in subsection 6.2 (f), above.

(b) Direct Payments

(i) General

When a written request for direct payment is received along with the requisite original supporting documentation and certification in accordance with subsection 6.2 (d)(ii) from an authorized government official, field offices should verify budget availability and, if appropriate, process a Government's request for direct payment.

(ii) Field Office request for payment by headquarters

1. In instances where the field office requests headquarters to make a direct payment on behalf of a Government, the resident representative shall cable the Chief, Accounts

(b) Recording of payment transactions

(i) Operating Fund Account (OFA)

1. For each government-executed project, a separate Operating Fund Account (OFA) shall be maintained by the Accounts Section. All advances of UNDP funds to a Government are recorded in the OFA, as well as all project disbursements made by the Government (from the advances). Gains and losses resulting from fluctuations in the United Nations operational rate of exchange are also recorded in the OFA.

2. Although the OFA is kept in US dollars, a subsidiary local currency record will be maintained in order to facilitate project reconciliations and to ensure the existence of a complete audit trail.

3. A debit balance in the OFA is treated as a receivable from the Government. When financial assistance to a project is complete, any unspent balance should be refunded to UNDP by the Government.

(ii) Direct payments

Payments made by UNDP (whether by a field office or by headquarters) on behalf of Governments are not treated as advances of funds to Governments and accordingly are not recorded in an Operating Fund Account. These direct payments should be recorded as project disbursements on a budget line-item basis.

(iii) Disbursement of UNDP funds by Governments

Disbursements made by Governments from UNDP funds provided to them shall be recorded both as a reduction of the balance in the OFA and as project disbursements on a budget line-item basis. These disbursements must correspond to the amounts indicated on the Government Disbursement Report submitted each quarter by the Government. The amounts shown on this report are in the currency of the advance and any exchange rate translation is the responsibility of the Accounts Section.

(iv) Co-operating agency expenditures

Expenditure (i.e. unliquidated obligations plus disbursement) reported by operating agencies for a government-executed project shall be recorded as project expenditures on a budget line-item basis.

(d) Reporting

(i) To headquarters

a. Inter-Office Vouchers (IOVs)

1. All payments made by field offices for government-executed projects are to be recorded on a UNDP-GOVT Inter-Office Voucher (IOV) and forwarded in the usual fashion to UNDP Accounts Section each month. These payments include both advances made to Governments and direct payments made by the field office. Copies of disbursement vouchers and certified payment requests or 'Request for Advance of Funds' forms should be attached to the IOV.

2. Original DVs, supporting documentation and certified payment requests or 'Request for Advance of Funds' forms relating to field office and headquarters payments should be forwarded to the Accounts Section together with the monthly accounts.

b. Project financial reports

Field offices shall forward to UNDP Accounts Section the Quarterly Government Disbursement Report and the Reconciliation of Outstanding Advances/Status of Funds, financial reports issued by the Government, and retain copies for their files.

(ii) To Governments

a. Project reports

Field offices shall forward to the Government all project financial reports issued by UNDP Accounts Section and the co-operating agency.

6.4 UNDP headquarters - Accounts Section

(a) Direct payments

1. Requests from field offices for UNDP headquarters to pay suppliers directly on behalf of Governments are to be reviewed and approved for payment by the Accounts Section. Requests from the field office should contain the information referred to in sub-section 6.3 (b)(ii).

2. UNDP headquarters should confirm that the payment has been effected and the resident representative must inform the Government accordingly.

Attachment 1

GOVERNMENT OF: _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP

PROJECT TITLE: _____ PROJECT No. __/__/__/__/__/__

QUARTER: _____ CURRENCY: _____

Component/ Budget Line Number	Component/Budget Line Description	Total Amount for Quarter
10	Project Personnel	
11-99	International Professional	
12-99	OPAS	
13-99	Administrative Support Personnel	
14-99	UNV	
15-99	Official Travel	
16-99	Mission Cost	
17-99	National Professional	
19	Component Total	
29	Subcontracts	
39	Training	
49	Equipment	
59	Miscellaneous	
93*	Support Costs	
	TOTAL	

Plus: Estimate of Current Month's Cash Requirements
Less: Account Balance (Beginning of Current Month) ( )
Petty Cash On Hand (Beginning of Current Month) ( )

Total Advance Requested _____

VERIFICATION OF BUDGET AVAILABILITY

Annual Budget (from GDR)

Less: Total Advance Requested (from Above) ( )
Total Advances Received Against Current Year's Budget ( )

Amount Still Available in Budget _____

* Applicable to UNDP Trust Funds Only

(c) Reporting: Combined delivery report

1. Three times per year, the Accounts Section will issue a Combined Delivery Report to the Government through the resident representative for each government-executed project in the country's portfolio. This report shall contain disbursements made by the Governments, field offices, and UNDP headquarters for the periods ending 30 June, 30 September, and 31 December. The report shall also contain co-operating agency expenditures for the periods in which agencies report (semi-annually). A sample of this report is shown in Attachment 4 (see subsection 6.5, below, page 41).

2. Field offices should forward the CDR to the Government within two weeks of the date of receipt.

3. The CDR must be verified and certified by Governments within 30 days of receipt, returned to the resident representatives for on-forwarding to UNDP headquarters.

6.5 Co-operating agencies a/

(a) Funds required for government execution

Funds required by a co-operating agency for government execution will be provided as part of the total monthly remittance requested by the agency for the implementation of UNDP assistance to the projects. Agencies should include their cash requirements for projects in which they participate as co-operating agency in their statements of cash requirements submitted to UNDP Treasury Section.

(b) Reporting

Co-operating agencies having responsibility for certain components of a government-executed project should issue semi-annual expenditure statements in accordance with the letter of agreement entered into between the Government and the agency. The statements should reflect all expenditures by component/budget line and should be submitted to the Government through the resident representative within 30 days after 30 June and 31 December.

---

a/ Co-operating agency procedures are described in section 30503, subsection 5.0.

Attachment 2

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____ PROJECT No: _ _ _ / _ _ / _ _ _ / _ _ / _ _

PERIOD: _____ CURRENCY: _____

Component/ Budget Line	Component Budget/Line Description	Month 1	Month 2	Month 3	Total for Quarter
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	OPAS				
12-01	OPAS 1				
12-02	OPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
93*	Support Costs				
99	Total Budgetary Categories				

CERTIFICATION

The undersigned authorized government official hereby certifies that the budgetary disbursements shown above have been made in accordance with the project document, that an appropriate refund will be made to the UNDP in the event of any disallowances, and that information supporting the disbursements will be available for audit, if requested.

Date Submitted: _____ Name: _____

Title: _____

*Applicable to UNDP Trust Funds only Signature: _____

GOVERNMENT OF: _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP
(BANK INFORMATION AND CERTIFICATION)

BANK INFORMATION

Bank Name: _____ Payment Advice To: _____

Account Number: _____ Contact Person: _____

Bank Address: _____

_____

Certification

The undersigned authorized government official hereby certifies that the projected cash requirements shown on page 1 and the resulting cash request, represent the best estimate of funds needed to cover disbursements for the period indicated. Any funds that are advanced but not disbursed for budgetary purposes will be refunded to UNDP in accordance with the terms and conditions of the project document.

Date: _____ Name: _____

Title: _____

Signature: _____

Attachment 3

GOVERNMENT OF:_____

RECONCILIATION OF OUTSTANDING UNDP ADVANCE/STATUS OF FUNDS
FOR PERIOD FROM _____ TO _____

PROJECT TITLE:_____ PROJECT No.__/__/__/__/__/__

QUARTER:_____ CURRENCY:_____

STEP 1

Outstanding UNDP Advance (Beginning of year)		XXX
UNDP Advances Received This Quarter	XXX	
UNDP Advances Received in Prior Quarters (year-to-date)	XXX	
Total UNDP Funds Received (year-to-date)		XXX
Total UNDP Advance		XXX
Less: Total Disbursements (year-to-date)		(XXX)
Outstanding UNDP Advance		XXX

STEP 2

Account Balance at End of Quarter	
Add: Unresolved/Unreimbursed Disallowances	
Petty Cash on Hand	
Less: Interest Not Yet Refunded to UNDP	(XXX)
Outstanding UNDP Advance	XXX

Date Submitted: _____ Name: _____
Authorized
Government Official)

Title: _____

Signature:_____

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: _ _ / _ _ / _ _ _ / _ / _ _ / _ _

CURRENCY: _____ _____

Component/ Budget Line	Description	Annual Budget A	Disbursements for Quarter (from Page 2)	Year to Date B	Available Budget A-B
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	OPAS				
12-01	OPAS 1				
12-02	OPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
93*	Support Costs				
99	Total Budgetary Categories				

*Applicable to UNDP Trust funds only

Attachment 4

COMBINED DELIVERY REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: _ _ _ / _ _ / _ _ _ / _ / _ _ / _ _

CURRENCY: _____

Component/ Budget Line	Component/Budget Line Description	Annual Budget A	EXPENDITURE					Available Budget A-B
			UNDP Field Office	UNDP Headquarters	Govern-ment	Co-operat-ing Agency	Combined Year to Date B	
10	Project Personnel:							
11	International Professional							
11-01	International Professional 1							
11-02	International Professional 2							
11-99	Subtotal							
12	OPAS							
12-01	OPAS 1							
12-02	OPAS 2							
12-99	Subtotal							
13	Admin. Support Personnel							
14	UNV							
14-01	Volunteer 1							
14-02	Volunteer 2							
14-99	Subtotal							
15	Official Travel							
16	Mission Cost							
17	National Professional							
17-01	National Professional 1							
17-02	National Professional 2							
17-99	Subtotal							
19	Component Total							
20	Subcontracts:							
21	Subcontracts							
29	Component Total							
30	Training:							
31	Individual Fellowships							
32	Group Training							
33	In-Service Training							
39	Component Total							
40	Equipment:							
41	Expendable Equipment							
42	Non-expendable Equipment							
43	Premises							
49	Component Total							
50	Miscellaneous:							
51	Miscellaneous							
52	Reports							
53	Sundries							
59	Component Total							
83*	Support Costs							
99	Total Budgetary Categories							

*Applicable to UNDP Trust Funds only

Institutional framework

The Office of the Chairman of the Group of 77, located on the 39th floor of the UN Secretariat Building, shall be the Executing Agency for the Project. The Executing agency shall subcontract project implementation to Ministry of Agriculture, Indonesia in accordance with the UNDP procedures. The subcontract shall be awarded within a month of signature of this document and shall be the basis of a separate document to be signed by the two parties. As executing agent for the project, the Office of the Chairman of the Group of 77 will be responsible for the financial reporting requirements foreseen under the UNDP's government execution procedures in annex to this document.

MONITORING EVALUATION AND REPORTS

Schedule of review

The review of the status of the implementation of the project will be undertaken by the Committee of Experts of the Perez-Guerrero Trust Fund (PGTF) for ECDC. The Committee's recommendations are submitted to an annual meeting of the Ministers of Foreign Affairs of the Group of 77 for endorsement as appropriate.

Progress and Terminal Reports

The final report and studies resulting from the project shall, for purposes of the project, be considered the terminal report.

PEREZ-GUERRERO TRUST FUND

FOR ECONOMIC AND TECHNICAL COOPERATION

AMONG DEVELOPING COUNTRIES MEMBERS OF THE GROUP OF 77

PROJECT DOCUMENT

Country: Interregional

Title: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

Number: INT/94/K04/A/95/99

Submitted by: Ministry of Agriculture of the Republic of Indonesia

Beneficiaries: NAM Countries

Duration of Project: Six (6) months

Estimated starting date: March 1995

Perez-Guerrero Trust Fund Inputs: (US) $70,000

Total cost of the Project: (US) $70,000

This project is to be executed by the Office of the Chairman of the Group of 77 under UNDP's Government Execution arrangements with a subcontract to be awarded to the Ministry of Agriculture, Indonesia, as subcontractor within a month of signature of the project document.

F Mabilangan

31 March 1995

FELIPE MABILANGAN — Date

Ambassador & Permanent Representative of the
Philippines to the United Nations
Chairman of the Group of 77

14 April 1995

DENIS BENN — Date

Director
Special Unit for TCDC
On behalf of UNDP

I. BACKGROUND AND JUSTIFICATION

Food Security was considered as a prime concern at the Tenth Summit Meeting of Non Aligned Movement (NAM) held in Jakarta in September 1992. During the meeting, the Heads of State or Government reviewed the food situation in the NAM and other developing countries. They approved the Resolution on Food Security which expressed a deep concern on the number of people plagued by hunger and malnutrition, which has increased in the past decade, despite the ability of the world to increase food output firstly.

In order to handle the pressing issues on the food security problems, general meetings had been conducted in Indonesia to support the preparation of a ministerial meeting on Food and Agriculture of the NAM on Food Security which was commenced by two informal meetings of Food Experts from NAM Countries and international organizations taken place in Rome in October 1992 and in Jakarta in February 1993. Ad-hoc Advisory Group of Experts on Food Security of the NAM countries had been conducted a meeting in Jakarta from 25 to 28 January 1994 and the results of the meeting had been submitted to the Conference of Ministers of Food and Agriculture of the NAM on Food Security convened in Bali-Indonesia in October 1994.

The problems of food security, despite low productivity, include the availabity of food with better qualities. Pricing policies on several food commodities can alter the availability and supply of food with various qualities. Therefore, the lack of ability to predict and create a model to ensure food security mechanisms is a serious issue to be overcome by the NAM member countries.

An appropriate pricing policies and the operation of National Food Authority become more challenging and need more detailed operating procedures. This is to ensure, not only the availability of food with better qualities, but to increase farmers' income as well.

Globalization and regional economic trend toward regional trade and economic cooperation are other recent issues which express the importance of strengthening South-South cooperation to ensure Food Security among members of the NAM and other developing countries. A series of proposed programmes had been recommended for enhancing food security and have been adopted by the Conference of Ministers of Food and Agriculture of the NAM on Food Security which are included : (1) Training and exchange of information on the design and management of relevant projects, (2) Technology Generation and Dissemination, (3) Input Supply and Production, (4) Institution Building through the decentralization and strengthening of national capacity, (5) Trade and (6) Political Cooperation, to galvanize the unutilized potential of NAM member countries to arrest the decline of interest in, and support for, agricultural development and food security in developing countries.

From the above-mentioned reasons and the availability of Peresz-Guerrero Trust Fund (PGTF) giving G-77 member countries an opportunity to develop their ability in creating a model for ensuring food security in each and among the member countries, Indonesia proposes : <u>Training on the Use of A Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM</u>.

Regarding the characteristics of a country's food security problems, the nature of the food insecure population, resources availability, institutional capabilities, and the possibility of regional food security research scheme,

first priority will be given to the developing countries of the NAM and members of G-77 such as : Senegal, Uganda, Sudan, Tanzania, Gambia, Nigeria, Zimbabwe, Kenya, Zambia, Ghana, Bangladesh, India and Indonesia. As a pilot project, this project could be widened to cover the NAM and other developing countries members of G-77 with larger regionalization whenever the outputs of the project can be implemented successfully.

II. OBJECTIVES

A. Development objective

Improved Policies and Strategies of Food Security in Developing Countries of the NAM to achieve sustainable food security.

B. Immediate objective

Strengthened and improved national capabilities of NAM's Developing Countries in analyzing and formulating Policies and Strategies of Food Security. This objective could be achieved if each government provides instutitional and operational support as well as effective national training programme on food security.

III. CONTENTS OF THE TRAINING

1. Introduction review
2. Single Equation Modeling of Food Supply, Demand and prices:

   - Model structure
   - Model of supply
   - Model of demand
   - Model of prices
   - Model of stock

3. Regression Analysis

   - Equations models

4. Regression software use time series package (TSP.)
   - data generate
   - graphs
   - regression analysis
   - exercises

5. Changing the model : Simultaneous equation models
   - Re-estimation of parameters
   - Determining policy parameters

6. Computer simulation model of Food security model
   - data input
   - specification
   - parameter changes
   - simulations and forecasts in Lotus
   - exercises

7. Discussion of model simulation results
   - model structure
   - applicability for policy use
   - improvements
   - Further action

8. National food security analysis and policy formulation exercises.

III. OUTPUT AND ACTIVITIES OF THE PROJECT

The main outputs and activities of the project are summarized below. The Matrix in Annex.1 provides a more detailed relation of this project activities and outputs.

A. Output 1. Computer simulation model of food security constracted.

Activities :

1. Selecting and oppointing consultants
2. Developing of computer simulation model by consultant to be used by participants of the training.
3. Collecting data by candidates of the participants of the training to used in the training for preparing national food security strategies.

B. Output 2. Trained food security planners of selected developing countries of NAM.

Activities :

1. Developing training curriculum and modules.
2. Sending information and invitation to participating countries.
3. Selecting participants of the training.

4. Procurement of training facilities.
5. Conducting 12 days training activities.
6. Evaluating training program.
7. Reporting training activities and outputs.

IV. INPUTS TO BE PROVIDED BY PGTF

1. Personnel
   National Consultants

2. Equipment
   Two personal Computers, printer and other equipment.

3. International Travel
   12 participants from Africa and Asia

4. Training
   Training facilities, accommodation, per diem allowance, field trip and instructor's honoraria

5. General Operating Expenses
   General operating expenses related to the project, including preparation, reproduction of documents, budget for secretariat assistance, local transportation and cost of communication.

6. Preparation and dissemination of report

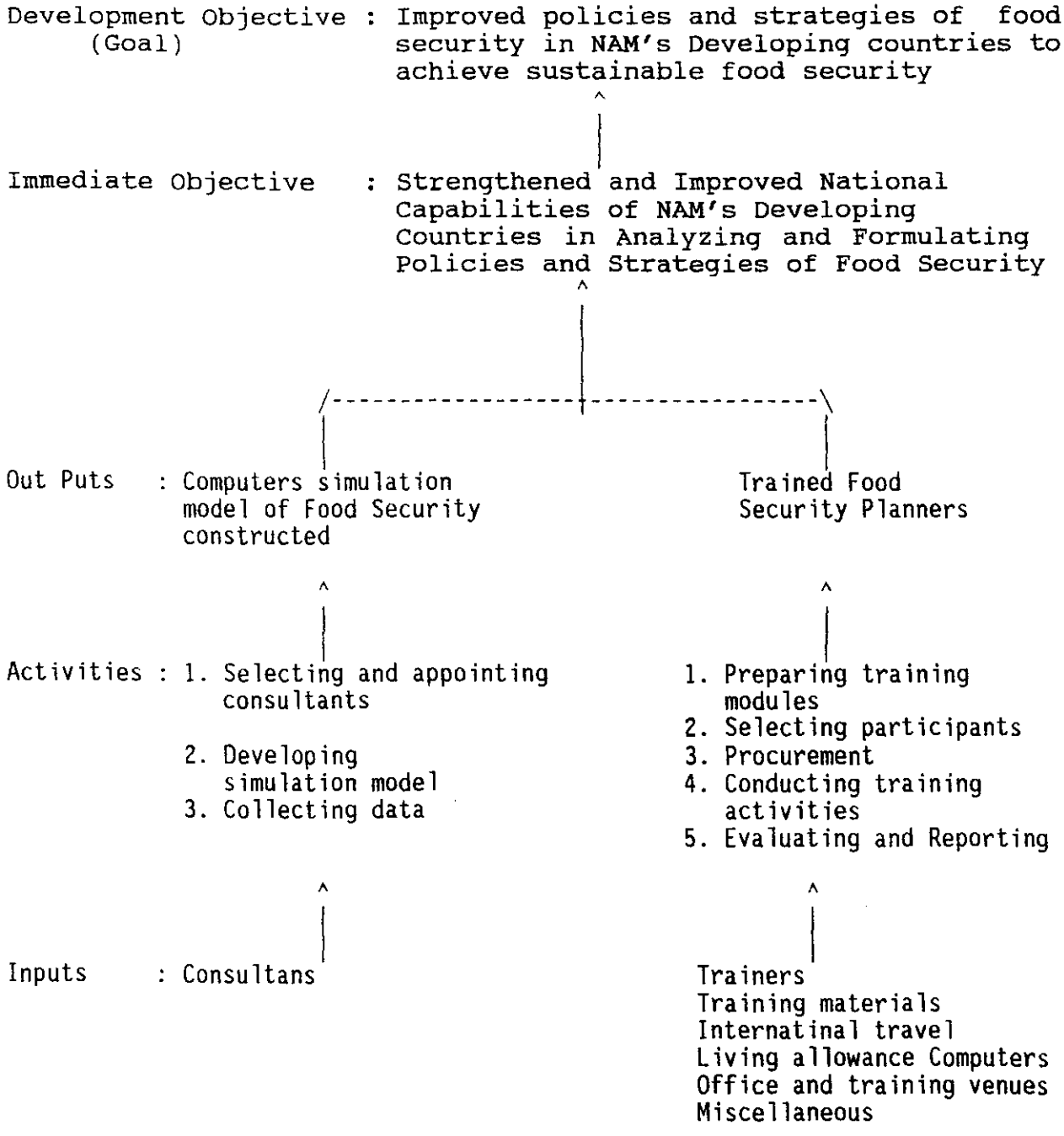
The workplan of the projects implementation and a detailed account of the projects input and budget is presented in Annex 2 and 3 respectively.

V. INPUTS TO BE PROVIDED BY HOST COUNTRY (INDONESIA)

1. Project preparation
2. Project's office and facilities
3. Training center facilities and staff salary
4. Project staff salary
5. Follow up national training program and dissemination of model.

Annex 1.a

INPUT - OUPUT - RELATIONSHIPS OF TRAINING OF THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN NAM'S DEVELOPING COUNTRIES



OVERVIEW OF PROJECT ACTIVITIES AND OUTPUTS

	Activities	Purpose of Activities	Duration	No of Participant	Source of Fund	Output
1	Notification to Asia & African Countries	To solicit agreements for participants from Asia & Africa Countries	2 months	-	-	List of countries willing to participate in the project
2	Appointment of Consultant	To hire consultant to construction of the model	2 months	-	-	Consultant hired
3	Procurement of hardware and software	This is needed for development of model	2 months	Project management	PGTF	Computer hardware and software installed
4	Data collection	To Construct of a Computer Simulation Model	2 months	5 participants from Indonesia	PGTF	Data production related to the Food, Stcok, Supply Demand and Price
5	Model Construction	To detailed description of the model	4 months	Consultant National	PGTF	Computer Simulation Model Construction
6	Training					
	6.1. Asia & Africa Training for Trainers	To train the trainers who will in turn train participants in their respective countries in the use of a Computer Simulation Model for forecasting supply, demand and price of Food	12 day	7 participants from Indonesia	PGTF	- Food Security (12 Trainers) - Trained Personnel who will be trainers in respective countries
	6.2. National Training for commodity analyst in respective countries	Enable the trainers to train other officers in respective countries		Varies according to the needs and resources of the countries	Local	- Food Security (120 officers)

Annex-2

WORKPLAN AND PRELIMINARY TIME SCHEDULE

No.	ACTIVITY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1	Administrative	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	- notification to Asia & Africa countries	.....	.....										
	- Appointment of consultants	.....	.....										
	- procurement		.....										
2	Data collection		.....	.....	.....								
3	Construction of the model by the consultnats		.....		.....	.....	.....	.....					
4	Issue of invitations		.....			.....							
5	Asia & Africa Training for Trainers						.....						
6	Dissemination of Report							.....					.....

SCHEDULE OF SERVICES AND FACILITIES TO BE PROVIDED BY THE SUB-CONTRACTOR

No.	Activities	Details of Expenditure	Amount ($US)	Source of Funding
1	Data Collection	Team members	2,500	PGTF
2	Construction of a Computer Simulation Model Implementation	Consultants		PGTF
	Local Consultant	2x4x US$ 750	6,000	
3	Asia & Africa Training for Trainers	- Airfare Participant from		PGTF
		(1) Bangladesh 1xUS$1,730	1,730	
		(2) India 1xUS$1,205	1,205	
		(3) Nigeria 1xUS$4,590	4,590	
		(4) Senegal 1xUS$4,475	4,475	
		(5) Sudan 1xUS$2,700	2,700	
		(6) Indonesia 7 xUS$150	1,050	
		- Accommodations (US$100/day/person) 12 x 12 x US$100	14,400	
		- Perdiem US$50/day/person 12 x 12 x US$50	7,200	
		- Local Travel US$3,000	3,000	
		- Training Facilities US$2,000	2,000	
		- Honorarium for Instructor (US$50/hour) 9 x 7 x US$50	3,150	PGTF
4	Procurement	- 2(Two) PC's- 486DX2 8MB RAM, 210MB HDD, 2 HD FDD, SVGA Monitor, Mouse, - 1(One) HP LaserJet 4+ , 1(One) Epson LQ-1070+ - 2(Two) UPS-ICA102B - 2(Two) Table & Chairs	10,000	PGTF
5	Secretariat		5,000	PGTF
6	Final Report	- Report (US$1,000)	1,000	PGTF
		Total PGTF contribution	70,000	

Country:	Interregional
Project Number:	INT/94/K04/A/95/99
Project Title:	Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

	Total $
Personnel (Consultants)	8,500
Travel (Asia & Africa Trainers)	45,500
Equipment	10,000
Miscellaneous	6,000
Project total	70,000

The Account Number to which the transfer of disbursement should be made is 108-04247517.

The name of Bank is Bank Bumi Daya (BBD), Pasar Minggu Branch, Jakarta Selatan, Indonesia.

Institutional framework

The Office of the Chairman of the Group of 77, located on the 39th floor of the UN Secretariat Building, shall be the Executing Agency for the Project. The Executing agency shall subcontract project implementation to the Ministry of Agriculture, Republic of Indonesia in accordance with the UNDP procedures. The subcontract shall be awarded within a month of signature of this document and shall be the basis of a separate document to be signed by the two parties. As executing agent for the project, the Office of the Chairman of the Group of 77 will be responsible for the financial reporting requirements foreseen under the UNDP's government execution procedures in annex to this document.

MONITORING EVALUATION AND REPORTS

Schedule of review

The review of the status of the implementation of the project will be undertaken by the Committee of Experts of the Perez-Guerrero Trust Fund (PGTF) for ECDC. The Committee's recommendations are submitted to an annual meeting of the Ministers of Foreign Affairs of the Group of 77 for endorsement as appropriate.

Progress and Terminal Reports

The final report and studies resulting from the project shall, for purposes of the project, be considered the terminal report.

Project Budget

The total budget of the project for six months has been estimated at US$70,000. The contribution from the Perez-Guerrero Trust Fund (PGTF) shall be US$70,000.

Country:	Interregional
Project No.:	INT/94/K04/A/95/99
Title:	Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM

40	SUBCONTRACT	
	41 Subcontract	**US$ 70,000**
99	**PROJECT TOTAL**	**US$ 70,000**

(For PGTF Funded Projects)

Excerpt from UNDP's & PPM (Sec. 30503, pp.24-41)

Modalities of Project Execution:
Government Execution

6.0 Accounting and financial reporting procedures

6.1 General

1. Governments designated "executing agency" (herein after referred to simply as "Governments") are responsible for the management of all UNDP resources allocated to a government-executed project. In this capacity, Governments are accountable to the Administrator for the entirety of UNDP resources under their management.

Governments are responsible for maintaining an accounting and recordkeeping system that reflects all financial transactions of a government-executed project. In addition, Governments are required to report on the receipt and disbursement of UNDP funds. Governments should not include unliquidated obligations in reports issued to UNDP.

2. The Resident representative has the responsibility for ensuring timely submission of financial reports by Governments and for ensuring that advances of UNDP funds to Governments and UNDP direct payments are made in accordance with the project document, within the limits of the project budget, and on the basis of a written request and certification from the Government.

3. The Accounts Section within the Division of Finance has the responsibility for maintaining an Operating Fund Account by project in which all advances to and disbursements made by a Government are recorded. The Accounts Section also has responsibility for issuing Combined Delivery Reports, in US dollars, for each government-executed project.

4. Co-operating agencies must maintain accounting records and report on funds disbursed by them for government-executed projects in accordance with the agreement entered into between the agency and the Government.

5. The procedures for government execution contained herein apply to all projects financed from UNDP sources of funds and UNDP-administered Trust Funds except for those projects funded from UNCDF. This fund has its own policies and procedures for government execution.

Questions concerning material in this section should be addressed to: Director, Division of Finance, Bureau for Finance and Administration.

(ii) Advances of funds equal to or less than US $10,000

1. In instances when an Advance Authorization is used for a project, requests from Governments for advances of funds that are equal to or less than US $10,000 can be granted by the resident representative provided that the following pre-conditions have been met:

- An Advance Authorization Document has been prepared that includes the authorized project budget (original or revised, as applicable);

- The written confirmations required by section 30108, subsection 3.0, have been provided by the Government;

- A Request for Advance of Funds from UNDP form containing the requisite certification has been submitted to the resident representative by the Government. The amount of funds requested should not exceed 60 days' cash requirements.

2. A sample Request for Advance of Funds from UNDP form is presented as Attachment 1, subsection 6.5, below, pages 36-37.

(iii) Advances of funds in excess of US $10,000

In instances when an Advance Authorization is used for a project, Governments may receive advances of funds that exceed US $10,000 provided that the pre-conditions listed in sub-section (ii), above, have been met and provided that written approval has been obtained from the Director, Division of Finance.

(c) Routine advances of UNDP funds to Governments

1. All requests for advances of UNDP funds to Governments require the approval of the resident representative as described in subsection 6.3 (a), below. Requests should be submitted to the resident representative on the request form referred to in subsection 6.2 (b)(ii), above, and the amount requested should not exceed the amount of funds required to cover disbursements for the next three months.

2. Requests should be submitted to the resident representative at least 15 calendar days prior to the beginning of each calendar quarter.

6. The accounting and financial reporting procedures contained herein define the requirements concerning government execution on a general level. More detailed instructions, forms, and explanations including audit requirements are found in the following documents which are contained in the Government Execution Operational Handbook:

Accounting and Financial Reporting Guidelines for Governments as Executing Agency (GEM)

Finance Manual (FM), section 522: Accounting and Financial Reporting Procedures for Government Execution

Audit Requirements for Government Execution of UNDP-funded Projects (PPM section 30503, subsection 8.0)

The Government Execution Operational Handbook must be made an integral part of every project document.

6.2 Governments as executing agency

(a) Banking arrangements

(i) Separate account for UNDP funds

Governments should establish and maintain separate bank accounts for the receipt and disbursement of UNDP funds. Governments should not commingle funds advanced by UNDP with any other funds.

(ii) Interest earned on UNDP funds

Interest earned on project bank accounts shall be refunded to UNDP annually. Each year, a remittance (in the currency of the advance) should be made to the resident representative within 60 days following 31 December, for all interest credited during the preceding year.

(b) Advances of UNDP funds made under an advance authorization

(i) General

Procedures governing advance authorizations are contained in section 30108, subsection 3.0, Special rule for government-executed projects. Governments should note that the special requirements for Advance Authorizations are in addition to the otherwise applicable government execution procedures.

- Made for goods or services that have been delivered to the satisfaction of the Government or will be delivered pursuant to the terms and conditions of the contract; and

- Made on the basis of original supporting documentation attached to the request."

(e) Accounting books and records

(i) General

1. Governments should maintain an accounting system that contains books, records, and controls sufficient to ensure the accuracy and reliability of project financial information. The project accounting system should also ensure that the receipt and disbursement of UNDP funds is properly identified and that budgetary categories approved in the project document are not exceeded.

2. The system of accounting and recordkeeping must include the advances received and disbursed, co-operating agency expenditures and direct payments made by UNDP. The project accounting system maintained by the Government should also be kept current, with all ledgers and journals "closed out" at the end of each month.

3. A budget control mechanism should be instituted to ensure that requests for direct payments will only be issued if funds are available in the project budget.

(ii) Non-expendable property ledger

Governments should maintain a non-expendable property ledger for the purpose of recording the acquisition and disposition of property and equipment used in a government-executed project. This ledger should contain information on all property and equipment, whether purchased directly by the Government from funds advanced to it, or by the UNDP or a co-operating agency on behalf of the Government.

(iii) Project files

Governments should keep all supporting documentation pertaining to project purchases and payments in a separate set of project files.

(d) Direct payments by UNDP

(i) General

1. UNDP may, upon request from a Government, pay suppliers of goods or services to government-executed projects directly on their behalf. It should be noted, however, that the primary responsibility for the payment process for a government-executed project belongs with the Government.

2. Accordingly, Governments should seek UNDP assistance for the payment of project inputs only when they are unable to do so completely on their own.

3. Requests from Governments for UNDP direct payments should be submitted to the resident representative in writing and signed by an authorized government official. A listing of the authorized government officials and their specimen signatures should be obtained and kept up to date by the resident representative. Payment instructions must contain the payee, bank name, address, account number, and other pertinent instructions. As in the case of advances, Governments should allow 15 days' processing time.

4. In addition, the original documentation must be attached to the request. This original documentation and certified payment request will be forwarded to UNDP headquarters together with the monthly accounts. The Governments should retain a copy of this documentation for their records.

(ii) Required certification

When Governments submit requests to UNDP to pay suppliers directly on their behalf, the authorized government official signing the request should include the following certification language:

"The undersigned authorized government official hereby certifies that the payment being requested has not previously been made and that it will be:

- Made in accordance with the project document;

(iii) Verification and certification of the Combined Delivery Report (CDR)

Upon receipt of the Combined Delivery Report (CDR) (see subsection 6.4 (c), below), which is issued three times a year by UNDP headquarters, Governments must verify the reports with their records and certify them. Any disrepancies should be reported to the resident representative. The CDRs should be returned to the resident representative within 30 days upon receipt.

(iv) Final project reports

When a government-executed project is financially complete (as defined in section 30107, subsection 6.0), Governments should issue final project reports. These reports are the same two described above and would reflect financial activity for the final quarter of the project. The reports should be clearly marked "FINAL" and a refund of any outstanding advance to UNDP should be attached with interest, if any, stated separately.

(g) IPF add-on funds

1. For purposes of accounting and financial reporting, IPF add-on funds received and disbursed by a Government are treated as if the funds were being used for a separate government-executed project. Thus, all accounting records and financial reports required for government-executed projects also are required for activities financed from IPF add-on funds.

2. IPF add-on funds that are earned by a Government and subsequently transferred to UNDP as extrabudgetary resources are no longer considered IPF add-on funds. When this happens, the government execution accounting and financial reporting provisions contained herein no longer apply to those transferred funds.

(h) Other sources of funding

1. Government-executed projects that contain multiple budgets, each financed from a different source of UNDP funds (i.e., IPF, SPR, SIS, SMF/LDCs, and GCCC), require a separate set of project reports for each source of funds. As an example, if a project is partially funded from IPF and partially from GCCC, and the Government is advanced funds from each of these sources, separate reports would have to be issued.

2. This "separate source, separate reports" principle also applies in the case of UNDP Administered Trust Funds that are used in conjunction with other UNDP sources of funds.

(f) Financial reporting

(i) General

Governments' reporting requirements are limited to those funds they actually receive and disburse.

(ii) Required periodic reports

1. Governments are expected to prepare the two financial reports indicated below and submit them to the resident representative within 30 days after the end of each quarter, in English, French, or Spanish. Reports issued in other languages should be accompanied by an official translation in English.

2. The financial reports have been designed to reflect the transactions of a project on a cash basis. Because of this, unliquidated obligations or commitments should not be reported to UNDP.

3. The information furnished on the reports forms the basis of a periodic financial review, and their timely submission is a prerequisite to the continuing funding of a project. Unless the financial reports are received, requests for advances of funds from UNDP will not be honoured by the resident representative.

a. Government disbursement report

1. The purpose of this report is to list the disbursements incurred by component/budget line on a monthly, quarterly, and cumulative basis. The report also is used to verify the balance available in the budget as of a given date.

2. Any refund received by a Government from a supplier should be reflected on this report as a reduction of disbursements on the component and budget line to which it relates.

3. This report is shown as Attachment 2, subsection 6.5, below, pages 38-39.

b. Reconciliation of outstanding UNDP advance/status of funds

1. This report reconciles the funds received from UNDP with the amount expended for budgetary control purposes. This exercise is undertaken in order to calculate the net amount owed to UNDP from the Government as of a given date.

2. This report is shown as Attachment 3, subsection 6.5, below, page 40.

Section, with the following information:

- Supplier's name and address;
- Supplier's bank name, address, and account number;
- Project name and number;
- Currency and amount required; and
- Component/budget line number and description.

2. In addition, the resident representative will confirm in the cable that the required certification from the Government in accordance with subsection 6.2 (d)(ii), above, has been received, that budget availability has been verified and that original documentation has been reviewed and adequately supports the payment request.

(iii) Source documentation and notification

When UNDP field offices pay suppliers directly on behalf of the Government, they must submit copies of all documentation to the Government and they should retain copies for their files.

(c) Recordkeeping

(i) General

Field offices should maintain a government-executed project control system designed to ensure that the resident representative can adequately monitor and control a project's financial activity and budget within the scope of his responsibilities.

(ii) Project financial files

a. Payment transactions

Field offices are expected to maintain an appropriate system of classifying payment transactions for government-executed projects. Such a system would separate advances to Governments from direct payments and would largely consist of files containing copies of disbursement vouchers and relevant documentation. Written requests and certifications from Governments should also be kept in the files.

b. Project financial reports

Field offices should keep copies of all project financial reports in files designated specifically for that purpose. Separate files should be kept for reports issued by the Government, UNDP Accounts Section, and the co-operating agency, if any.

6.3 UNDP field offices

(a) Advances of funds to Governments

(i) Advances in local currency

Local currency advances to the Government should normally be made by the resident representative. Field offices shall, upon receipt of a completed Request for Advance of Funds from UNDP form, verify budget availability and, if adequate, process a Government's request for project funds. Field offices should ensure that the amount requested does not exceed the amount of funds reasonably required to cover disbursements for three months.

(ii) Advances in other currencies

Advances to the Governments in US dollars should be made by the resident representative if this currency is available to him or her. Requests for advances in currencies not available to the resident representative should normally be transmitted to UNDP headquarters. If approved, DOF will make the advance and inform the resident representative by cable. Requests for advances in curencies available to other UNDP field offices should be forwarded thereto, as appropriate.

(iii) Release of funds contingent upon receipt of financial reports

Resident representative should not release or request the release of funds requested by a Government if the Government has failed to submit the two required financial reports described in subsection 6.2 (f), above.

(b) Direct Payments

(i) General

When a written request for direct payment is received along with the requisite original supporting documentation and certification in accordance with subsection 6.2 (d)(ii) from an authorized government official, field offices should verify budget availability and, if appropriate, process a Government's request for direct payment.

(ii) Field Office request for payment by headquarters

1. In instances where the field office requests headquarters to make a direct payment on behalf of a Government, the resident representative shall cable the Chief, Accounts

(b) Recording of payment transactions

(i) Operating Fund Account (OFA)

1. For each government-executed project, a separate Operating Fund Account (OFA) shall be maintained by the Accounts Section. All advances of UNDP funds to a Government are recorded in the OFA, as well as all project disbursements made by the Government (from the advances). Gains and losses resulting from fluctuations in the United Nations operational rate of exchange are also recorded in the OFA.

2. Although the OFA is kept in US dollars, a subsidiary local currency record will be maintained in order to facilitate project reconciliations and to ensure the existence of a complete audit trail.

3. A debit balance in the OFA is treated as a receivable from the Government. When financial assistance to a project is complete, any unspent balance should be refunded to UNDP by the Government.

(ii) Direct payments

Payments made by UNDP (whether by a field office or by headquarters) on behalf of Governments are not treated as advances of funds to Governments and accordingly are not recorded in an Operating Fund Account. These direct payments should be recorded as project disbursements on a budget line-item basis.

(iii) Disbursement of UNDP funds by Governments

Disbursements made by Governments from UNDP funds provided to them shall be recorded both as a reduction of the balance in the OFA and as project disbursements on a budget line-item basis. These disbursements must correspond to the amounts indicated on the Government Disbursement Report submitted each quarter by the Government. The amounts shown on this report are in the currency of the advance and any exchange rate translation is the responsibility of the Accounts Section.

(iv) Co-operating agency expenditures

Expenditure (i.e. unliquidated obligations plus disbursement) reported by operating agencies for a government-executed project shall be recorded as project expenditures on a budget line-item basis.

(d) Reporting

(i) To headquarters

a. Inter-Office Vouchers (IOVs)

1. All payments made by field offices for government-executed projects are to be recorded on a UNDP-GOVT Inter-Office Voucher (IOV) and forwarded in the usual fashion to UNDP Accounts Section each month. These payments include both advances made to Governments and direct payments made by the field office. Copies of disbursement vouchers and certified payment requests or 'Request for Advance of Funds' forms should be attached to the IOV.

2. Original DVs, supporting documentation and certified payment requests or 'Request for Advance of Funds' forms relating to field office and headquarters payments should be forwarded to the Accounts Section together with the monthly accounts.

b. Project financial reports

Field offices shall forward to UNDP Accounts Section the Quarterly Government Disbursement Report and the Reconciliation of Outstanding Advances/Status of Funds, financial reports issued by the Government, and retain copies for their files.

(ii) To Governments

a. Project reports

Field offices shall forward to the Government all project financial reports issued by UNDP Accounts Section and the co-operating agency.

6.4 UNDP headquarters - Accounts Section

(a) Direct payments

1. Requests from field offices for UNDP headquarters to pay suppliers directly on behalf of Governments are to be reviewed and approved for payment by the Accounts Section. Requests from the field office should contain the information referred to in sub-section 6.3 (b)(ii).

2. UNDP headquarters should confirm that the payment has been effected and the resident representative must inform the Government accordingly.

Attachment 1

GOVERNMENT OF: _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP

PROJECT TITLE: _____ PROJECT No. __/__/__/__/__/__

QUARTER: _____ CURRENCY: _____

Component/ Budget Line Number	Component/Budget Line Description	Total Amount for Quarter
10	Project Personnel	
11-99	International Professional	
12-99	OPAS	
13-99	Administrative Support Personnel	
14-99	UNV	
15-99	Official Travel	
16-99	Mission Cost	
17-99	National Professional	
19	Component Total	
29	Subcontracts	
39	Training	
49	Equipment	
59	Miscellaneous	
93*	Support Costs	
	TOTAL	

Plus: Estimate of Current Month's Cash Requirements
Less: Account Balance (Beginning of Current Month) ( )
Petty Cash On Hand (Beginning of Current Month) ( )

Total Advance Requested

VERIFICATION OF BUDGET AVAILABILITY

Annual Budget (from CDR)

Less: Total Advance Requested (from Above) ( )
Total Advances Received Against Current Year's Budget ( )

Amount Still Available in Budget

* Applicable to UNDP Trust Funds Only

(c) Reporting: Combined delivery report

1. Three times per year, the Accounts Section will issue a Combined Delivery Report to the Government through the resident representative for each government-executed project in the country's portfolio. This report shall contain disbursements made by the Governments, field offices, and UNDP headquarters for the periods ending 30 June, 30 September, and 31 December. The report shall also contain co-operating agency expenditures for the periods in which agencies report (semi-annually). A sample of this report is shown in Attachment 4 (see subsection 6.5, below, page 41).

2. Field offices should forward the CDR to the Government within two weeks of the date of receipt.

3. The CDR must be verified and certified by Governments within 30 days of receipt, returned to the resident representatives for on-forwarding to UNDP headquarters.

6.5 Co-operating agencies a/

(a) Funds required for government execution

Funds required by a co-operating agency for government execution will be provided as part of the total monthly remittance requested by the agency for the implementation of UNDP assistance to the projects. Agencies should include their cash requirements for projects in which they participate as co-operating agency in their statements of cash requirements submitted to UNDP Treasury Section.

(b) Reporting

Co-operating agencies having responsibility for certain components of a government-executed project should issue semi-annual expenditure statements in accordance with the letter of agreement entered into between the Government and the agency. The statements should reflect all expenditures by component/budget line and should be submitted to the Government through the resident representative within 30 days after 30 June and 31 December.

---

a/ Co-operating agency procedures are described in section 30503, subsection 5.0.

Attachment 2

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: _ _ _ / _ _ / _ _ _ / _ / _ _ / _ _

CURRENCY: _____ _____

Component/ Budget Line	Component Budget/Line Description	Month 1	Month 2	Month 3	Total for Quarter
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	DPAS				
12-01	DPAS 1				
12-02	DPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
93*	Support Costs				
99	Total Budgetary Categories				

CERTIFICATION

The undersigned authorized government official hereby certifies that the budgetary disbursements shown above have been made in accordance with the project document, that an appropriate refund will be made to the UNDP in the event of any disallowances, and that information supporting the disbursements will be available for audit, if requested.

Date Submitted: _____

Name: _____

Title: _____

Signature: _____

*Applicable to UNDP Trust Funds only

GOVERNMENT OF:_____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP
(BANK INFORMATION AND CERTIFICATION)

BANK INFORMATION

Bank Name:_____ Payment Advice To: _____

Account Number: _____ Contact Person: _____

Bank Address:_____

_____

Certification

The undersigned authorized government official hereby certifies that the projected cash requirements shown on page 1 and the resulting cash request, represent the best estimate of funds needed to cover disbursements for the period indicated. Any funds that are advanced but not disbursed for budgetary purposes will be refunded to UNDP in accordance with the terms and conditions of the project document.

Date:_____ Name:_____

Title:_____

Signature:_____

Attachment 3

GOVERNMENT OF: _____

RECONCILIATION OF OUTSTANDING UNDP ADVANCE/STATUS OF FUNDS
FOR PERIOD FROM _____ TO _____

PROJECT TITLE: _____ PROJECT No. __/__/__/__/__/__

QUARTER: _____ CURRENCY: _____

STEP 1

Outstanding UNDP Advance (Beginning of year)		XXX
UNDP Advances Received This Quarter	XXX	
UNDP Advances Received in Prior Quarters (year-to-date)	XXX	
Total UNDP Funds Received (year-to-date)		XXX
Total UNDP Advance		XXX
Less: Total Disbursements (year-to-date)		(XXX)
Outstanding UNDP Advance		XXX

STEP 2

Account Balance at End of Quarter	
Add: Unresolved/Unreimbursed Disallowances	
Petty Cash on Hand	
Less: Interest Not Yet Refunded to UNDP	(XXX)
Outstanding UNDP Advance	XXX

Date Submitted: _____ Name: _____
Authorized
Government Official)

Title: _____

Signature: _____

GOVERNMENT DISBURSEMENT REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: ___/__/___/__/__/__

CURRENCY: _____ _____

Component/ Budget Line	Description	Annual Budget A	Disbursements for Quarter (from Page 2)	Year to Date B	Available Budget A-B
10	Project Personnel:				
11	International Professional				
11-01	International Professional 1				
11-02	International Professional 2				
11-99	Subtotal				
12	OPAS				
12-01	OPAS 1				
12-02	OPAS 2				
12-99	Subtotal				
13	Administrative Support Personnel				
14	UNV				
14-01	Volunteer 1				
14-02	Volunteer 2				
14-99	Subtotal				
15	Official Travel				
16	Mission Cost				
17	National Professional				
17-01	National Professional 1				
17-02	National Professional 2				
17-99	Subtotal				
19	Component Total				
20	Subcontracts:				
21	Subcontracts				
29	Component Total				
30	Training:				
31	Individual Fellowships				
32	Group Training				
33	In-Service Training				
39	Component Total				
40	Equipment:				
41	Expendable Equipment				
42	Non-expendable Equipment				
43	Premises				
49	Component Total				
50	Miscellaneous:				
51	Miscellaneous				
52	Reports				
53	Sundries				
59	Component Total				
93*	Support Costs				
99	Total Budgetary Categories				

*Applicable to UNDP Trust Funds only

Attachment 4

COMBINED DELIVERY REPORT

GOVERNMENT OF: _____

PROJECT TITLE: _____

PERIOD: _____

PROJECT No: _ _ _ /_ _ /_ _ _ /_ /_ _ /_ _

CURRENCY: _____

Component/ Budget Line	Component/Budget Line Description	Annual Budget A	EXPENDITURE					Available Budget A-B
			UNDP Field Office	UNDP Headquarters	Government	Co-operating Agency	Combined Year to Date B	
10	Project Personnel:							
11	International Professional							
11-01	International Professional 1							
11-02	International Professional 2							
11-99	Subtotal							
12	OPAS							
12-01	OPAS 1							
12-02	OPAS 2							
12-99	Subtotal							
13	Admin. Support Personnel							
14	Law							
14-01	Volunteer 1							
14-02	Volunteer 2							
14-99	Subtotal							
15	Official Travel							
16	Mission Cost							
17	National Professional							
17-01	National Professional 1							
17-02	National Professional 2							
17-99	Subtotal							
19	Component Total							
20	Subcontracts:							
21	Subcontracts							
29	Component Total							
30	Training:							
31	Individual Fellowships							
32	Group Training							
33	In-Service Training							
39	Component Total							
40	Equipment:							
41	Expendable Equipment							
42	Non-expendable Equipment							
43	Premises							
49	Component Total							
50	Miscellaneous:							
51	Miscellaneous							
52	Reports							
53	Surveys							
59	Component Total							
93*	Support Costs							
99	Total Budgetary Categories							

*Applicable to UNDP Trust Funds only

PERMANENT MISSION OF THE REPUBLIC OF INDONESIA
TO THE UNITED NATIONS
NEW YORK

No. 338/EC - 301/95

The Permanent Mission of the Republic of Indonesia to the United Nations presents its compliments to the Office of the Chairman of the Group of 77 and with reference to the latter's letter, No. 238/EC - 301/95 dated 24 February 1995, concerning Indonesia's proposed project entitled, "Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries", has the honour to transmit herewith an original document.

The Permanent Mission of the Republic of Indonesia to the United Nations avails itself of this opportunity to renew to the Office of the Chairman of the Group of 77 the assurances of its highest consideration.

New York, 17 March 1995

Office of the Chairman of the Group 77
United Nations Secretariat Building
Room S-3959/39th Floor
New York

PEREZ-GUERRERO TRUST FUND
FOR ECONOMIC AND TECHNICAL COOPERATION
AMONG DEVELOPING COUNTRIES MEMBERS OF THE GROUP OF 77

PROJECT DOCUMENT

Country	:	Interregional
Title	:	Training on the Use of a Computer Stimulation Model for Food Security Analysis in Developing Countries of the NAM
Number	:	INT/9-/K--/A/95/99
Submitted by	:	The Ministry of Agriculture, Republic of Indonesia
Beneficiaries	:	NAM Countries
Duration of Project	:	6 (six) months
Estimated starting date	:	March 1995

Perez-Guerrero Trust Fund Inputs :	(US) $ 70,000.00
Other Inputs (UNEP, UNSO,FAO, IFAD)	(US) $ -
Total cost of the Project :	(US) $ 70,000.00

This project is to be executed by the Office of the Chairman of the Group of 77 under UNDP's Government Execution arrangements with a subcontract to be awarded to, Minstry of Agriculture, Republic of Indonesia, as subcontractor within a month of signature of the project document.

Chairman of the Group of 77
Ambassador Felipe Mabilangan
Permanent Representative of the Philippines
to the United Nations

Date

On behalf of UNDP
Denis Benn
Director
Special Unit for TCDC

Date

PEREZ-GUERRERO TRUST FUND
FOR ECONOMIC AND TECHNICAL COOPREATION
AMONG DEVELOPING COUNTRIES MEMBERS
OF THE GROUP 77

PROPOSED

Project of the Government of The Republic of Indonesia

PROJECT TITLE	:	TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF N A M
PROJECT NUMBER	:	
STARTING DATE	:	March 1995
COMPLETION DATE	:	September 1995
GOVERNMENT / MINISTRY RESPONSIBLE FOR PROJECT EXECUTION	:	MINISTRY OF AGRICULTURE OF THE REPUBLIC OF INDONESIA
PGTF CONTRIBUTION	:	US $. 70,000,00

(on behalf of the United Nations Development Programme)

(on behalf of the Group 77)

I. BACKGROUND AND JUSTIFICATION

Food Security was considered as a prime concern at the Tenth Summit Meeting of Non Aligned Movement (NAM) held in Jakarta in September 1992. During the meeting, the Heads of State or Government reviewed the food situation in the NAM and other developing countries. They approved the Resolution on Food Security which expressed a deep concern on the number of people plagued by hunger and malnutrition, which has increased in the past decade, despite the ability of the world to increase food output firstly.

In order to handle the pressing issues on the food security problems, general meetings had been conducted in Indonesia to support the preparation of a ministerial meeting on Food and Agriculture of the NAM on Food Security which was commenced by two informal meetings of Food Experts from NAM Countries and international organizations taken place in Rome in October 1992 and in Jakarta in February 1993. Ad-hoc Advisory Group of Experts on Food Security of the NAM countries had been conducted a meeting in Jakarta from 25 to 28 January 1994 and the results of the meeting had been submitted to the Conference of Ministers of Food and Agriculture of the NAM on Food Security convened in Bali-Indonesia in October 1994.

The problems of food security, despite low productivity, include the availabity of food with better qualities. Pricing policies on several food commodities can alter the availability and supply of food with various qualities. Therefore, the lack of ability to predict and create a model to ensure food security mechanisms is a serious issue to be overcome by the NAM member countries.

An appropriate pricing policies and the operation of National Food Authority become more challenging and need more detailed operating procedures. This is to ensure, not only the availability of food with better qualities, but to increase farmers' income as well.

Globalization and regional economic trend toward regional trade and economic cooperation are other recent issues which express the importance of strengthening South-South cooperation to ensure Food Security among members of the NAM and other developing countries. A series of proposed programmes had been recommended for enhancing food security and have been adopted by the Conference of Ministers of Food and Agriculture of the NAM on Food Security which are included : (1) Training and exchange of information on the design and management of relevant projects, (2) Technology Generation and Dissemination, (3) Input Supply and Production, (4) Institution Building through the decentralization and strengthening of national capacity, (5) Trade and (6) Political Cooperation, to galvanize the unutilized potential of NAM member countries to arrest the decline of interest in, and support for, agricultural development and food security in developing countries.

From the above-mentioned reasons and the availability of Peresz-Guerrero Trust Fund (PGTF) giving G-77 member countries an opportunity to develop their ability in creating a model for ensuring food security in each and among the member countries, Indonesia proposes : Training on the Use of A Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM.

Regarding the characteristics of a country's food security problems, the nature of the food insecure population, resources availability, institutional capabilities, and the possibility of regional food security research scheme,

first priority will be given to the developing countries of the NAM and members of G-77 such as : Senegal, Uganda, Sudan, Tanzania, Gambia, Nigeria, Zimbabwe, Kenya, Zambia, Ghana, Bangladesh, India and Indonesia. As a pilot project, this project could be widened to cover the NAM and other developing countries members of G-77 with larger regionalization whenever the outputs of the project can be implemented successfully.

II. OBJECTIVES

A. Development objective

Improved Policies and Strategies of Food Security in Developing Countries of the NAM to achieve sustainable food security.

B. Immediate objective

Strengthened and improved national capabilities of NAM's Developing Countries in analyzing and formulating Policies and Strategies of Food Security. This objective could be achieved if each government provides instutitional and operational support as well as effective national training programme on food security.

7. Discussion of model simulation results
   - model structure
   - applicability for policy use
   - improvements
   - Further action

8. National food security analysis and policy formulation exercises.

III. OUTPUT AND ACTIVITIES OF THE PROJECT

The main outputs and activities of the project are summarized below. The Matrix in Annex.1 provides a more detailed relation of this project activities and outputs.

A. Output 1. Computer simulation model of food security constracted.

Activities :

1. Selecting and oppointing consultants
2. Developing of computer simulation model by consultant to be used by participants of the training.
3. Collecting data by candidates of the participants of the training to used in the training for preparing national food security strategies.

B. Output 2. Trained food security planners of selected developing countries of NAM.

Activities :

1. Developing training curriculum and modules.
2. Sending information and invitation to participating countries.
3. Selecting participants of the training.

4. Procurement of training facilities.
5. Conducting 12 days training activities.
6. Evaluating training program.
7. Reporting training activities and outputs.

IV. INPUTS TO BE PROVIDED BY PGTF

1. Personnel
   National Consultants

2. Equipment
   Two personal Computers, printer and other equipment.

3. International Travel
   12 participants from Africa and Asia

4. Training
   Training facilities, accommodation, per diem allowance, field trip and instructor's honoraria

5. General Operating Expenses
   General operating expenses related to the project, including preparation, reproduction of documents, budget for secretariat assistance, local transportation and cost of communication.

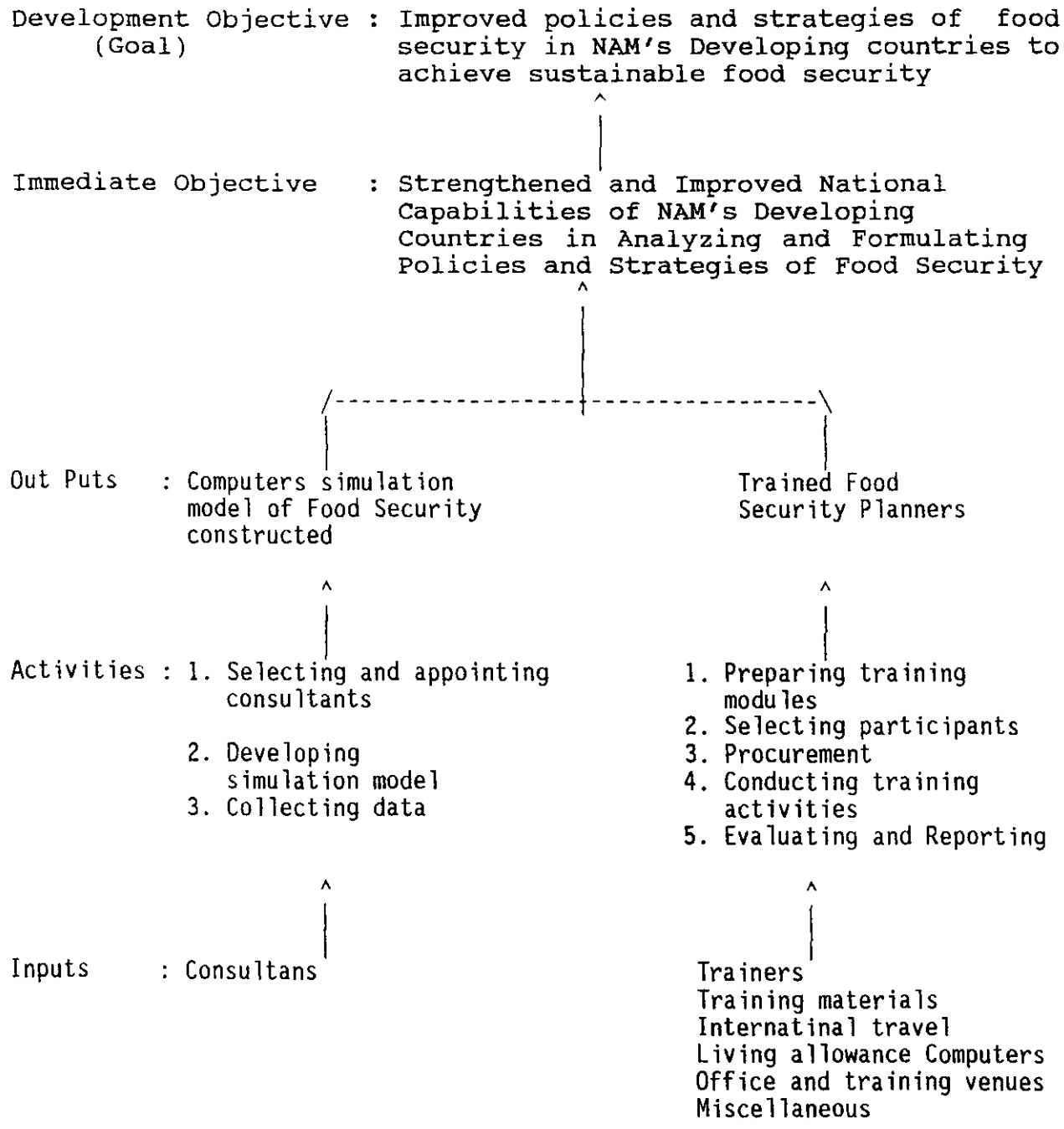
6. Preparation and dissemination of report

The workplan of the projects implementation and a detailed account of the projects input and budget is presented in Annex 2 and 3 respectively.

V. INPUTS TO BE PROVIDED BY HOST COUNTRY (INDONESIA)

1. Project preparation
2. Project's office and facilities
3. Training center facilities and staff salary
4. Project staff salary
5. Follow up national training program and dissemination of model.

INPUT - OUPUT - RELATIONSHIPS OF TRAINING OF THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN NAM'S DEVELOPING COUNTRIES



OVERVIEW OF PROJECT ACTIVITIES AND OUTPUTS

	Activities	Purpose of Activities	Duration	No of Participant	Source of Fund	Output
1	Notification to Asia & African Countries	To solicit agreements for participants from Asia & Africa Countries	2 months	-	-	List of countries willing to participate in the project
2	Appointment of Consultant	To hire consultant to construction of the model	2 months	-	-	Consultant hired
3	Procurement of hardware and software	This is needed for development of model	2 months	Project management	PGTF	Computer hardware and software installed
4	Data collection	To Construct of a Computer Simulation Model	2 months	5 participants from Indonesia	PGTF	Data production related to the Food, Stcok, Supply Demand and Price
5	Model Construction	To detailed description of the model	4 months	Consultant National	PGTF	Computer Simulation Model Construction
6	Training					
	6.1. Asia & Africa Training for Trainers	To train the trainers who will in turn train participants in their respective countries in the use of a Computer Simulation Model for forecasting supply, demand and price of Food	12 day	7 participants from Indonesia	PGTF	- Food Security (12 Trainers) - Trained Personnel who will be trainers in respective countries
	6.2. National Training for commodity analyst in respective countries	Enable the trainers to train other officers in respective countries		Varies according to the needs and resources of the countries	Local	- Food Security (120 officers)

Annex-2

WORKPLAN AND PRELIMINARY TIME SCHEDULE

No.	ACTIVITY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1	Administrative	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	- notification to Asia & Africa countries	.....	.....										
	- Appointment of consultants	.....	.....										
	- procurement		.....	.....									
2	Data collection		.....	.....	.....								
3	Construction of the model by the consultnats		.....		.....	.....	.....	.....					
4	Issue of invitations		.....	.....	.....	.....	.....						
5	Asia & Africa Training for Trainers						.....						
6	Dissemination of Report							.....					.....

SCHEDULE OF SERVICES AND FACILITIES TO BE PROVIDED BY THE SUB-CONTRACTOR

No.	Activities	Details of Expenditure	Amount ($US)	Source of Funding
1	Data Collection	Team members	2,500	PGTF
2	Construction of a Computer Simulation Model Implementation	Consultants		PGTF
	Local Consultant	2x4x US$ 750	6,000	
3	Asia & Africa Training for Trainers	- Airfare Participant from		PGTF
		(1) Bangladesh 1xUS$1,730	1,730	
		(2) India 1xUS$1,205	1,205	
		(3) Nigeria 1xUS$4,590	4,590	
		(4) Senegal 1xUS$4,475	4,475	
		(5) Sudan 1xUS$2,700	2,700	
		(6) Indonesia 7 xUS$150	1,050	
		- Accommodations (US$100/day/person) 12 x 12 x US$100	14,400	
		- Perdiem US$50/day/person 12 x 12 x US$50	7,200	
		- Local Travel US$3,000	3,000	
		- Training Facilities US$2,000	2,000	
		- Honorarium for Instructor (US$50/hour) 9 x 7 x US$50	3,150	PGTF
4	Procurement	- 2(Two) PC's- 486DX2 8MB RAM, 210MB HDD, 2 HD FDD, SVGA Monitor, Mouse, - 1(One) HP LaserJet 4+ , 1(One) Epson LQ-1070+ - 2(Two) UPS-ICA102B - 2(Two) Table & Chairs	10,000	PGTF
5	Secretariat		5,000	PGTF
6	Final Report	- Report (US$1,000)	1,000	PGTF
		Total PGTF contribution	70,000	

Country	:	Indonesia
Project Number	:	INT/9-/K--/A/95/99
Project Title	:	Training on the Use of a Computer Stimulation Model for Food Security Analysis in Developing Countries of the NAM

	Total
Personnel	8,500.00
Travel	45,500.00
Equipment	10,000.00
Miscellaneous	6,000.00

Project total	70,000.00
	========

PERMANENT MISSION OF THE REPUBLIC OF INDONESIA
TO THE UNITED NATIONS
NEW YORK

No. 651/EC-101/VI/97

The Permanent Mission of the Republic of Indonesia to the United Nations presents its compliments to the Office of the Chairman of the Group of 77 and, with reference to the latter's letter dated 23 May 1997 concerning *the Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM (INT/94/K04),* has the honour to transmit a copy of the progress report and the statement of expenditure which is financed by the Perez-Guerrero Trust Fund (PGTF) for ECDC/TCDC. The original progress report will be submitted as soon as it has been received at the Permanent Mission.

The Permanent Mission of the Republic of Indonesia to the United Nations avails itself of this opportunity to renew to Office of the Chairman of the Group of 77 the assurances of its highest consideration.

New York, 24 June 1997

PERMANENT MISSION OF INDONESIA TO THE UNITED NATIONS

Office of the Chairman of the Group of 77
United Nations Headquarters,
New York, N.Y. 10017

RECEIVED
JUN 24 1997

REPORT
OF THE TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF NAM

I. BACKGROUND

01. The Ministry of Agriculture of the Republic of Indonesia has been awarded grant amounting to a sum of US $ 70,000 from Perez-Guerrero Trust Fund (PGTF) of G-77 to conduct a training program on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of Non-Aligned Movement (NAM).

02. The Project is proposed by Indonesian Government in order to follow up the results of the Conference of Ministers of Food and Agriculture of the NAM on Food Security held in Bali in 1994 in which were proposed encompassing among others :

a. Training and exchange of information;
b. Technology generation and transfer;
c. Input supply and production;
d. Institution building;
e. Trade; and
f. Policy Reforms.

II. OBJECTIVES

03 The main objective of the project was to improve policies and strategies on Food Security in Developing Countries of the NAM to achieve sustainable food security. Specifically, the immediate objective of this project was to strengthen and improve national capabilities of NAM's developing countries in analyzing and formulating policies and strategies on Food Security.

III. PROJECT OUTPUTS

04. The outputs expected from the project were :

a. Computer Simulation Model
b. Trained Food Security Trainers and Planners
c. Computer-based system (installed computer hardware and software) for forecasting supply, demand and prices of major agricultural commodities in NAM Countries

IV. PROJECT MANAGEMENT

05. This project has been executed by the Ministry of Agriculture (MOA) of the Republic of Indonesia. The Project Management comprised of the following personnels :

Project Coordinator	:	**Mr. Suharyo Husen** Director, Bureau for International Cooperation of MOA
Project Manager	:	**Mrs. Subiyanti Sa'ud, M.Agr.St.** Head of Bilateral Division, Bureau for International Cooperation of MOA
Project Secretariat	:	**Mr. Nyoman G. Widhi Adnyana** Head of Africa and Middle East Sub-division, Bureau for International Cooperation of MOA
Treasurer	:	**Dewi Pudjiastuti** Staff, Bureau for International Cooperation of MOA
Liaison between PGTF and Project Management	:	**Mr. R. Muhamad Benyamin Carnadi** Staff, Directorate for Economic Relations Among of Developing Countries, Ministry of Foreign Affairs.

06. The Project Management was responsible for the following tasks :

a. Project coordination among participant countries
b. Control and disbursement of PGTF Funds
c. Overseeing the project implementation and
d. Evaluation and reporting the progress of the project

07. Technical inputs to the project were provided by a project team consisting of :

a. Project manager
b. National consultants

The National Consultants consisted of the following personnels :

a.	Food Security Analyst Specialist	:	**Dr. Tjuk Eko Hari Basuki**
b.	Training Specialist	:	**Mrs. Budiarti R., M.Sc.**

08. The National Consultants were responsible for the following activities:

a. **Food Security Analyst Specialist**

(1). To coordinate and supervise the project's team members in the collection of data for constructing computer simulation model for food security analysis

(2). To analyze data for construction of computer simulation models for food security analysis

(3). To construct a computer simulation model as follow:

a. Modeling of food supply, demand and prices :

(I) structure model
(ii) supply model
(iii) demand model
(iv) prices model
(v) stock model

b. Regression analysis

(I) equations model

c. Regression analysis using Time Series Package (TSP) software

(I) data generate
(ii) graphs
(iii) regression analysis

d. Changing the model

(I) re estimation of parameters
(ii) determining policy parameters

e. Computer Simulation Model of Food Security

(I) data input
(ii) specification
(iii) parameter changes
(iv) simulation and forecast in Lotus 123

(4). To train food security analysis capable of using the computer simulation model for food security analysis in developing countries of NAM

(5). To evaluate the training

(6). To prepare final report on the activities carried and during the subscriber assignment.

b. Training Specialist

(1). To prepare training manuals and training kit including training models for participants in close coordination with the food security analyst specialist.

(2). To coordinate and supervise the preparation of training schedules for the project capable of using the computer simulation model for food security analysis in developing countries of NAM.

(3). To train food security analysis capable of using the computer simulation model for food security analysis in developing countries of NAM.

(4). To evaluate the training.

(5). To prepare final report on the activities carried out during the subscriber assignment.

V. IMPLEMENTATION OF THE PROJECT

09. The complete list of activities appears in Table 1

Table 1. : Schedule Activities of the Project from March 1995 to April 1996

	Activities	Proposed Date of Completion	State of Progress
1	Project Administration	March 1995	Completed
2.	Appointment of Consultants	March 1995	Completed
3.	Notification to Asia & Africa Countries	March 1995 - June 1995	Completed
4.	Data Collection	March 1995	Completed
5.	Construction of Simulation Model	April 1995 - July 1995	Completed
6.	Procurement of Hardware - Two Wearners 486/ DX 2-8 Mb RAM 210 Mb HDD. 2 HD. FDD. SVGA Monitor - Two Note Book USA-COM 486 SLC 2-50 Colour - Printer HP Desk Jet 600 C - Epson LQ-1070 + - Two UPS - ICA 10213	July 1995	Completed
7.	Asia and Africa Training for Trainers	1-12 August 1995	Completed
8.	Preliminary Progress Report	December 1995	Completed
9.	Post Evaluation	March 1996	Completed
10.	Final Report	April 1996	Completed

THE TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF NAM

10. The Training on the Use of a Computer Simulation Model for Food Security Analysis was conducted in the Agricultural In-Service Training Center (BLPP) Ciawi-Bogor, Indonesia from 1 to 12 August 1995. The training was opened by H.E. Mrs. Saodah BA. Syahruddin, the Ambassador of the Republic of Indonesia to the United Nations. Because of its intensive and applied computer-based character, the Training had to be limited to 13 participants from 6 (six) invited countries (Bangladesh, India, Indonesia, Nigeria, Sudan and Senegal). Due to delay in transferring air ticket from appointed airlines to Nigerian's participant, one Participant was not able to participate the Training. The list of the participants is appended as **Annex 1.**

11. The objective of the Training was to improve the capability of participants in methods of analysis of the information of data on supply, demand and prices of major agricultural commodities, such as rice, corn, soybean, livestock products etc., to improve policy and strategy formulation in achieving sustainable food security. By the end of the Training Program, the Participants were expected to be able to understand and develop model for forecasting supply, demand and prices for major agricultural commodities for their respective countries.

12. The Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM was in general divided into three parts as follows:

Part I. Concepts of demand and supply accompanied with statistical tools for estimation parameters in demand and supply functions and the use of microcomputers for policy analysis.

Part II Topics on consumption, production and marketing with Indonesia as a special case.

Part III. An example of computer simulation model for food security policy with Indonesia as a special case.

The complete programs of the Training were as follows :

- Use of Personal Computer
- Spreadsheet program (LOTUS 123)
- Elasticities
- Demand Analysis
- Supply Analysis
- Regression Analysis
- Demand Projection
- Supply Projection
- Food Security Simulation

13. The Training started on Tuesday, 1 August 1995 and completed on Saturday, 12 August 1995. Daily training sessions were held from 8 a.m. to 5.30 p.m. with two short coffee breaks and lunch break.

14. The Training was commenced with an introduction by consultants on information in general of using a computer in particular for policy analysis. In advance, the participants were introduced by using LOTUS 123 spreadsheet software as one of a tool for computation.

15. The participants were invited to refresh the theories on demand, supply and prices as well as statistical analysis using regression basing on data availability.

16. The participants carried out exercises using personal computers to familiarize themselves with the annual model of supply, demand, and prices. They undertook regression analysis in an effort to further improve the estimated structural relationships for production, consumption and price, which could then incorporated in the model. In a discussion on these exercises, the participants made suggestions regarding the inclusion of exchange rates and social factors in smallholdings supply function.

17. Furthermore the participants were invited to project demand and supply on data availability of some main Indonesian agricultural commodities by using regression analysis which was followed by doing simulation on Food security with data on food consumption food production and food availability as well as considering agricultural marketing and food distribution.

18. In order to provide the participants as a trainer, the participant were also invited to discuss "Training for Trainer" session. In this session the participants discussed a plan for an effective training with preparing a task analysis, setting training objectives and formative evaluation procedures and building the training group.

19. The Training strongly felt after completion of the program, it would be beneficial for participants from the NAM member countries to inform each other on updating and other improvements that they had made, particularly as regards supply projections, and to coordinate further work on the simulation model.

20. At the end of the Training, an evaluation exercise was conducted to asses the usefulness of the Training.

21. To evaluate the useful of training to their home countries, post evaluation is needed to be done after 6 month course. Therefore, an evaluation to India and Bangladesh was conducted on March 1996.

22. The complete Final Report of the "Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM" is submitted after Post Evaluation been done on March 1996.

POST EVALUATION OF THE TRAINING

23. The post evaluation was done in March 1996 by sending a form to each participants in order to evaluate the follow-up so far done by participants. Response from the participants will be usefull to evaluate target needs of the project.

VI. STATEMENT OF ACCOUNT

21. The following Table 2, shows the description and amount of expenses borne by the project during March 1995 through April 1996.

Table 2

STATEMENT OF ACCOUNT
Perez Guerrero Trust Fund
for the Training on the Use of a Computer Simulation Model
for Food Security Analysis in Developing Countries Non-Aligned Movement

No.	Description	Amount (US $)	Description	Amount (US $)
	Receipt		**Payment**	
1.	Data Collection	2,500.00	Team members for Data Collection (a)	2,500.00
2.	Construction of a Computer Simulation Model Implementation Local Consultants		Construction of a Computer Simulation Model Implementation Local Consultants 2 x 4 x US $ 750 (b)	6,000.00
3.	Asia & Africa Training for Trainers : * Airfare for Participants	15,750.00	Asia & Africa Training for Trainers Airfare for Participants from : (c)	11,160.00
			1 person from Bangladesh 1 x US $ 1,730	1,730.00
			1 person from India 1 x US $ 1,205	1,205.00
			1 person from Nigeria 1 x US $ 4,590	0.00
			1 person from Senegal 1 x US $ 4,475	4,475.00
			1 person from Sudan 1 x US $ 2,700	2,700.00
			7 persons from Indonesia 7 x US $ 150	1,050.00
	* Accommodation	14,400.00	Accommodation for 12 Paricipants 2 rooms for Instructors and OC (d)	14,400.00
	* Perdiem	7,200.00	Perdiem 11 x 12 x US $ 50 (e)	6,600.00
	* Local Travel	3,000.00	Transportation (f) - Rental Car/Bus during the Course - Immigration Administration - Others	3,000.00

9/12

No.	Description	Amount (US $)	Description	Amount (US $)
	Receipt		**Payment**	
	• Training Facilities	2,000.00	Training Facilities (g) - Executive Seminar Map - Block Note - Brousure (General Information) - Book Reference - Diskettes - Computer Paper - TSP - Computer Ribbon - Card Identity for Participants, Instructors and OC	2,000.00
3.	• Honorarium for Instructor	3,150.00	• Honorarium for Instructor (h) 03 hours x US $ 50	3,150.00
4.	Procurement	10,000.00	Procurement (i) - Two Wearnes 486/DX2- 8Mb Ram, 210 Mb HDD, 2 HD FDD, SVGA Monitor - Printer HP Deskjet 600C - Printer Epson LQ-1700 - Two UPS-ICA 102B - Two Note Book USA COM 486 SLC 2-50 Colour	14,690.00
5.	Secretariat	5,000.00	Secretariat (j) - Correspondence - Preparation Meetings - Stationary - Certificate - Documentation/Photograph - Honorarium for SC and OC - Others	5,000.00
6.	Dissemination of the Report	1,000.00	Progress and Final Report and Dissemination of the Report (k)	1,500.00
	GRAND TOTAL	70,000.00		70,000.00

Receipt, Payment and Balance in US$ at conversion rate 1 US $ = Rp 2,200.-

Subiyanti Sa'ud
PGTF Project Manager

Dewi Pudjiastuti
Treasurer

Mr. Suharyo Husen
PGTF Project Coordinator,
Director, International Cooperation Bureau
Ministry of Agriculture

10 8
12

ANNEX I

Training on
the Use of a Computer Simulation Model
for Food Security Analysis in Developing Countries
of Non-Aligned Movement
Ciawi Bogor, Indonesia, 1-12 August 1995

LIST OF PARTICIPANTS

NO.	COUNTRY	NAME/OCCUPATION
1.	Bangladesh	Ms. Monwara Begum Assistant Chief Ministry of Agriculture
2.	India	Mr. Rajiv Kumar Bora, I.A.S. Deputy Secretary Ministry of Food Government of India
3.	Indonesia	Binari Sinurat, SE, MS Agency for Agribusiness Development Ministry of Agriculture
4.	Indonesia	Mr. Masdulhaq Yumm, MPA Center for Technology & Economic Research National Logistics Agency
5.	Indonesia	Mr. Dadang Kusnandi, MBA Head of Division Market and Prices Analysis, National Logistics Agency
6.	Indonesia	Ms. Anastasia Promosiana, MS Directorate General of Food Crops and Horticultura Ministry of Agriculture

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No. 3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609,2610 ; 7806174 Fax :(021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

Training on
the Use of a Computer Simulation Model
for Food Security Analysis in Developing Countries
of Non-Aligned Movement

Ciawi-Bogor, Indonesia, 1-12 August 1995

7.	Indonesia	Mr. Iskandar Panjaitan Bureau for International Cooperation, Ministry of Agriculture
8.	Indonesia	Mr. Hasudungan Batubara Bureau for International Cooperation, Ministry of Agriculture
9.	Indonesia	Ms. Roch Widaningsih Center for Agricultural Data, Ministry of Agriculture
10.	Indonesia	Ms. Dyah Niniarsi Triyanti Center for Agricultural Data, Ministry of Agriculture
11.	Nigeria	Mr. Abugu John Ohgebudri Ministry of Agriculture
12.	Senegal	Mr. Moussa Cisse Chief Cell of Studies and Information, in Charge of Market Information System Food Security Office, General Secretary of the Government Prime Ministry
13.	Sudan	Mr. Salih Hussein Mohamed Head of Computer Center, Dept. of Agric. Economics & Statistics Ministry of Agriculture

list – p/dewi

Organized by the Ministry of Agriculture of the Republic of Indonesia
Jl. Harsono RM. No. 3 Pasar Minggu Jakarta 12550, Indonesia
Tel : (021) 7806131; 7804116 Ext. 2609,2610 ; 7806174 Fax :(021) 783237; 7806174
in Collaboration with Perez-Guerrero Trust Fund of the Group 77

12
12

THE GROUP OF 77

New York
Office of the Chairman

L-067/97 URGENT 23 May 1997

Excellency,

Subject: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM (INT/94/K04)

I have the honor to refer to the above-mentioned project implemented with financial assistance from the Perez-Guerrero Trust Fund (PGTF) for ECDC/TCDC.

In accordance with reporting requirements applicable to PGTF-funded projects, it is customary to submit a progress report and a statement of expenditure for the project that is under implementation. I will therefore appreciate the submission by the Ministry of Agriculture of Indonesia of a progress report as well as a statement of expenditure for the project by 30 June 1997.

I take this opportunity to inform you that the Twelfth Meeting of the Committee of Experts of PGTF will be convened in New York from 30 July to 1 August 1997, during which a review of all projects under implementation will be undertaken.

Please accept, Excellency, the assurances of my highest consideration.

Ambassador Daudi N. Mwakawago
Permanent Representative of the United
Republic of Tanzania to the United Nations
Chairman of the Group of 77

H.E. Mr. Nugroho Wisnumurti
Ambassador Extraordinary and Plenipotentiary
Permanent Representative of Indonesia to the United Nations
New York, N.Y.

P.O.BOX 20 • NEW YORK, N.Y. 10017 U.S.A. • TELEPHONE (212) 963-4777 • (212) 963-3816 • FAX (212) 963-3515/963-1753

LAST TRANSACTION REPORT FOR HP FAX-700 SERIES VERSION: 01.03

FAX NAME: GROUP77 DATE: 27-MAY-97
FAX NUMBER: 212+963+3515 TIME: 13:57

DATE	TIME		REMOTE FAX NAME AND NUMBER	DURATION	PG	RESULT	DIAGNOSTIC
27-MAY	13:56	S	212 972 9780	0:00:35	1	OK	663840100188

****

S=FAX SENT
I=POLL IN(FAX RECEIVED)
O=POLLED OUT(FAX SENT)

TO PRINT THIS REPORT AUTOMATICALLY, SELECT AUTOMATIC REPORTS IN THE SETTINGS MENU.
TO PRINT MANUALLY, PRESS THE REPORT/SPACE BUTTON, THEN PRESS ENTER.

THE GROUP OF 77

New York
Office of the Chairman

L-067/97 URGENT 23 May 1997

Excellency,

Subject: Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of NAM (INT/94/K04)

I have the honor to refer to the above-mentioned project implemented with financial assistance from the Perez-Guerrero Trust Fund (PGTF) for ECDC/TCDC.

In accordance with reporting requirements applicable to PGTF-funded projects, it is customary to submit a progress report and a statement of expenditure for the project that is under implementation. I will therefore appreciate the submission by the Ministry of Agriculture of Indonesia of a progress report as well as a statement of expenditure for the project by 30 June 1997.

I take this opportunity to inform you that the Twelfth Meeting of the Committee of Experts of PGTF will be convened in New York from 30 July to 1 August 1997, during which a review of all projects under implementation will be undertaken.

Please accept, Excellency, the assurances of my highest consideration.

Ambassador Daudi N. Mwakawago
Permanent Representative of the United
Republic of Tanzania to the United Nations
Chairman of the Group of 77

H.E. Mr. Nugroho Wisnumurti
Ambassador Extraordinary and Plenipotentiary
Permanent Representative of Indonesia to the United Nations
New York, N.Y.

P.O.BOX 20 • NEW YORK, N.Y. 10017 U.S.A. • TELEPHONE (212) 963-4777 • (212) 963-3816 • FAX (212) 963-3515/963-1753

PERMANENT MISSION OF THE REPUBLIC OF INDONESIA
TO THE UNITED NATIONS
NEW YORK

No. 338/EC - 301/95

The Permanent Mission of the Republic of Indonesia to the United Nations presents its compliments to the Office of the Chairman of the Group of 77 and with reference to the latter's letter, No. 238/EC - 301/95 dated 24 February 1995, concerning Indonesia's proposed project entitled, "Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries", has the honour to transmit herewith an original document.

The Permanent Mission of the Republic of Indonesia to the United Nations avails itself of this opportunity to renew to the Office of the Chairman of the Group of 77 the assurances of its highest consideration.

New York, 17 March 1995

PERMANENT MISSION OF INDONESIA TO THE UNITED NATIONS

Office of the Chairman of the Group 77
United Nations Secretariat Building
Room S-3959/39th Floor
New York

PEREZ-GUERRERO TRUST FUND
FOR ECONOMIC AND TECHNICAL COOPERATION
AMONG DEVELOPING COUNTRIES MEMBERS OF THE GROUP OF 77

PROJECT DOCUMENT

Country	:	Interregional
Title	:	Training on the Use of a Computer Stimulation Model for Food Security Analysis in Developing Countries of the NAM
Number	:	INT/9-/K--/A/95/99
Submitted by	:	The Ministry of Agriculture, Republic of Indonesia
Beneficiaries	:	NAM Countries
Duration of Project	:	6 (six) months
Estimated starting date	:	March 1995

Perez-Guerrero Trust Fund Inputs :	(US) $ 70,000.00
Other Inputs (UNEP, UNSO,FAO, IFAD)	(US) $ -
Total cost of the Project :	(US) $ 70,000.00

This project is to be executed by the Office of the Chairman of the Group of 77 under UNDP's Government Execution arrangements with a subcontract to be awarded to, Minstry of Agriculture, Republic of Indonesia, as subcontractor within a month of signature of the project document.

Chairman of the Group of 77
Ambassador Felipe Mabilangan
Permanent Representative of the Philippines
to the United Nations

Date

On behalf of UNDP
Denis Benn
Director
Special Unit for TCDC

Date

PEREZ-GUERRERO TRUST FUND
FOR ECONOMIC AND TECHNICAL COOPREATION
AMONG DEVELOPING COUNTRIES MEMBERS
OF THE GROUP 77

PROPOSED

Project of the Government of The Republic of Indonesia

PROJECT TITLE	:	TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF N A M
PROJECT NUMBER	:	
STARTING DATE	:	March 1995
COMPLETION DATE	:	September 1995
GOVERNMENT / MINISTRY RESPONSIBLE FOR PROJECT EXECUTION	:	MINISTRY OF AGRICULTURE OF THE REPUBLIC OF INDONESIA
PGTF CONTRIBUTION	:	US $. 70,000,00

(on behalf of the United Nations Development Programme)

(on behalf of the Group 77)

I. BACKGROUND AND JUSTIFICATION

Food Security was considered as a prime concern at the Tenth Summit Meeting of Non Aligned Movement (NAM) held in Jakarta in September 1992. During the meeting, the Heads of State or Government reviewed the food situation in the NAM and other developing countries. They approved the Resolution on Food Security which expressed a deep concern on the number of people plagued by hunger and malnutrition, which has increased in the past decade, despite the ability of the world to increase food output firstly.

In order to handle the pressing issues on the food security problems, general meetings had been conducted in Indonesia to support the preparation of a ministerial meeting on Food and Agriculture of the NAM on Food Security which was commenced by two informal meetings of Food Experts from NAM Countries and international organizations taken place in Rome in October 1992 and in Jakarta in February 1993. Ad-hoc Advisory Group of Experts on Food Security of the NAM countries had been conducted a meeting in Jakarta from 25 to 28 January 1994 and the results of the meeting had been submitted to the Conference of Ministers of Food and Agriculture of the NAM on Food Security convened in Bali-Indonesia in October 1994.

The problems of food security, despite low productivity, include the availabity of food with better qualities. Pricing policies on several food commodities can alter the availability and supply of food with various qualities. Therefore, the lack of ability to predict and create a model to ensure food security mechanisms is a serious issue to be overcome by the NAM member countries.

An appropriate pricing policies and the operation of National Food Authority become more challenging and need more detailed operating procedures. This is to ensure, not only the availability of food with better qualities, but to increase farmers' income as well.

Globalization and regional economic trend toward regional trade and economic cooperation are other recent issues which express the importance of strengthening South-South cooperation to ensure Food Security among members of the NAM and other developing countries. A series of proposed programmes had been recommended for enhancing food security and have been adopted by the Conference of Ministers of Food and Agriculture of the NAM on Food Security which are included : (1) Training and exchange of information on the design and management of relevant projects, (2) Technology Generation and Dissemination, (3) Input Supply and Production, (4) Institution Building through the decentralization and strengthening of national capacity, (5) Trade and (6) Political Cooperation, to galvanize the unutilized potential of NAM member countries to arrest the decline of interest in, and support for, agricultural development and food security in developing countries.

From the above-mentioned reasons and the availability of Peresz-Guerrero Trust Fund (PGTF) giving G-77 member countries an opportunity to develop their ability in creating a model for ensuring food security in each and among the member countries, Indonesia proposes : <u>Training on the Use of A Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM</u>.

Regarding the characteristics of a country's food security problems, the nature of the food insecure population, resources availability, institutional capabilities, and the possibility of regional food security research scheme,

first priority will be given to the developing countries of the NAM and members of G-77 such as : Senegal, Uganda, Sudan, Tanzania, Gambia, Nigeria, Zimbabwe, Kenya, Zambia, Ghana, Bangladesh, India and Indonesia. As a pilot project, this project could be widened to cover the NAM and other developing countries members of G-77 with larger regionalization whenever the outputs of the project can be implemented successfully.

II. OBJECTIVES

A. Development objective

Improved Policies and Strategies of Food Security in Developing Countries of the NAM to achieve sustainable food security.

B. Immediate objective

Strengthened and improved national capabilities of NAM's Developing Countries in analyzing and formulating Policies and Strategies of Food Security. This objective could be achieved if each government provides instutitional and operational support as well as effective national training programme on food security.

III. CONTENTS OF THE TRAINING

1. Introduction review
2. Single Equation Modeling of Food Supply, Demand and prices:

   - Model structure
   - Model of supply
   - Model of demand
   - Model of prices
   - Model of stock

3. Regression Analysis

   - Equations models

4. Regression software use time series package (TSP.)
   - data generate
   - graphs
   - regression analysis
   - exercises

5. Changing the model : Simultaneous equation models
   - Re-estimation of parameters
   - Determining policy parameters

6. Computer simulation model of Food security model
   - data input
   - specification
   - parameter changes
   - simulations and forecasts in Lotus
   - exercises

7. Discussion of model simulation results
   - model structure
   - applicability for policy use
   - improvements
   - Further action

8. National food security analysis and policy formulation exercises.

III. OUTPUT AND ACTIVITIES OF THE PROJECT

The main outputs and activities of the project are summarized below. The Matrix in Annex.1 provides a more detailed relation of this project activities and outputs.

A. Output 1. Computer simulation model of food security constracted.

Activities :

1. Selecting and oppointing consultants
2. Developing of computer simulation model by consultant to be used by participants of the training.
3. Collecting data by candidates of the participants of the training to used in the training for preparing national food security strategies.

B. Output 2. Trained food security planners of selected developing countries of NAM.

Activities :

1. Developing training curriculum and modules.
2. Sending information and invitation to participating countries.
3. Selecting participants of the training.

4. Procurement of training facilities.
5. Conducting 12 days training activities.
6. Evaluating training program.
7. Reporting training activities and outputs.

IV. INPUTS TO BE PROVIDED BY PGTF

1. Personnel
   National Consultants

2. Equipment
   Two personal Computers, printer and other equipment.

3. International Travel
   12 participants from Africa and Asia

4. Training
   Training facilities, accommodation, per diem allowance, field trip and instructor's honoraria

5. General Operating Expenses
   General operating expenses related to the project, including preparation, reproduction of documents, budget for secretariat assistance, local transportation and cost of communication.

6. Preparation and dissemination of report

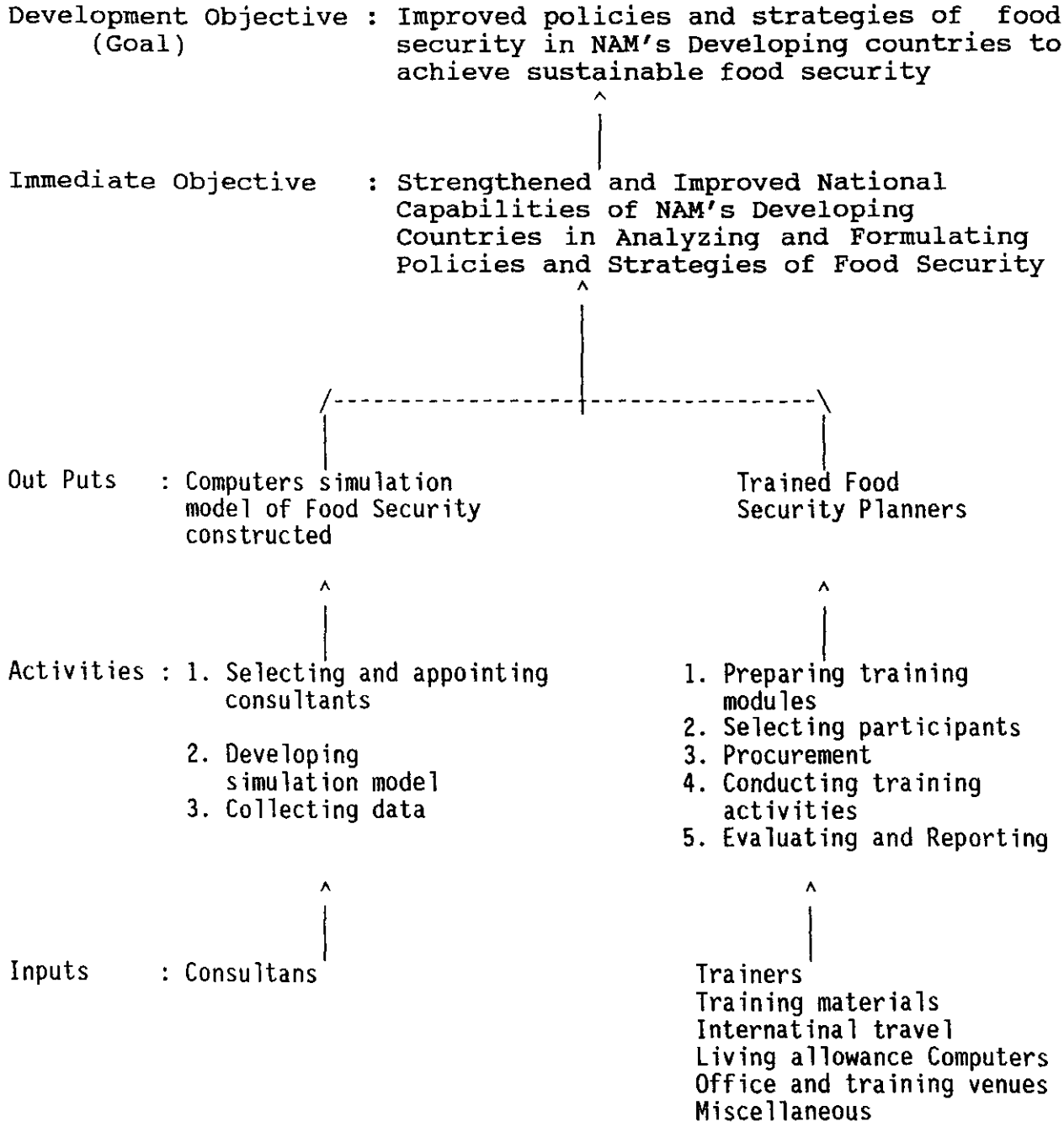
The workplan of the projects implementation and a detailed account of the projects input and budget is presented in Annex 2 and 3 respectively.

V. INPUTS TO BE PROVIDED BY HOST COUNTRY (INDONESIA)

1. Project preparation
2. Project's office and facilities
3. Training center facilities and staff salary
4. Project staff salary
5. Follow up national training program and dissemination of model.

Annex 1.a

INPUT - OUPUT - RELATIONSHIPS OF TRAINING OF THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN NAM'S DEVELOPING COUNTRIES



OVERVIEW OF PROJECT ACTIVITIES AND OUTPUTS

	Activities	Purpose of Activities	Duration	No of Participant	Source of Fund	Output
1	Notification to Asia & African Countries	To solicit agreements for participants from Asia & Africa Countries	2 months	-	-	List of countries willing to participate in the project
2	Appointment of Consultant	To hire consultant to construction of the model	2 months	-	-	Consultant hired
3	Procurement of hardware and software	This is needed for development of model	2 months	Project management	PGTF	Computer hardware and software installed
4	Data collection	To Construct of a Computer Simulation Model	2 months	5 participants from Indonesia	PGTF	Data production related to the Food, Stcok, Supply Demand and Price
5	Model Construction	To detailed description of the model	4 months	Consultant National	PGTF	Computer Simulation Model Construction
6	Training					
	6.1. Asia & Africa Training for Trainers	To train the trainers who will in turn train participants in their respective countries in the use of a Computer Simulation Model for forecasting supply, demand and price of Food	12 day	7 participants from Indonesia	PGTF	- Food Security (12 Trainers) - Trained Personnel who will be trainers in respective countries
	6.2. National Training for commodity analyst in respective countries	Enable the trainers to train other officers in respective countries		Varies according to the needs and resources of the countries	Local	- Food Security (120 officers)

Annex-2

WORKPLAN AND PRELIMINARY TIME SCHEDULE

No.	ACTIVITY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1	Administrative	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	- notification to Asia & Africa countries	.....	.....										
	- Appointment of consultants	.....	.....										
	- procurement		.....										
2	Data collection		.....	.....	.....								
3	Construction of the model by the consultnats		.....		.....	.....	.....	.....					
4	Issue of invitations		.....			.....							
5	Asia & Africa Training for Trainers						.....						
6	Dissemination of Report							.....					.....

SCHEDULE OF SERVICES AND FACILITIES TO BE PROVIDED BY THE SUB-CONTRACTOR

No.	Activities	Details of Expenditure	Amount ($US)	Source of Funding
1	Data Collection	Team members	2,500	PGTF
2	Construction of a Computer Simulation Model Implementation	Consultants		PGTF
	Local Consultant	2x4x US$ 750	6,000	
3	Asia & Africa Training for Trainers	- Airfare Participant from		PGTF
		(1) Bangladesh 1xUS$1,730	1,730	
		(2) India 1xUS$1,205	1,205	
		(3) Nigeria 1xUS$4,590	4,590	
		(4) Senegal 1xUS$4,475	4,475	
		(5) Sudan 1xUS$2,700	2,700	
		(6) Indonesia 7 xUS$150	1,050	
		- Accommodations (US$100/day/person) 12 x 12 x US$100	14,400	
		- Perdiem US$50/day/person 12 x 12 x US$50	7,200	
		- Local Travel US$3,000	3,000	
		- Training Facilities US$2,000	2,000	
		- Honorarium for Instructor (US$50/hour) 9 x 7 x US$50	3,150	PGTF
4	Procurement	- 2(Two) PC's- 486DX2 8MB RAM, 210MB HDD, 2 HD FDD, SVGA Monitor, Mouse, - 1(One) HP LaserJet 4+ , 1(One) Epson LQ-1070+ - 2(Two) UPS-ICA102B - 2(Two) Table & Chairs	10,000	PGTF
5	Secretariat		5,000	PGTF
6	Final Report	- Report (US$1,000)	1,000	PGTF
		Total PGTF contribution	70,000	

Country	:	Indonesia
Project Number	:	INT/9-/K--/A/95/99
Project Title	:	Training on the Use of a Computer Stimulation Model for Food Security Analysis in Developing Countries of the NAM

	Total
Personnel	8,500.00
Travel	45,500.00
Equipment	10,000.00
Miscellaneous	6,000.00

Project total	70,000.00
	========

THE GROUP OF 77

New York
Office of the Chairman

L-0034/95 10 March 1995

Subject: INT/94/K04 - Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM

Excellency,

With reference to your Note Verbale 238/EC-301/95 dated 24 February 1995, I have the honour to acknowledge receipt of a copy of the revised version of the proposal for the above-mentioned project.

Please find attached for easy preparation a copy of the cover page and last page for the project document that should be filled out as appropriate on the original document that is to be forwarded by your Permanent Mission.

Please accept, Excellency, the assurances of my highest consideration.

Yours sincerely,

FELIPE MABILANGAN
Ambassador and Permanent Representative
of the Philippines to the United Nations
Chairman of the Group of 77
New York

H.E. Mr. Nugroho Wisnumurti
Permanent Representative of Indonesia
to the United Nations
New York, N.Y.

P.O.BOX 20 • NEW YORK, N.Y. 10017 U.S.A. • TELEPHONE (212) 963-4777 • (212) 963-3816 • FAX (212) 963-3515/963-1753

PEREZ-GUERRERO TRUST FUND

FOR ECONOMIC AND TECHNICAL COOPERATION

AMONG DEVELOPING COUNTRIES MEMBERS OF THE GROUP OF 77

PROJECT DOCUMENT

Country: Interregional

Title: ----------

Number: INT/9-/K--/A/95/99

Submitted by: ----------

Beneficiaries: ----------

Duration of Project: ----------

Estimated starting date: Two weeks after signature of the document

Perez-Guerrero Trust Fund Inputs: (US) $------

Other Inputs (UNEP,UNSO,FAO,IFAD): (US) $------

Total cost of the Project: (US) $------

This project is to be executed by the Office of the Chairman of the Group of 77 under UNDP's Government Execution arrangements with a subcontract to be awarded to -------, ---------, as subcontractor within a month of signature of the project document.

---------- ----------

Chairman of the Group of 77 Date
Ambassador Felipe Mabilangan
Permanent Representative of the Philippines
to the United Nations

---------- ----------

On behalf of UNDP Date
Denis Benn
Director
Special Unit for TCDC

Country: Interregional

Project Number: INT/9-/K--/A/95/99

Project Title: ----------

	Total
Personnel	-----
Travel	-----
Equipment	-----
Miscellaneous	-----

Project total	------
	======

PERMANENT MISSION OF THE REPUBLIC OF INDONESIA
TO THE UNITED NATIONS
NEW YORK

No. 238/EC - 301/95

The Permanent Mission of the Republic of Indonesia to the United Nations presents its compliments to the Office of the Chairman of the Group of 77 and with reference to the latter's letter, No. L-0854/94 dated 26 October 1994, concerning Indonesia's proposed project entitled, "Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries" which was endorsed by the Minister for Foreign Affairs of the Group of 77, has the honour to transmit herewith a copy of the revised version of that proposal for further consideration. The original document will be forwarded upon its receipt by the Permanent Mission.

With regard to the disbursement of the approved financing allocation for the project from PGTF, the Permanent Mission would greatly appreciate it if the process of disbursement could be directly transferred to the following.

Account Number	:	1 0 8 - 0 4 2 4 7 5 1 7
N a m e	:	H. Suharyo Husen, Bsc, S.E. Head, Bureau of Foreign Cooperation, Department of Agriculture, Republic of Indonesia
Name of Bank	:	Bank Bumi Daya (BBD) Pasar Minggu Branch Jakarta Selatan - Indonesia

The Permanent Mission of the Republic of Indonesia to the United Nations avails itself of this opportunity to renew to the Office of the Chairman of the Group of 77 the assurances of its highest consideration.

New York, 24 February 1995

Office of the Chairman of the Group 77
United Nations Secretariat Building
Room S-3959/39th Floor
New York

PERMANENT MISSION OF INDONESIA TO THE UNITED NATIONS

PEREZ-GUERRERO TRUST FUND FOR ECONOMIC AND TECHNICAL COOPREATION AMONG DEVELOPING COUNTRIES MEMBERS OF THE GROUP 77

PROPOSED

Project of the Government of The Republic of Indonesia

PROJECT TITLE	:	TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF N A M
PROJECT NUMBER	:	
STARTING DATE	:	March 1995
COMPLETION DATE	:	September 1995
GOVERNMENT / MINISTRY RESPONSIBLE FOR PROJECT EXECUTION	:	MINISTRY OF AGRICULTURE OF THE REPUBLIC OF INDONESIA
PGTF CONTRIBUTION	:	US $. 70,000,00

(on behalf of the United Nations Development Programme)

(on behalf of the Group 77)

I. BACKGROUND AND JUSTIFICATION

Food Security was considered as a prime concern at the Tenth Summit Meeting of Non Aligned Movement (NAM) held in Jakarta in September 1992. During the meeting, the Heads of State or Government reviewed the food situation in the NAM and other developing countries. They approved the Resolution on Food Security which expressed a deep concern on the number of people plagued by hunger and malnutrition, which has increased in the past decade, despite the ability of the world to increase food output firstly.

In order to handle the pressing issues on the food security problems, general meetings had been conducted in Indonesia to support the preparation of a ministerial meeting on Food and Agriculture of the NAM on Food Security which was commenced by two informal meetings of Food Experts from NAM Countries and international organizations taken place in Rome in October 1992 and in Jakarta in February 1993. Ad-hoc Advisory Group of Experts on Food Security of the NAM countries had been conducted a meeting in Jakarta from 25 to 28 January 1994 and the results of the meeting had been submitted to the Conference of Ministers of Food and Agriculture of the NAM on Food Security convened in Bali-Indonesia in October 1994.

The problems of food security, despite low productivity, include the availabity of food with better qualities. Pricing policies on several food commodities can alter the availability and supply of food with various qualities. Therefore, the lack of ability to predict and create a model to ensure food security mechanisms is a serious issue to be overcome by the NAM member countries.

An appropriate pricing policies and the operation of National Food Authority become more challenging and need more detailed operating procedures. This is to ensure, not only the availability of food with better qualities, but to increase farmers' income as well.

Globalization and regional economic trend toward regional trade and economic cooperation are other recent issues which express the importance of strengthening South-South cooperation to ensure Food Security among members of the NAM and other developing countries. A series of proposed programmes had been recommended for enhancing food security and have been adopted by the Conference of Ministers of Food and Agriculture of the NAM on Food Security which are included : (1) Training and exchange of information on the design and management of relevant projects, (2) Technology Generation and Dissemination, (3) Input Supply and Production, (4) Institution Building through the decentralization and strengthening of national capacity, (5) Trade and (6) Political Cooperation, to galvanize the unutilized potential of NAM member countries to arrest the decline of interest in, and support for, agricultural development and food security in developing countries.

From the above-mentioned reasons and the availability of Peresz-Guerrero Trust Fund (PGTF) giving G-77 member countries an opportunity to develop their ability in creating a model for ensuring food security in each and among the member countries, Indonesia proposes : Training on the Use of A Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM.

Regarding the characteristics of a country's food security problems, the nature of the food insecure population, resources availability, institutional capabilities, and the possibility of regional food security research scheme,

first priority will be given to the developing countries of the NAM and members of G-77 such as : Senegal, Uganda, Sudan, Tanzania, Gambia, Nigeria, Zimbabwe, Kenya, Zambia, Ghana, Bangladesh, India and Indonesia. As a pilot project, this project could be widened to cover the NAM and other developing countries members of G-77 with larger regionalization whenever the outputs of the project can be implemented successfully.

II. OBJECTIVES

A. Development objective

Improved Policies and Strategies of Food Security in Developing Countries of the NAM to achieve sustainable food security.

B. Immediate objective

Strengthened and improved national capabilities of NAM's Developing Countries in analyzing and formulating Policies and Strategies of Food Security. This objective could be achieved if each government provides instutitional and operational support as well as effective national training programme on food security.

6/14

III. CONTENTS OF THE TRAINING

1. Introduction review
2. Single Equation Modeling of Food Supply, Demand and prices:

   - Model structure
   - Model of supply
   - Model of demand
   - Model of prices
   - Model of stock

3. Regression Analysis

   - Equations models

4. Regression software use time series package (TSP.)
   - data generate
   - graphs
   - regression analysis
   - exercises

5. Changing the model : Simultaneous equation models
   - Re-estimation of parameters
   - Determining policy parameters

6. Computer simulation model of Food security model
   - data input
   - specification
   - parameter changes
   - simulations and forecasts in Lotus
   - exercises

7. Discussion of model simulation ...
   - model structure
   - applicability for policy use
   - improvements
   - Further action

8. National food security analysis and policy formulation exercises.

III. OUTPUT AND ACTIVITIES OF THE PROJECT

The main outputs and activities of the project are summarized below. The Matrix in Annex.1 provides a more detailed relation of this project activities and outputs.

A. Output 1. Computer simulation model of food security constracted.

Activities :

1. Selecting and oppointing consultants
2. Developing of computer simulation model by consultant to be used by participants of the training.
3. Collecting data by candidates of the participants of the training to used in the training for preparing national food security strategies.

B. Output 2. Trained food security planners of selected developing countries of NAM.

Activities :

1. Developing training curriculum and modules.
2. Sending information and invitation to participating countries.
3. Selecting participants of the training.

5. Conducting 12 days training activities.
6. Evaluating training program.
7. Reporting training activities and outputs.

IV. INPUTS TO BE PROVIDED BY PGTF

1. Personnel
   National Consultants

2. Equipment
   Two personal Computers, printer and other equipment.

3. International Travel
   12 participants from Africa and Asia

4. Training
   Training facilities, accommodation, per diem allowance, field trip and instructor's honoraria

5. General Operating Expenses
   General operating expenses related to the project, including preparation, reproduction of documents, budget for secretariat assistance, local transportation and cost of communication.

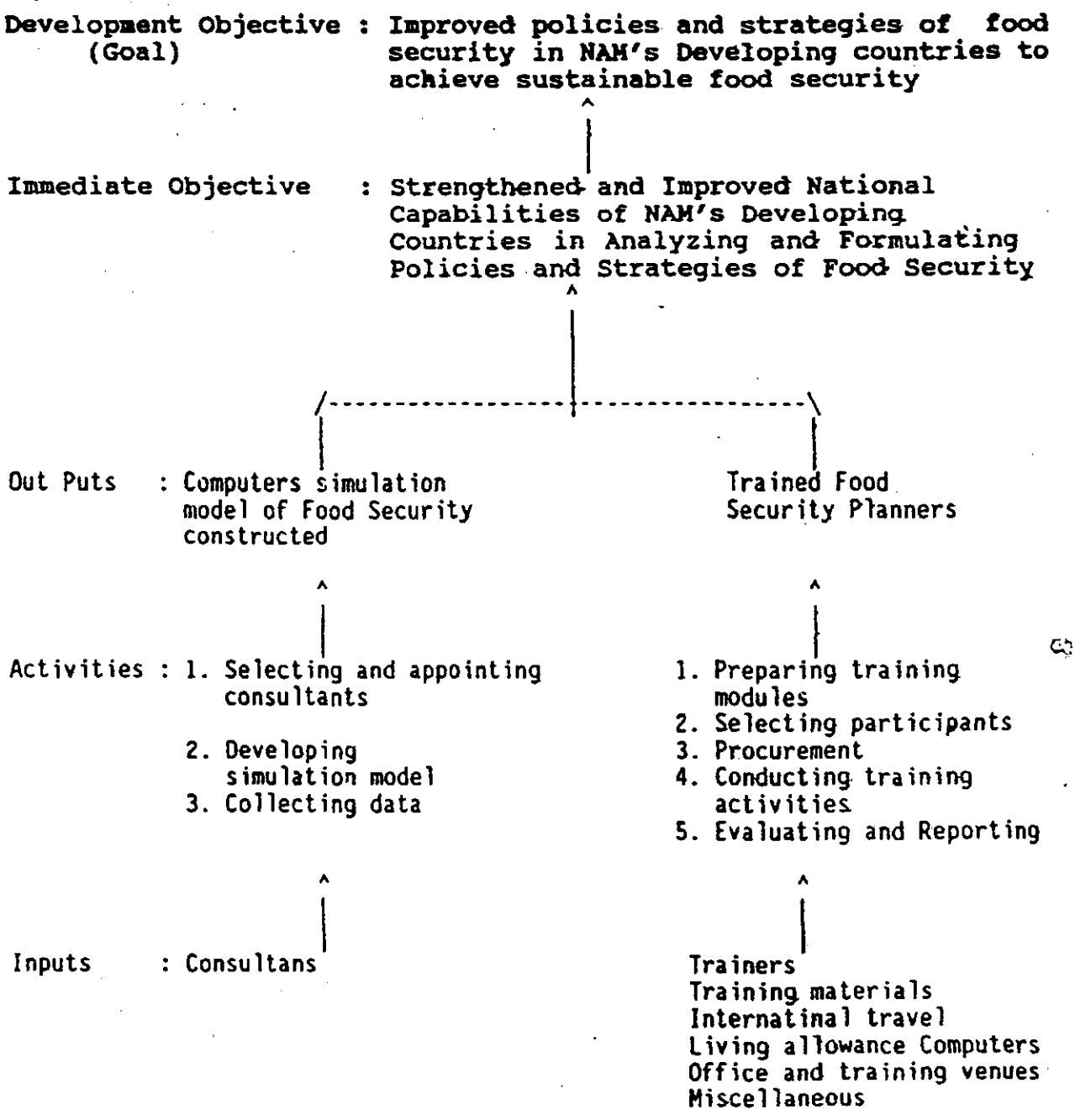
6. Preparation and dissemination of report

The workplan of the projects implementation and a detailed account of the projects input and budget is presented in Annex 2 and 3 respectively.

V. INPUTS TO BE PROVIDED BY HOST COUNTRY (INDONESIA)

1. Project preparation
2. Project's office and facilities
3. Training center facilities and staff salary
4. Project staff salary
5. Follow up national training program and dissemination of model.

INPUT - OUPUT - RELATIONSHIPS OF TRAINING OF THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN NAM'S DEVELOPING COUNTRIES



Annex-1

OVERVIEW OF PROJECT ACTIVITIES AND OUTPUTS

	Activities	Purpose of Activities	Duration	No of Participant	Source of Fund	Output
	Notification to Asia & African Countries	To solicit agreements for participants from Asia & Africa Countries	2 months	-	-	List of countries willing to participate in the project
	Appointment of Consultant	To hire consultant to construction of the model	2 months	-	-	Consultant hired
3	Procurement of hardware and software	This is needed for development of model	2 months	Project management	PGTF	Computer hardware and software installed
4	Data collection	To Construct of a Computer Simulation Model	2 months	5 participants from Indonesia	PGTF	Data production related to the Food, Stcok, Supply Demand and Price
5	Model Construction	To detailed description of the model	4 months	Consultant National	PGTF	Computer Simulation Model Construction
6	Training					
	6.1. Asia & Africa Training for Trainers	To train the trainers who will in turn train participants in their respective countries in the use of a Computer Simulation Model for forecasting supply, demand and price of Food	12 day	7 participants from Indonesia	PGTF	- Food Security (12 Trainers) - Trained Personnel who will be trainers in respective countries
	6.2. National Training for commodity analyst in respective countries	Enable the trainers to train other officers in respective countries		Varies according to the needs and resources of the countries	Local	- Food Security (120 officers)

Annex-2

WORKPLAN AND PRELIMINARY TIME SCHEDULE

No.	ACTIVITY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1	Administrative	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	- notification to Asia & Africa countries	.....	.....										
	- Appointment of consultants	.....	.....										
	- procurement		.....										
2	Data collection	.....	.....	.....	.....								
3	Construction of the model by the consultnats		.....	.....	.....	.....	.....	.....					
4	Issue of invitations		.....	.....	.....	.....							
5	Asia & Africa Training for Trainers						.....						
6	Dissemination of Report							.....					.....

SCHEDULE OF SERVICES AND FACILITIES TO BE PROVIDED BY THE SUB-CONTRACTOR

No.	Activities	Details of Expenditure	Amount ($US)	Source of Funding
1	Data Collection	Team members	2,500	PGTF
2	Construction of a Computer Simulation Model Implementation	Consultants		PGTF
	Local Consultant	2x4x US$ 750	6,000	
3	Asia & Africa Training for Trainers	- Airfare Participant from		PGTF
		(1) Bangladesh 1xUS$1,730	1,730	
		(2) India 1xUS$1,205	1,205	
		(3) Nigeria 1xUS$4,590	4,590	
		(4) Senegal 1xUS$4,475	4,475	
		(5) Sudan 1xUS$2,700	2,700	
		(6) Indonesia 7 xUS$150	1,050	
		- Accommodations (US$100/day/person) 12 x 12 x US$100	14,400	
		- Perdiem US$50/day/person 12 x 12 x US$50	7,200	
		- Local Travel US$3,000	3,000	
		- Training Facilities US$2,000	2,000	
		- Honorarium for Instructor (US$50/hour) 9 x 7 x US$50	3,150	PGTF
4	Procurement	- 2(Two) PC's- 486DX2 8MB RAM, 210MB HDD, 2 HD FDD, SVGA Monitor, Mouse, - 1(One) HP LaserJet 4+ , 1(One) Epson LQ-1070+ - 2(Two) UPS-ICA102B - 2(Two) Table & Chairs	10,000	PGTF
5	Secretariat		5,000	PGTF
6	Final Report	- Report (US$1,000)	1,000	PGTF
		Total PGTF contribution	70,000	

PERMANENT MISSION OF THE REPUBLIC OF INDONESIA
TO THE UNITED NATIONS
NEW YORK

No. 238/EC - 301/95

The Permanent Mission of the Republic of Indonesia to the United Nations presents its compliments to the Office of the Chairman of the Group of 77 and with reference to the latter's letter, No. L-0854/94 dated 26 October 1994, concerning Indonesia's proposed project entitled, "Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries" which was endorsed by the Minister for Foreign Affairs of the Group of 77, has the honour to transmit herewith a copy of the revised version of that proposal for further consideration. The original document will be forwarded upon its receipt by the Permanent Mission.

With regard to the disbursement of the approved financing allocation for the project from PGTF, the Permanent Mission would greatly appreciate it if the process of disbursement could be directly transferred to the following.

Account Number	:	1 0 8 - 0 4 2 4 7 5 1 7
N a m e	:	H. Suharyo Husen, Bsc, S.E. Head, Bureau of Foreign Cooperation, Department of Agriculture, Republic of Indonesia
Name of Bank	:	Bank Bumi Daya (BBD) Pasar Minggu Branch Jakarta Selatan - Indonesia

The Permanent Mission of the Republic of Indonesia to the United Nations avails itself of this opportunity to renew to the Office of the Chairman of the Group of 77 the assurances of its highest consideration.

New York, 24 February 1995

Office of the Chairman of the Group 77
United Nations Secretariat Building
Room S-3959/39th Floor
New York

THE GROUP OF 77
New York
Office of the Chairman

1006.44

L-0854/94

26 October 1994

Subject: INT/94/KO4 - Training on the Use of a Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM

Excellency,

1. With reference to your letter ref.820/EC-305/93 dated 24 May 1993, I have the honour to inform you that the project proposal submitted by the Government of the Republic of Indonesia entitled "Training on the use of a computer simulation model for food security analysis in developing countries of the NAM", was submitted to the Ninth Meeting of the Committee of Experts of the Perez-Guerrero Trust Fund(PGTF), which met in New York on 4-8 April 1994.

2. The Committee of Experts, having considered the project proposal, made the following recommendation to the Sixth Annual Meeting of Senior Officials of the Group of 77, which was subsequently endorsed by the Eighteenth Annual Meeting of the Ministers for Foreign Affairs of the Group of 77, which met in New York on 30 September 1994:

"The Committee considered that this project complies with the guidelines for utilization of PGTF and thus eligible for financing".

3. Although the contribution sought from the PGTF amounts to (US)$155,850, the Committee recommended that USD $70,000 be allocated from the PGTF.

4. I wish to inform that, following the endorsement by the Eighteenth Annual Meeting of the Ministers for Foreign Affairs of the Group of 77 on the above recommendation, the Office of the Chairman of the Group of 77 has duly informed UNDP and requested them to undertake the necessary measures to process the disbursement of the approved allocation from PGTF.

5. In accordance with established procedures, disbursement of

P.O.BOX 20 • NEW YORK, N.Y. 10017 U.S.A. • TELEPHONE (212) 963-4777 • (212) 963-3816 • FAX (212) 963-3515/963-1753

PGTF resources is made after a project document is signed by UNDP in its capacity as administering authority of PGTF, and the Office of the Chairman of the Group of 77 in New York as executing agency. The implementation of the project will be subcontracted by the Office of the Chairman to the Government of the Republic of Indonesia by a separate agreement after signature of the project document. Further appropriate action will be taken by the Office of the Chairman thereafter for disbursement of PGTF funds.

6. Work on the project document must be initiated by the implementing agency on the basis of the enclosed model format. Once the first draft is prepared, it must be transmitted to the Office of the Chairman in New York for further processing and clearance.

7. For further information regarding this project, please contact Mr.Bertram Goddard, UNDP Liaison Officer in charge of PGTF, Office of the Chairman of the Group of 77, United Nations Secretariat Building, Room S-3969, Telephone: (212) 963-0202 and Fax: (212) 963-3515.

With warmest regards,

Yours sincerely,

Ambassador Ramtane Lamamra
Permanent Representative of Algeria
to the United Nations and
Chairman of the Group of 77
New York

H.E. Mr.Nugroho Wisnurmurti
Ambassador and Permanent Representative of
Indonesia to the United Nations
New York

PERMANENT MISSION OF THE REPUBLIC OF INDONESIA
TO THE UNITED NATIONS
NEW YORK

No. 820/EC-305/93

The Permanent Mission of the Republic of Indonesia to the United Nations presents its compliments to the Office of the Chairman of the Group of 77 in New York and has the honour to inform that the Government of the Republic of Indonesia has prepared a project proposal, entitled "Training on the use of a computer simulation model for food security analysis in developing countries of the NAM", which is submitted herewith, and would like to request financing from the Perez-Guerrero Trust Fund.

The Permanent Mission of the Republic of Indonesia to the United Nations avails itself of this opportunity to renew to the Office of the Chairman of the Group of 77 in New York the assurances of its highest consideration.

New York, 24 Mei 1993

MAY 25

Office of the Chairman of the Group of 77
United Nations, Room 3959
New York, N.Y. 10021

PEREZ-GUERRERO TRUST FUND FOR ECONOMIC AND TECHNICAL COOPERATION AMONG DEVELOPING COUNTRIES MEMBERS OF THE GROUP 77

P R O P O S E D

Project of the Government of the Republic of Indonesia

PROJECT TITLE	:	TRAINING ON THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN DEVELOPING COUNTRIES OF THE NAM
PROJECT NUMBER	:	
STARTING DATE	:	March 1994.
COMPLETION DATE	:	February 1995
GOVERNMET/MINISTRY RESPONSIBLE FOR PROJECT EXECUTION	:	MINISTRY OF AGRICULTURE
PGTF CONTRIBUTION	:	US$ 155,850.00

(On behalf of the United Nations Development Programme)

(On behalf of the Group 77)

I. BACKGROUND AND JUSTIFICATION

Food Security was considered a prime concern at the Tenth Summit Meeting of Non Aligned Movement (NAM) held in Jakarta on September 1992. During the meeting, the Heads of State or Government review the food situation in the NAM and other developing countries. They approved the Resolution on Food Security which express a deep concern on the number of people plagued by hunger and malnutrition, which has increased in the past decade, despite the ability of the world to increase food output firstly.

In order to handle the pressing issue on the food security problems, a conference of Ministers on Food and Agriculture will be held in Jakarta in 1993. Two meeting of food experts from both NAM and international's organizations have taken placed in Rome last October 1992 and in Jakarta in February 1993 to formulate recommendations to be adopted at the Ministerial meeting. One important recommendation to enhance food security is by firstly raising the productivity and secondly south-south cooperation schemes through technical assistance including economics as well as social aspects such as pricing policies.

The problems of food security, despite low productivity, include the availabity of food with better qualities. Pricing policies on several food commodities can alter the availability and supply of food with various qualities. Therefore, the lack of ability to predict and create a model to ensure food security mechanisms is a serious issue to be overcome by the NAM member countries. An appropriate pricing policies and the operation of National Food Authority become more challenging and need more detailed operating procedures. This is to ensure, not only the availability of food with better qualities, but to increase farmers' income as well.

Globalization and regional economic trend toward regional trade and economic cooperation are other recent issues which have been addressed in the First Meeting of the NAM Advisory Group Experts on Food Security in Jakarta by expressing the importance of strengthening south-south cooperation to ensure Food Security among member of the NAM and other developing countries. Based on the deliberation of the meeting, a series of proposed programmes have been recommended for enhancing food security, which included : (1) Training and exchange of information on the design and management of relevant projects, (2) Technology Generation and Dissemination, (3) Input Supply and Production, (4) Institution Building through the decentralization and strengthening of national capacity, (5) Trade and (6) Political Cooperation, to galvanize the unutilized potential of NAM member countries to arrest the decline of interest in, and support for, agricultural development and food security in developing countries, for submission to the forthcoming conference of Ministers on Food and Agriculture of the NAM and other developing countries.

From the above-mentioned reasons and the availability of Peresz-Guerrero Trust Fund (PGTF) gives G-77 member countries an opportunity to develop their ability in creating a model for ensuring food security in each and among the member countries, Indonesia propose : <u>Training on the Use of A Computer Simulation Model for Food Security Analysis in Developing Countries of the NAM</u>.

Regarding the characteristics of a country's food security problems, the nature of the food insecure population, resources availability, institutional capabilities, and the possibility of regional food security research scheme, therefore first priority will be given to the developing countries of the NAM and members of G-77 such as : Senegal, Uganda, Sudan, Tanzania, Gambia, Nigeria, Zimbabwe, Kenya,

Zambia, Ghana, Bangladesh, India and Indonesia. As a pilot project, this project could be widened to cover the NAM and other developing countries members of G-77 with larger regionalization whenever the outputs of the project can be implemented successfully.

II. OBJECTIVES

A. Development objective

Improved Policies and Strategies of Food Security in Developing Countries of the NAM to achieve sustainable food security.

B. Immediate objective

Strengthened and improved national capabilities of NAM's Developing Countries in analyzing and formulating Policies and Strategies of Food Security. This objective could be achieved if each government provides instutitional and operational support as well as effective national training programme on food security.

III. OUTPUT AND ACTIVITIES OF THE PROJECT

The main outputs and activities of the project are summarized below.

A. Output 1. Computer simulation model of food security constracted.

Activities :

1. Selecting and oppointing consultants
2. Developing of computer simulation model by consultant to be used by participants of the training.
3. Collecting data by candidates of the participants of the training to used in the training for preparing national food security strategies.

B. Output 2. Trained food security planners of selected developing countries of NAM.

Activities :

1. Developing training curriculum and modules.
2. Sending information and invitation to participating countries.
3. Selecting participants of the training.
4. Procurement of training facilities.
5. Conducting 21-day training activities.
6. Evaluating training program.
7. Reporting training activities and outputs.

C. Output 3. After training comparative study tour implemented.

Activities :

1. Preparing program of study tour in a developing country other than Indonesia.
2. Implementing comparative study tour.
3. Monitoring and evaluating study tour implementation.

IV. INPUTS TO BE PROVIDED BY PGTF

1. Personnel

National Consultants 12 Man Months a US $ 1,500.00	US $	18,000.00

2. Equipment

Five personal Computers, printer and other equipment.	US $	15,000.00

3. International Travel

12 participants from Africa and Asia	US $	60,000.00

4. Training

Training facilities, accommodation, per diem allowance, field trip and instructor's honoraria	US $	39,250.00

5. General Operating Expenses

General operating expenses related to the project, including preparation, reproduction of documents, budget for secretariat assistance, local transportation and cost of communication.	US $	10,000.00

6. After - training comparative study tour

Five days study tour in a country between Indonesia and home country	US $	8,100.00

7. Monitoring and evaluation

During and post - training evaluation	US $	2,500.00

8. Preparation and dissemination of report

	US $	3,000.00
Total PGTF contribution is	US $	155,850.00

V. INPUTS TO BE PROVIDED BY HOST AND PARTICIPATING COUNTRIES

A. Host Country (Indonesia)

1. Project preparation
2. Project's office and facilities
3. Training center facilities and staff salary
4. Project staff salary
5. Follow up national training program and dissemination of model.

Total estimated contribution	US $	80,000.00

B. Participating Countries

1. Data Collection
2. Selection of participants
3. International travel preparation
4. Follow up national training and dissemination of the use of simulation model.

Total estimated contribution (12 countries)	US $	195,000.00

CONTENTS OF THE TRAINING

1. Introduction review

2. Single Equation Modeling of Food Supply, Demand and prices:

   - Model structure
   - Model of supply
   - Model of demand
   - Model of prices
   - Model of stock

3. Regression Analysis

   - Equations models

4. Regression software use time series package (TSP.)

   - data generate
   - graphs
   - regression analysis
   - exercises

5. Changing the model : Simultaneous equation models

   - Re-estimation of parameters
   - Determining policy parameters

6. Computer simulation model of Food security model
   - data input
   - specification
   - parameter changes
   - simulations and forecasts in Lotus
   - exercises

7. Discussion of model simulation results

   - model structure
   - applicability for policy use
   - improvements
   - Further action

8. National food security analysis and policy formulation exercises.

Annex 2

INPUT - OUPUT - RELATIONSHIPS OF TRAINING OF THE USE OF A COMPUTER SIMULATION MODEL FOR FOOD SECURITY ANALYSIS IN NAM'S DEVELOPING COUNTRIES

Development Objective (Goal) : Improved policies and strategies of food security in NAM's Developing countries to achieve sustainable food security

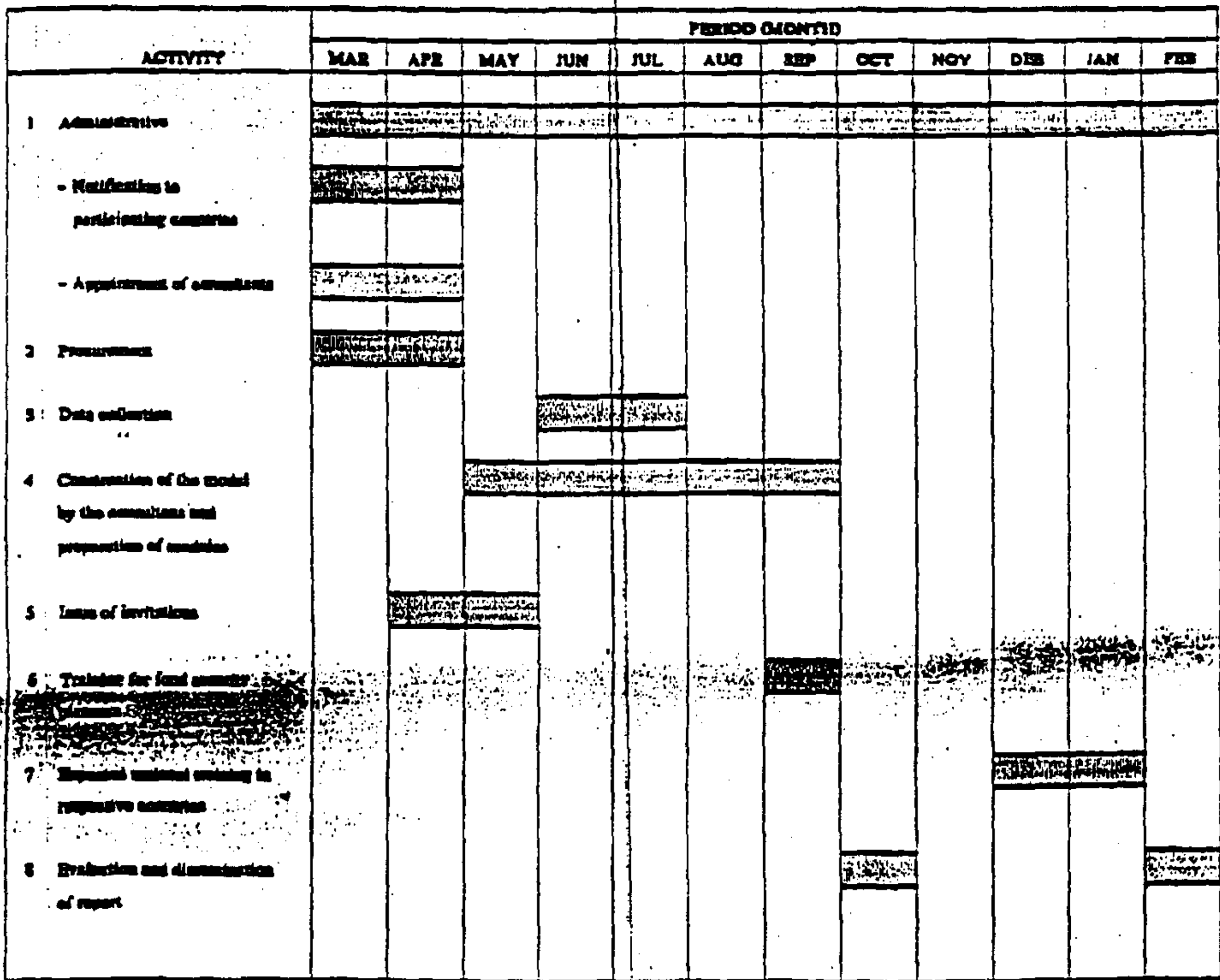
Immediate Objective : Strengthened and Improved National Capabilities of NAM's Developing Countries in Analyzing and Formulating Policies and Strategies of Food Security

Out Puts	Computers simulation model of Food Security constucted	Trained Food Security Planners	After - Training comparative study tour implemented
Activities	1. Selecting and appointing consultants 2. Developing simulation model 3. Collecting data	1. Preparing training modules 2. Selecting participants 3. Procurement 4. Conducting training activities 5. Evaluating and Reporting	1. Preparing study tour program 2. Implementing study tour 3. Monitoring and evaluation
Inputs	Consultans	Trainers Training materials International travel Living allowance Computers Office and training venues Miscellaneous	Travel and living Allowance

NAI/POP/dmr

Annex 3

WORKPLAN AND PRELIMINARY TIME SCHEDULE



Annex 4

ESTIMATED PROJECT COST

No.	Activities	Participants	Duration	Detail Expenditure	Amount US $	Source of Funding
1	Data Collection	15			15,000	Participating Countries
2	Construction of Computer Simulation Model and preparation of manuals		12 m.m.	2 consultants : 2 X 6 X US $ 1,500	18,000	FGTF
3	International Travel	12		12 participants from Senegal, Gambia, Uganda, Tanzania, Kenya, Sudan, Nigeria, Zambia, Ghana, Zimbabwe, Bangladesh, India. Estimated cost : 12 X US $ 5,000	60,000	FGTF
4	Training of Food Security Planners	15	21 days	Accomodations : US$ 20/day/person 21 X 15 X US $ 20	6,300	FGTF
				Perdiem participants : US $ 50/day/person. 21 X 15 X US $ 50	15,750	FGTF
				Local travel/Field Trip US $ 5,000	5,000	FGTF
				Training Facilities : US $ 5,000	5,000	FGTF
				Honorarium for instructors US $ 50 18 X 8 X US $ 50	7,200	FGTF
5	Comparative Studies	12	15 days	Living Allowance : 12 X 5 X US $ 135	8,100	FGTF
6	Procurement			Five Computer and printers	15,000	FGTF

No.	Activities	Participant	Duration	Detail Expenditure	Amount	Source of Funding
7	Secretariat/General operation activities		12 months		10,000	UNTF
8	Project Evaluation				2,500	POTF
9	Preparation and Dissemination report				3,000	POTF
10	Project Office and staff salary and training various			US $ 6,000 per month	60,000	Host Country
11	Follow-up national of model			13 countries	200,000	host and participating countries
TOTAL				POTF	155,250	
				Host and Participating Countries	275,000	

anx4-1/fx.all/egm

REPORT OF THE NINTH MEETING OF THE COMMITTEE OF EXPERTS OF THE PEREZ-GUERRERO TRUST FUND FOR ECDC/TCDC

New York, 4-8 April 1994

OFFICE OF THE CHAIRMAN OF THE GROUP OF 77
NEW YORK

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
II.	ASSESSMENT OF THE RESULTS ACHIEVED BY PGTF	2
III.	CONSIDERATION OF OPTIONS AVAILABLE TO EXPAND THE RESOURCES OF PGTF	3
IV.	REVIEW OF THE GUIDELINES OF PGTF	5
V.	CONSIDERATION OF NEW PROJECT PROPOSALS	8
VI.	ASSESSMENT OF THE IMPLEMENTATION OF APPROVED PROJECTS	29
VII.	OTHER MATTERS	49
	Annex I: List of Participants	50
	Annex II: Summary of the Utilization of PGTF	52
	Annex III: Financial Statement of PGTF (as of 31 March 1994)	53

I. INTRODUCTION

1. Pursuant to the provisions of the High-level Meeting on ECDC held in Cairo in August 1986, the rules of procedure adopted at its first meeting held in Caracas in August 1987, the provisions of the Twelfth Annual Meeting of the Ministers for Foreign Affairs of the Group of 77 held in New York in September 1988, the Seventh Meeting of the Intergovernmental Follow-up and Coordination Committee on ECDC (IFCC-VII) held in Kuala Lumpur in July-August 1989, the First Annual Meeting of the Group of 77, held in New York in September 1989, and the provisions of the Eighth Meeting of the Intergovernmental Follow-up and Coordination Committee on ECDC (IFCC-VIII), held in Panama City in August-September 1993, the Committee of Experts of the Perez-Guerrero Trust Fund (PGTF) for ECDC/TCDC held its ninth meeting in New York from 4 to 8 April 1994.

2. IFCC-VIII, held in Panama City from 30August to 3 September 1993, decided that a special meeting of the Committe of Experts of PGTF should be convened to: (a) assess the results achieved by PGTF; (b) examine options available to expand its resources: (c) review the implementation of the guidelines for its utilization in the light of the experience gained and recommend their improvement and adjustment if necessary; and (d) reconsider a project proposal submitted by the Action Committee for Collaboration in the Field of Consultancy, Construction and Engineering.

3. Following a request by the Chairman of the Group of 77 in New York, the meeting combined the special session of the Committe of Experts, as mandated by IFCC-VIII, and the regular session for 1994, with a view to rationalizing the work of the Committee of Experts.

4. The meeting was attended by the six members of the Committeee, representing the three regions of the Group of 77. A representative of the Chairman of the Group of 77 in New York also attended the meeting. Dr. Eduardo Praselj was elected chairman of this session. The list of participants appears as annex I.

5. An officer of the Special Unit for TCDC of UNDP was invited by the Committee to provide information on matters related to UNDP relevant to the deliberations of the Committee.

6. The Committee adopted the following agenda:

1. Assessment of the results achieved by PGTF;
2. Consideration of options available to expand the resources of PGTF;
3. Review of the guidelines of PGTF with a view to their improvement;
4. Consideration of new project proposals;
5. Assessment of the implementation of approved projects;
6. Other matters.

7. The Committee had before it the following documents:

1. Inputs submitted by Member States concerning the guidelines for the utilization of PGTF
2. Working Paper submitted by the Office of the Chairman concerning the guidelines for the utilization of PGTF
3. Thirty-five (35) project proposals;
4. Twelve (12) project reports received by the Office of the Chairman
5. Note by the Office of the Chairman on the status of approved projects
6. Note by UNDP on the composition of the PGTF portfolio.
7. Note by UNDP on the financial status of PGTF

II. ASSESSMENT OF THE RESULTS ACHIEVED BY PGTF

8. Since its establishment in 1986, the PGTF has provided support to 43 projects for a total of US$4.055.321. These projects fall within the various priority areas identified in the Caracas Programme of Action and they include activities carried out at the sub-regional, regional and interregional levels. A breakdown of the areas receiving the largest support from PGTF is as follows:

22% to trade related projects, mainly support to GSTP negotiations;
21% to projects related to information exchange and dissemination;
20% to projects in the food and agriculture sector;
10% to technology related projects; and
27% to projects in the areas of finance, consulting services, training, other TCDC activities, industrialization and finance

On the basis of country coverage, PGTF resources were allocated as follows:

51% to inter-regional projects;
31% to sub-regional projects;
16% to regional projects; and
2% to action committees.

A summary of the utilization of PGTF resources is provided in Annex II.

9. It should be noted that in spite of the limited resources made available to PGTF at its inception and the difficulties arising from the very limited infrastructure for supporting the work of the Committee of Experts and ensuring an appropriate follow-up of the implementation of projects, PGTF has proved to be a viable initiative, where ECDC and TCDC activities are funded according to the priorities decided by the Group of 77.

10. For a number of years, one of the main shortcomings of PGTF has been the lack of suitable project proposals and the rather long delays in implementing the approved projects. This

problem was tackled through: (a) a vigorous effort by the Office of the Chairman of the Group of 77 in New York to increase awareness of governments of developing countries and intergovernmental institutions of the possibilities of PGTF as a source of financial support for ECDC/TCDC; (b) facilitating the process of submission and appraisal of projects by the preparation and dissemination of a model format and an informative brochure; and (c) expediting the follow-up and implementation of approved projects by adopting the appropriate operational arrangements between the Office of the Chairman and the UNDP as the administering body of the resources of PGTF.

11. As a result of these activities, some 30-50 project proposals are being submitted each year for consideration by the Committee of Experts. This development has coincided with a sharp decline in the resources available for project support, that would require urgent action from the Group of 77 to preserve and ensure the long-term viability of PGTF as an important, albeit modest, source of financial support for ECDC and TCDC.

12. It should also be noted that the original project cycle, including submission, appraisal and recommendation by the Committe of Experts and approval by member countries of the Group of 77, assumed a yearly session of the IFCC with a view to holding a discussion of the proposals at the governmental level. Since IFCC is no longer meeting on a yearly basis, it is important to ensure the necessary continuity of PGTF through suitable intersessional arrangements, as recommended in the final report of IFCC-VIII.

III. CONSIDERATION OF OPTIONS AVAILABLE TO EXPAND THE RESOURCES OF PGTF

13. According to the guidelines for utilization of PGTF, the resources available for supporting projects were provided by the interest earned by the core capital of the Fund (US$ 5 million), plus the interest stemming from the unspent resources in any given year . In its second meeting in 1988, the Committee recommended that the UNDP explore ways and means to increase the yield of the Fund resources, striking the appropriate balance between yield, security and availability of resources. As a result of this recommendation, the core capital of the Fund was invested in high-yield medium-term financial instruments that provided an average return of around 9% per annum and therefore the yearly resources available to PGTF were in the order of US$500,000.

14. The majority of these medium-term instruments matured in December 1993 and the reinvestment of funds was adversely affected by the low level of interest rates prevailing in the major financial markets. As a result, current average yield of PGTF resources is slightly above 5% per annum and the yearly available resources have been reduced to US$300,000. This is likely to be the case for 1994 and 1995 as well. This development puts a very severe constraint on the capability of PGTF to support ECDC/TCDC projects.

15. The Committee examined various potential ways and means to expand the resources of PGTF. Options available fall within one of the three following categories: (a) increase of the core capital; (b) increase of the yield of the PGTF portfolio: and (c) increase of the multiplier effect of PGTF resources.

(a) Increase of core capital

16. This option implies the enlisting of contributions from potential donors. Since the current guidelines for utilization of PGTF establish that only interest accruing from the core capital can be used for supporting projects, the request for contributions should be made on the same grounds, that is funds-in-trust to be administered by the UNDP, with the provision that only the interest earnings could be utilized for funding projects.

17. The potential donors may include interested developing and developed countries as well as intergovernmental and non-governmental institutions and organizations. Private foundations may represent a promising source for contributions.

18. The possibility of earmarking these contributions for certain types of projects or certain areas of activity or project components, such as environmental concerns, should also be considered.

19. The Committee was of the view that the Chairman of the Group of 77 should be requested to identify and approach the potential donors with a view to exploring their interest and willingness to make contributions, taking into account the foregoing.

(b) Increase of the yield of the PGTF portfolio

20. The short-term outlook of financial markets where UNDP invests the PGTF core capital in accordance with its Financial Rules and Regulations, indicate that it is very unlikely that interest rates will increase in the next two or three years, and there are very little prospects that the yield of the current PGTF portfolio would show any substantial increase. There are other possibilities for financial investment of PGTF resources that could result in higher returns but at the expense of an increased risk that makes these options unfeasible.

21. Following the maturity of two medium-term (four years) financial instruments in December 1993, the UNDP decided to reinvest in shorter-term (two years) financial instruments in view of the prevailing low interest rates. The Committee was of the view that the evolution of interest rates should be closely followed in order to make the necessary recommendations to UNDP. This would imply that PGTF core capital should be maintained in financial instruments with a maturity of 2-3 years until the interest rates peak. At that moment, it would be advisable to select longer-term instruments.

22. The Committee recommended that the situation of the interest rates be examined at each

session of the Commttee with a view to making appropriate recommendations.

(c) Increase of the multiplier effect of PGTF resources

23. One of the available options for increasing the multiplier effect of PGTF resources is through cofinancing of projects with third parties, including governmental, intergovernmental and non-governmental organizations.

24. The operationalization of this option requires the identification of entities iterested in cofinancing projects with the PGTF, and a workable arrangement for identifying and selecting projects for cofinancing. One possible way is the submission, after approval by IFCC or the Ministerial Meeting of the Group of 77, as appropriate, of the projects availing from the funding of the PGTF to the prospective cofinancing entities with a view to enlisting their support. It has to be borne in mind that this option would introduce a certain rigidity in the implementation process of the approved projects.

25. Another option would be to request a mandatory minimum contribution from the project sponsors when submitting proposals for consideration by the Committee of Experts.

IV. REVIEW OF THE GUIDELINES OF PGTF

26. The Committee of Experts made a thorough revision of the inputs provided by governments regarding the guidelines for utilization of PGTF and noted that only six countries provided comments in writing for the special session.

27. The Committee considered that, in the light of the experience of the PGTF since its inception in 1986, some adjustments have to be made to the guidelines with a view to ensuring a more effective and prompt response of PGTF to the needs of developing countries. These adjustments can be grouped into three categories: (a) clarifications regarding the meaning of criteria for project eligibility; (b) new elements to be added to the project criteria in view of the current severe limitation of resources of PGTF; and (c) improvements in the operational arrangements between the Office of the Chairman, the project sponsors and the UNDP with a view to expediting the follow-up and implementation of approved projects.

(a) Clarifications regarding the meaning of criteria for project eligibility

28. The Committee was guided by the interpretations provided on a consistent basis by the Committee in its first eight meetings regarding the criteria for project eligibility. It should be noted that the guidelines provide a general framework within which it is necessary to appraise the specific features of every individual project.

29. One main area where some clarification is required is the scope of eligibility of projects.

It should be noted that around one-half (113 out of 224) of the project proposals submitted for consideration by the Committee of Experts in its first eight meetings were not eligible for funding because they corresponded to national projects. Even though the basic purpose of PGTF is to finance ECDC/TCDC projects and therefore national projects are not eligible as indicated in the guidelines. it seems that this aspect has not been adequately perceived by the project sponsors.

30. The Committee recommended that the following clarification should be added to the criteria for project eligibility:

> *Projects that are exclusively of a national nature would not be eligible for financing. A project to be eligible should necessarily contain an ECDC or TCDC component. that is any activity that involves the deliberate and voluntary sharing, pooling or exchange of economic and technical resources. skills and capabilities between two or more developing countries for their individual or mutual development.*

31. The definition of the cooperative dimension of projects to be eligible is a second area that requires clarification. In this regard, the Committee recommended the following:

> *For nationally executed projects to be eligible, the cooperative component of the project has to be established through the identification and declared interest of and explicit participation by other developing countries as potential beneficiaries in the activities of the project, as appropriate.*
>
> *Cooperative projects can be carried out on a sub-regional. regional or inter-regional basis. In this regard, projects that are essentially of a bilateral nature are not eligible for funding.*
>
> *Dissemination of results to interested countries cannot by itself be considered as a rationale for the cooperative character and hence the eligibility of the project.*

32. The guidelines indicate that the objective of the Fund is to provide seed money for ECDC/TCDC activities. This implies that regular budget activities of organizations and institutions are not eligible for funding. However, the Committee was of the view that this does not preclude the eligibility of ongoing activities, provided that the requested support is of a catalytic nature. In the light of the above, the Committee considered that it should be necessary to provide clarifications in this regard:

> ***The support provided by PGTF is of a catalytic nature and cannot be used for the full implementation of a project, which is the responsibility of the participating countries. In this regard, regular budget activities of organizations or institutions are not eligible for funding from PGTF resources.***

33. There has been some confusion regarding the priority areas that should be addressed in the project proposals. Even though ECDC/TCDC activities are carried out by the Group of 77 within the framework of the Caracas Programme of Action, the Committee felt that this matter should be clarified as follows:

Project proposals submitted for funding from PGTF should address the sectoral priorities contained in the Caracas Programme of Action, that is Trade, Technology, Food and Agirculture, Energy, Raw Materials, Finance, Industrialization and Technical Cooperation among Developing Countries.

(b) New elements to be added to the project criteria in view of the current severe limitation of resources of PGTF

34. As previously indicated in this report, PGTF is facing a severe shrinking of its available resources that imposes a serious limitation on its capabilities for providing support to ECDC/TCDC projects. The Committee therefore felt that it would be necessary, at least under the present circumstances, to include new elements so as to ensure the best possible use of the scarce resources available.

35. Bearing in mind the need for an adequate rotation of beneficiaries of PGTF support as well as for rationalization in the submission of project proposals, the Committee recommended that the following elements be added to the criteria for project elegibility:

Proposing organizations and institutions may submit no more than one (1) project proposal per annum for funding from PGTF.

Project proposals by governmental or non-governmental organizations should be submitted to PGTF through their respective National Focal Points for ECDC/TCDC.

The financial support given to any project proposal in a given year cannot exceed one-fifth of the total resources available to PGTF for that year. The Office of the Chairman of the Group of 77 will inform at the beginning of each calendar year the corresponding availability of resources.

All project proposals submitted to PGTF should include inputs from other sources of an amount at least equal to the resources requested from PGTF. These inputs should be secured by the sponsors prior to submission of the proposal to PGTF.

The initiation of the implementation of projects, determined by the signature of the project document and the corresponding sub-contract where appropriate, should take place no more than two years after the adoption of the project by IFCC or the Ministerial Meeting of the Group of 77. Should this condition not be

fulfilled. the funds would revert to PGTF folowing consideration and recommendation by the Committee of Experts.

(c) Improvements in the operational arrangements

36. The Committee noted with statisfaction that there has been a substantial improvement in the follow-up and implementation of approved projects, as indicated by the significant reduction in the time elapsed between approval of projects and initiation of their implementation. However. the Committee felt that reporting on progress of the projects and on the status of expenditures. with very few exceptions, has not been satisfactory and action should be taken in this regard.

37. The Commitee felt that executing organizations should be requested to submit timely progress and financial reports. In this regard. whenever the characteristics of the implementation of the project enable such an approach. disbursement of funds should be made in more than one tranche. The Committee recommended that the following procedure be incorporated in the follow-up and execution of projects:

Whenever feasible. the Committee of Experts should indicate in its recommendation for adoption of a given project if disbursement of funds should take place in two or more tranches. The disbursement of subsequent tranches would be subject to the timely submission of the corresponding financial and progress reports.

No follow-up project would be considered until the previous one is implemented.

38. One area that requires the support of various organizations from the United Nations system is the verification of possible duplications of proposed projects with activities under way in the various agencies of the U.N. system or in developing countries. In this regard. the Committee recommended that the Office of the Chairman of the Group of 77 in New York verifies possible duplications well before the holding of each meeting of the Committee of Experts. In this activity, the Office of the Chairman should seek the assistance of UNDP and other relevant organizations.

39. The term of office of the members of the Committee of Experts is two years, as indicated by the guidelines. Bearing in mind that it is fundamental to ensure that the Committee as a collective body strikes the right balance between experience gained and the principle of rotation, the Committee considers that this term should be increased to three or four years.

V. CONSIDERATION OF NEW PROJECT PROPOSALS

40. The Committee had before it thirty-five (35) project proposals submitted to avail of the

financing of PGTF. The list of these proposals is as follows:

(1) *Financing of the follow-up of the activities of the Group of 77 Action Committee for Collaboration in the field of Consultancy, Construction and Engineering*
(2) *Caribbean Community (CARICOM) Secretariat: Integrated Information Systems Establishment and Use*
(3) *Philippine Proposal: A Conference on Fisheries Development Strategies for the ASEAN Region for the Year 2000*
(4) *Regional Strategic Armyworm Control Project*
(5) *Training on the use of a computer simulation model for food security analysis in developing countries of the NAM*
(6) *Establishment of an industrial Technical Information Service*
(7) *Kenya Entrepreneurship Development for rural areas*
(8) *Evaluation of Mineral Ore resources in Kenya*
(9) *Protection of Lake Victoria Waters*
(10) *The Integration of Women, Retirees and the Youth into Industry*
(11) *Teaching of practical skills in polymer (plastic) processing*
(12) *A Survey of Polymer Industries, products, processing techniques, equipment and its bi-products in the Kenyan industrial sector plus industrial waste disposal*
(13) *Corps of Senegalese Volunteers for Development (CVSD)*
(14) *Integrated Development Plan for the recovery of historical and artistical sites*
(15) *Optimization of the process for obtaining crude PMSG for animal reproduction*
(16) *Technical assistance to members of the Group of 77 participating in the Second Round of Negotiations within the Global System of Trade Preferences among Developing Countries (GSTP) and seeking membership in the GSTP, as well as related technical, secretariat and other support to the GSTP*
(17) *Program for the Development of Communications and Cooperation among Latin American and Caribbean Educators (AELAC)*
(18) *The Latona Project (Dominican Republic)*
(19) *Establishment of TIN Management Center to coordinate the global establishment of the network with a Project Coordinating Committee*
(20) *Promotion and Enhancement of the Self-Propelling Growth Strategy*
(21) *Low cost housing technology programme*
(22) *Training of extension personnel from developing countries*
(23) *Competence building in biotechnology*
(24) *India and ASEAN: An operational programme for economic cooperation*
(25) *Foreign direct investment in MERCOSUR countries*
(26) *Productive internationalization in MERCOSUR: Foreign direct investment and regional transnational corporations*
(27) *Establishment of a productivity centre and advisory services in the mines and energy sector*

(28) *Technical assistance to establish petroleum college in Sudan, Africa*
(29) *ASEAN Regional Development Centre for Mineral Resources (ARDCMR)*
(30) *Arab Regional Legislation Information Network - ARLIN*
(31) *West Indian Immigrants in Urban America: Policy Research and Action Plan for Skills and Technology Transfer*
(32) *Catering and Tourism Training Institute Expansion Project*
(33) *Employment and income generation in West and Central Africa*
(34) *The Latona Project (Honduras)*
(35) *Control of Eutrophication and pollution in Iraqi Lakes*

41. The following six (6) project proposals were submitted after the established deadline of 31 March 1994 and therefore were not considered by the Committee at this session:

(1) *Feasibility study for renovation of textile mills*
(2) *Pyinmana sugar factory no. 1 renovation project*
(3) *Disposable syringes production project*
(4) *Prefeasibility study for cement plant projects and for operating the production capacity of existing cement mills*
(5) *Technical experts for granite quarrying*
(6) *Renovation of the Myaungmya jute mill*

Project proposal No. 1 - ***Financing of the follow-up of the activities of the Group of 77 Action Committee for Collaboration in the field of Consultancy, Construction and Engineering***

42. This project proposal was reconsidered by the Committee of Experts as requested in paragraph 79 of the Final Report of IFCC-VIII. The project proposal was originally submitted to the Committee of Experts at its eighth meeting in 1993 by the G-77 Action Committee for the Collaboration in the Field of Consultancy, Construction and Engineering and endorsed by the Member Countries of the Action Committee.

43. On that occasion the Committee was of the view that this project could lead to duplication of work currently carried out by the United Nations system and in particular by UNIDO. According to the information gathered by the Committee of Experts, the previous position was reiterated on the basis of the following evidence of duplication with some of objectives of the proposed project:

(a) UNIDO has prepared and regularly updates a roster of consultants and experts, that includes consultants from developing countries in the field covered by the project proposal;
(b) The Special Unit for TCDC of UNDP has developed and regularly updates the Information Referral System (INRES), that contains a comprehensive list of organizations from developing countries having the capability to provide consultancy services in the field covered by the project proposal;

(c) UNCTAD has been providing support to the member countries of the G-77 for the GATT negotiations in the field of services;

44. The Committee therefore recommended that this proposal should not avail from the financing of PGTF.

Project proposal No. 2 - ***Caribbean Community (CARICOM) Secretariat: Integrated Information Systems Establishment and Use***

45. The project proposal was submitted by the Caribbean Community (CARICOM) Secretariat, headquartered in Georgetown, Guyana.

46. According to the text of the proposal, the objective of the project is to complete the establishment of an Integrated Information System in the CARICOM Secretariat and provide access to the system through the provision of training and equipment.

47. Total cost of the project, to be completed in one year, is estimated at US$257,610. The contribution requested from PGTF amounts to US$205,900 to be totally devoted to the acquisition of computer hardware and software.

48. The Committee considered that the activities listed in the proposal do not relate explicitly to any cooperation project, since they refer only to the purchase of equipment and software to carry out the regular activities of the proposing institution. Therefore, this project does not comply with the guidelines for utilization of PGTF and is not eligible for funding.

49. The Committee recommended that this proposal should not avail from the financing of PGTF.

Project proposal No. 3 - ***Philippine Proposal: A Conference on Fisheries Development Strategies for the ASEAN Region for the Year 2000***

50. The proposal was submitted by the Bureau of Fisheries and Aquatic Resources, Department of Agriculture, of the Philippines.

51. According to the information submitted, the objective of the project is to hold a conference through the ASEAN Coordinating Group on Fisheries with a view to (a) convening representative interest groups from the fisheries sectors from all ASEAN member countries; (b) reviewing the status of the fisheries sectors of the region as a resource and their roles in the economies of ASEAN; (c) conducting an assessment of the impacts of various fishery management measures that affected the ASEAN as a region; and (d) examining and determining the future directions/strategies for fisheries management and development of ASEAN for the year 2000.

52. Total estimated cost of the project is US$200.000. The contribution requested from PGTF amounts to US$135.000. but no breakdown of costs was provided in the proposal. The Philippines and other ASEAN member countries contribution is US$66,000.

53. The Committee considered that the activities described in the proposal had been carried out in larger and specific contexts, such as FAO and the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. Given that the resources of PGTF should not be used as a substitute for resources available to the U.N. agencies, the Committee concluded that this proposal is not eligible for funding from PGTF.

54. The Committee therefore recommended that this proposal should not avail from the financing of PGTF.

Project proposal No. 4 - ***Regional Strategic Armyworm Control Project***

55. The project proposal was submitted by the Ministry of Agriculture of Kenya.

56. According to the text of the proposal. the broad objective of this project is to control crop damage from armyworm with the following specific objectives: (a) to carry out a feasibility study to determine how the existing organizations can best be coordinated prior to the implementation of the project; (b) to improve and refine the understanding of the factors affecting the development and spread of the armyworms in Kenya; (c) to strengthen the monitoring, forecasting and early warning system in Kenya needed to disseminate rapidly on primary and critical outbreaks of armyworms; (d) to strengthen the capability to rapidly control such outbreaks: and (e) to strengthen the capacity of the Crop Protection Branch of the Ministry of Agriculture of Kenya to continue with the effective armyworm control measures.

57. Total cost of the project. to be carried out over a three-year period. is estimated at US$2 million. Contribution sought from PGTF amounts to US$500,000 while the proposing institution and the European Economic Community are contributing US$200,000 and US$1.3 million. respectively.

58. The Committee considered that even though the subject of the proposed project corresponds to an area of high priority, its activities indicate that it is a national project that is not eligible for funding from PGTF. Moreover, the contribution sought from PGTF goes well beyond the current funding capability of the Fund.

59. The Committee therefore recommended that this project should not avail from the financing of PGTF.

Project proposal No. 5 - ***Training on the use of a computer simulation model for food security analysis in developing countries of the NAM***

60. The project proposal was submitted by the Ministry of Agriculture of Indonesia.

61. According to the text of the proposal, the objective of the project is to strengthen and improve national capabilities of NAM developing countries in analyzing and formulating policies and strategies of food security. The project involves three main outputs, namely (a) development of a computer simulation model of food security; (b) training food security planners of selected developing countries of NAM, and (c) implementing of an after-training comparative study tour.

62. Total cost of the project for training of participants of 12 countries, to be carried out in one year, amounts to US$430,850. Contribution sought from PGTF amounts to US$155,850. The host country and participating countries contributions amount to US$80,000 and US$195.000, respectively.

63. The Committee considered that this project complies with the guidelines for utilization of PGTF.

Project proposal No. 6 - ***Establishment of an industrial Technical Information Service***

64. The proposal was submitted by the Ministry of Commerce and Industry of Kenya.

65. According to the information submitted, the objective of the project is to meet the information needs of entrepreneurs, potential investors, managers, production engineers, researchers and consultants in industry.

66. Total cost of the project is estimated at US$1.4 million. There is no indication of the contribution sought from PGTF.

67. The Committee considered that this project proposal corresponds to a national project that is not eligible for funding from PGTF.

68. The Committee therefore recommended that this proposal should not avail from the financing of the PGTF.

Project proposal No. 7 - ***Kenya Entrepreneurship Development for rural areas***
Project proposal No. 8 - ***Evaluation of Mineral Ore resources in Kenya***
Project proposal No. 9 - ***Protection of Lake Victoria Waters***
Project proposal No. 10 - ***The Integration of Women, Retirees and the Youth into Industry***

69. These four project proposals were also submitted by the Ministry of Commerce and Industry of Kenya.

70. The Committee examined the foregoing four proposals and found that both the scope and

the beneficiaries of these projects are of national character. and therefore are not eligible for funding from PGTF.

71. The Committee recommended that project proposals Nos. 7-10 should not avail from the financing of PGTF.

Project proposal No. 11 - ***Teaching of practical skills in polymer (plastic) processing***

72. The proposal was submitted by the Ministry of Commerce and Industry of Kenya.

73. According to the text of the proposal. the objective of the project is to strengthen national and regional research potential in the basic and engineering sciences through further training in polymer processing techniques. In this regard. it is proposed to organize an eight-week course to train academic staff from eastern and central African regional universities.

74. Total cost of the project is estimated US$381.270. There is no indication of the contribution sought from PGTF.

75. The Committee considered that even though the proposed programme is aimed at providing training on a regional basis. there is neither identification of potential beneficiaries nor any declared interest on their part. Therefore. the cooperative element of the project cannot be ascertained and it should be considered as a national one that is thus not eligible for financing from PGTF.

76. The Committee recommended that this project proposal should not avail from the financing of PGTF.

Project proposal No. 12 - *A **Survey of Polymer Industries. products. processing techniques. equipment and its bi-products in the Kenyan industrial sector plus industrial waste disposal***

77. The project proposal was submitted by the Ministry of Commerce and Industry of Kenya.

78. According to the information provided, the objective of the project is to establish the ownership and the available equipment used in polymer processing, with a view to determining the capability of this industrial sector.

79. Total estimated cost of the project is US$286,800. There is no indication of the contribution sought from PGTF.

80. The Committee considered that this proposal corresponds to a national project that is not eligible for financing from PGTF.

81. The Committee recommended that this project proposal should not avail from the

financing of PGTF.

Project proposal No. 13 - *Corps of Senegalese Volunteers for Development (CVSD)*

82. The proposal was submitted by the Office of the Prime Minister of Senegal.

83. According to the text of the proposal, the objective of the project is to establish a Corps of Senegalese Volunteers for Development.

84. Total cost of the project is estimated at US$2.4 million. The contribution sought from PGTF amounts to US$2 million.

85. The Committee considered that this proposal corresponds to a national project that is not eligible for financing from PGTF. Moreover, the contribution requested from PGTF exceeds by far the current capabilites of the Fund.

86. The Committee recommended that this project proposal should not avail from the financing of PGTF.

Project proposal No. 14 - ***Integrated Development Plan for the recovery of historical and artistical sites***

87. The project proposal was submitted by the Fondo Nacional de Fomento al Turismo (National Fund for Tourism Promotion) from Mexico and the Instituto Hondureño de Turismo (Honduran Tourism Institute).

88. According to the information provided, the main objectives of the project are (a) to prepare a comprehensive assessment of the historical sites of Oaxaca in Mexico and Tela in Honduras, including present socio-economic, urbanistic and architectural aspects as well as their short-, medium- and long-term prospects; (b) to provide the technical justification required for the integration and launching of a historical sites programme that would provide for the uitilization, preservation, restoration and protection of cultural resources; (c) to establish the strategy for the rational and sustained utilization of Oaxaca and Tela with a view to improving local productive activities, with special emphasis on tourism development; and (d) assess the trends of environmental degradation in these historical sites.

89. Total cost of the project, to be carried out in a ten-month period, is US$294,362. The contribution sought from PGTF is 50% of the total cost, that is US$147,181, the balance being contributed by the proposing institutions.

90. The Committee considered that the activities described in the proposal fall fully within the purview of UNESCO and that this U.N. specialized agency should be approached for funding of the project. Furthermore, the Committee noted that the country coverage of this proposal is

limited since it corresponds to a bilateral project.

91. The Committee recommended that this project proposal should not avail from the financing of PGTF.

Project proposal No. 15 - ***Optimization of the process for obtaining crude PMSG for animal reproduction***

92. This project proposal was submitted by the Government of Cuba.

93. According to the text of the proposal. the objectives of the project are: (a) to optimize the process of obtaining high quality blood plasm from pregnant mares, as well as its preservation; (b) to optimize the process of industrial production of PMSG; (c) to undertake studies at laboratory and pilot scales with a view to producing purified PMSG; (d) dissemination of the results of the research to interested developing countries: and (e) organization of an interregional seminar with specialists from interested developing countries.

94. Total estimated cost of the project is USD 597,194. The contribution requested from PGTF is USD 165.000. A breakdown of the total cost is as follows:

	Contribution (USD)		
Item	Local	PGTF	Total
Personnel	69,096	-	69,096
Experts	16,000	-	16,000
Equipment	257,098	80,000	337,098
Seminar	30,000	60,000	90,000
Other	60.000	25.000	85.000
	432,194	165,000	597,194

95. This proposal was originally submitted to the Committee of Experts at its sixth meeting in 1991. The view of the Committee was that the proposal corresponded to a national project and thus was not eligible for financing from PGTF, since there was no explicit participation of or declared interest by other countries as potential beneficiaries. In the revised version submitted to the present session of the Committee, the proposal contains the explicit support of the Governments of six other developing countries. Therefore, the Committee considered that the outstanding condition for complying with the guidelines for utilization of PGTF had been fulfilled.

Project proposal No. 16 - ***Technical assistance to members of the Group of 77 participating in the Second Round of Negotiations within the Global System of Trade Preferences among Developing Countries (GSTP) and seeking membership in the GSTP, as well as related technical, secretariat and other support to the GSTP***

96. The proposal was submitted by the Group of 77 in Geneva through its Chairman.

97. According to the text of the proposal, the development objectives of the project is to promote trade liberalization and diversification of trade and production of developing countries through the further enhancement of the GSTP in terms of increasing membership and expanding product coverage in the context of the Second Round of Negotiations.

98. The duration of the project is one year. Total estimated cost of the project is US$177,000, the totality of which is the contribution sought from PGTF. A breakdown of the project cost is as follows:

Item	PGTF contribution
Experts	70,000
Support personnel	50,000
Official travel	12,000
Meetings, workshops, including documentation, and computer time-sharing costs	42,000
Reproduction and dissemination of final report by the G-77 in New York	3,000
TOTAL	177,000

99. The Committee considered that this proposal complies with the guidelines for utilization of PGTF. However, given the limitation of resources of PGTF and taking into account that PGTF has already allocated around US$2 million to the GSTP process, the Committee reiterated the recommendation made at its seventh meeting which was adopted by and reflected in para. 59(a) of the Final Report of IFCC-VIII where the Chairmen of the Group of 77 in New York and in Geneva were invited to explore various other sources of possible funding for the GSTP process, specifically related to technical support to the GSTP, including support to the Ministerial Meeting of the GSTP Negotiating Committee.

Project proposal No. 17 - ***Program for the Development of Communications and Cooperation among Latin American and Caribbean Educators***

100. This project proposal was submitted by the Association of Educators of Latin America and the Caribbean (AELAC), headquartered in Havana, through the Government of Cuba.

101. According to the text of the proposal, the objectives of the project are: (a) to expand Latin American and Caribbean coordination and integration so as to improve higher education and develop its own pedagogy in answer to the problems and needs of the region; (b) to increase professional relations between institutions and workers in the field of education; (c) to establish material and human conditions enabling communication and specialized information exchange; (d) to publicize experiences and promote the knowledge and use of new techniques in education

and teaching; and (e) to contribute towards the improvement of the region's educators as a basic requisite for enhancement of the educational activity.

102. The duration of the project is three years and total estimated cost of the project is US$ 477,534. The contribution requested from PGTF amounts to US$ 150,000. A breakdown of the total cost is as follows:

	Contribution (US$)		
Item	Local	PGTF	Total
Personnel	45,000	-	45,000
Consultants	-	13,500	13,500
Training	72,000	67,200	139,200
Travel	-	44,160	44,160
Equipment	19,800	12,900	32,700
Office space and furniture	168,570	-	168,570
Other	22,164	12,240	34,404
TOTAL	27,534	150,000	477,534

103. This proposal was submitted originally at the sixth session of the Committee of Experts in 1991. The view of the Committee on that occasion was that the proposal fell within the purview of activities regularly undertaken by UNESCO. However, the project sponsors made the necessary consultations and ascertained that this proposal could not be financed by UNESCO and therefore decided to resubmit it for consideration by the Committee of Experts.

104. In the light of this information, the Committee considered that the proposal complies with the guidelines for utilization of PGTF.

Project proposal No. 18 - ***The Latona Project (Dominican Republic)***

105. The proposal was submitted by Bio-Waste Technologies International, Ltd., headquartered in St. Vincent, through the Government of the Dominican Republic.

106. According to the text of the proposal, the objective of the project is to prepare a feasibility study, preliminary to the installation of facilities for the disposal and processing, through biological agents, of municipal solid wastes and sewage sludge into non-polluting material (compost), in various locations of the Dominican Republic. An immediate objective is the selection of suitable landfills for locating the waste disposal and treament facilities.

107. Total cost of the project, to be carried out over a five-year period, is estimated at US$4,905,000. The contribution requested from PGTF amounts to US$3,255,000. The initial study for selecting landfills would require six months to be completed, at a cost of US$300,000.

108. In the light of the information provided, the Committee considered that this proposal

corresponds to a national project that is not eligible for funding from PGTF. Furthermore. the contribution sought from PGTF exceeds by far its current funding capacity.

109. The Committee recommended that this project should not avail from financing of PGTF.

Project proposal No. 19 - ***Establishment of Trade Information Network (TIN) Management Center to coordinate the global establishment of the network with a Project Coordinating Committee***

110. The project proposal was submitted by the Office of the Chairman of the Steering Committee of the Conference of Chambers of Commerce and Industry (CCI) of Developing Countries Members of the Group of 77.

111. According to the information provided, the development objective of the project is to contribute towards the enhancing of expansion of South-South trade by meeting the information requirements of businesses and by making this information accessible to them. The immediate objective of the project is to design and initiate the programme for managing the implementation of TIN.

112. Total cost of the project, to be carried out in one year, is estimated at US$255,000, the contribution sought from PGTF being US$130,000. The UNDP contribution amounts to US$125,000 plus an in-kind contribution through office support services.

113. The Committee examined this proposal taking into consideration the high priority attached by the Group of 77 to the establishment of TIN among the CCIs, as stated in paras. 59 (b) and 60 of the Final Report of IFCC-VIII. The Committee considered that the proposal complies with the guidelines for utilization of PGTF.

Project proposal No. 20 - ***Promotion and Enhancement of the Self-Propelling Growth Strategy***

114. This proposal was submitted by the Government of Indonesia.

115. According to the text of the proposal, the development objective of the project is to strengthen South-South and international development cooperation in dealing with common critical needs and problems of the developing world through the Self-Propelling Growth Strategy (SPG). The immediate objectives of the project are: (a) to develop schemes and transfer those successful innovations through joint SPG projects; (b) to exchange experience and technical assistance on selected SPG schemes; and (c) to enhance the flow of information of any SPG related aspects by networking and interlinking the existing focal points in the participating countries and organizations.

116. Total estimated cost of the project is US$315,720. The contribution sought from PGTF amounts to US$215,720, the balance being provided by the government of Indonesia.

117. The Committee considered that the cooperative element of the project cannot be ascertained since there is neither identification of other developing countries as potential beneficiaries nor indication of the concrete utilization of the project's results. Therefore, the project is not eligible for financing from PGTF.

118. The Committee recommended that this project proposal should not avail from the financing of PGTF.

Project proposal No. 21 - ***Low cost housing technology programme***

119. The proposal was submitted by the Center for Science and Technology of the Non-aligned Movement through the Government of India.

120. According to the text of the proposal, the general objective of the project is to launch a viable low cost building technology programme, taking fully into account the specific climatic and economic situation prevailing in the various regions of the Group of 77.

121. The project would have a duration of two years. The total funds required for the implementation of the project would be US$95,000, the contribution sought from PGTF being US$65,000. A breakdown of the total cost is as follows:

Item	Contribution (US$)		
	PGTF	NAM S&T Centre	Total
Publication of S&T inputs for low cost housing	-	10,000	10,000
Feasibility report	20,000	10,000	30,000
Personnel training, travel, equipment, etc.	45,000	10,000	55,000
TOTAL	65,000	30,000	95,000

122. The Committee was of the view that the project complies with the guidelines for utilization of PGTF.

Project proposal No. 22 - ***Training of extension personnel from developing countries***

123. The proposal was submitted by the Ministry of Agriculture of India.

124. According to the information provided, the primary objectives of the project are: (a) to organize need-based and problem-oriented training for senior and middle managers of extension organizations of developing countries; (b) to serve as a repository of ideas and develop information, communication and documentation services on an international basis in agricultural extension management; and (c) to demonstrate effective extension education teaching procedures, methods and techniques to the managers of the agricultural extension programme.

125. Total estimated cost of the project, with a duration of five years, is US$2,350,000 the totality of which is the contribution sought from PGTF.

126. The Committee noted that there is no identification of the other participating countries as potential beneficiaries and that the contribution requested exceeds by far the current funding capabilities of PGTF. The Committee therefore recommended that this proposal should not avail from the financing of PGTF.

Project proposal No. 23 - ***Competence building in biotechnology***

127. The proposal was submitted by the Ministry of Science and Technology of India.

128. According to the text of the proposal, the immediate objective of the proposal is to train scientists, technologies, faculty members, and managers engaged in research and development, teaching at post-graduate level, production and application activities in the area of biotechnology. The long-term objective is the creation of competence and skilled manpower for the teaching and research pool of the country which would be beneficial to the scientists, both in India and other developing countries in the areas of mutual interest in biotechnology.

129. Total cost of the project to be carried out over a three-year period is estimated at US$585,000, the totality of which is the contribution sought from PGTF.

130. The Committee considered that there is no identification of the potential beneficiaries of the project from other developing countries and therefore it was not possible to ascertain the cooperative element of the project. Accordingly, the proposal should be considered as a national project that is not eligible for funding from PGTF. The Committee recommended that the project should not avail from the financing of PGTF.

Project proposal No. 24 - ***India and ASEAN: An operational programme for economic cooperation***

131. This proposal was submitted by the Research and Information System (RIS) for the Non-Aligned and other Developing Countries, headquartered in New Delhi, through the Government of India.

132. According to the text of the proposal, the objectives of the project are (a) to make follow-up study of sectoral dialogue issues between India and ASEAN with particular preference to ASEAN's experience with other dialogue partners; and (b) to conduct bilateral studies.

133. Total cost of the project is estimated at US$88,000. Contribution from the proposing institution amounts to US$30,000 while contribution sought from PGTF amounts to US$58,000.

134. The Committee considered that the nature of the activities described in the proposal fall

within the purview of the regular activities of concerned governmental and intergovernmental institutions and that therefore the proposal is not eligible for funding from PGTF. The Committee suggested that these institutions be approached for providing the necessary resources.

135. The Committee recommended that this proposal should not avail from the financing of PGTF.

Project proposal No. 25 - ***Foreign direct investment in MERCOSUR countries***
Project proposal No. 26 - ***Productive internationalization in MERCOSUR: Foreign direct investment and regional transnational corporations***

136. These two project proposals were submitted by the CPC Consultora Internacional Ltda., headquartered in Montevideo, through the Government of Uruguay.

137. According to the information provided, the objectives of the first proposal are to provide the national and private institutions with the information and tools necessary to empower them to take the appropriate decisions in the field of foreign direct investment (FDI) that will lead to attracting and channeling FDI in such a way that it will contribute to the growth and development of the four countries members of MERCOSUR, both individually and as a region, thus strengthening integration.

138. Total estimated cost of the project, to be carried out in nine months, is US$104,054. The contribution sought from PGTF amounts to US$80,000.

139. The second project, according to the text of the proposal, aims at the same broad objective as the first one, but in addition to FDI, an analysis of the activities of transnational corporations in each country of the region will be made. Total cost of the second project, the duration of which is one year, is estimated at US$182,200. The contribution sought from PGTF amounts to US$140,000.

140. The Committee considered that the proposal complies with the guidelines for utilization of PGTF.

Project proposal No. 27 - ***Establishment of a productivity centre and advisory services in the mines and energy sector***

141. The project was submitted by the Ministry of Mines and Energy of Indonesia.

142. According to the information provided, the long-term development objective of the project is to improve the productivity of the mines and energy sector and provide for increased job security and income of the sector employees through equitable sharing in the financial gains achieved through increased productivity.

143. Total cost of the project, to be carried out in one year, is estimated at US$100,000, the totality of which is the contribution requested from PGTF.

144. In the light of the information presented, the Committee concluded that this proposal corresponds to a national project which is not eligible for funding from PGTF.

145. The Committee recommended that this project should not avail from financing of PGTF.

Project proposal No. 28 - ***Technical assistance to establish petroleum college in Sudan, Africa***

146. The proposal was submitted by the Ministry of Mines and Energy of Indonesia.

147. The Committee considered that the proposal was incomplete, since the text submitted contains only the amount of the contribution sought from PGTF (US$50,000), but there is no indication of the activities to be carried out. Therefore, the Committee recommended that no action should be taken on this proposal. Furthermore, according to the title of the proposal, the Committee noted that the country coverage of this proposal is limited since it corresponds to a bilateral project.

148. The Committee recommended that this project should not avail from financing of PGTF.

Project proposal No. 29 - ***ASEAN Regional Development Centre for Mineral Resources (ARDCMR)***

149. The proposal was submitted by the Ministry of Mines and Energy of Indonesia.

150. According to the text of the proposal, the objective of the project is to provide support to the ASEAN Regional Development Centre for Mineral Resources (ARDCMR) with a view to promoting economic development within the ASEAN region particularly in support of the industrialization programme in each member country and enhancing intra-ASEAN trade.

151. Total cost of the project, to be carried out in one year, is estimated at US$475,000. Contribution sought from PGTF amounts to US$225,000.

152. The Committee considered that since a large proportion of the contribution requested would be used to provide compensation (incentives) to the permanent staff of ARDCMR (management, researchers and technicians), the project calls for the funding of the regular budget of the Centre. This activity does not comply with the guidelines for utilization of PGTF and therefore the project is not eligible for funding.

153. The Committee therefore recommended that this project should not avail from the financing of PGTF.

Project proposal No. 30 - *Arab Regional Legislation Information Network - ARLIN*

154. This project proposal was submitted by the Cabinet Information and Decision Support Centre (IDSC), headquartered in Cairo, through the Government of Egypt.

155. According to the text of the proposal, the project aims at supporting the acceleration of socio-economic, structural adjustment and administrative development programmes of Arab countries members of the Group of 77 through accessing, disseminating and exchanging legislation information of Arab countries via a state-of-the-art regional network. In this connection, the immediate objectives of the project are: (a) to conduct a regional survey for the legislation of the Arab countries; (b) to analyze the results of the survey and prepare the conceptual framework of the network, as well as its detailed project document; (c) to identify the technical requirements for establishing the network; (d) to communicate with official authorities in interested Arab countries to agree on the conceptual framework; and (e) to contact possible agencies to finance and support the implementation of the project.

156. Total cost of the project, to be carried out in nine months, is estimated at US$205,000. Contribution requested from PGTF amounts to US$135,000.

157. In the light of the information available, the Committee considered that this proposal falls within the purview of participating intergovernmental organizations, such as the League of Arab States. Since PGTF resources should not be used as a substitute or resources available in other organizations, the Committee considered that this proposal does not comply with the guidelines for utilization of PGTF.

158. The Committee recommended that this project should not avail from financing of PGTF.

Project proposal No. 31 - ***West Indian Immigrants in Urban America: Policy Research and Action Plan for Skills and Technology Transfer***

159. This proposal was submitted directly by the Caribbean Centre for Development Administration (CARICAD), headquartered in Barbados.

160. The proposed project seeks to inquire into the consequences of migration in and out of the West Indies and the implications of such migration for the development of human resources in and for the Caribbean region. More specifically, this study will examine the assimilation proces of West Indian immigrants into "host" societies of urban America and the significance of their cultural identity in nation-building.

161. The duration of the project would be fifteen months. Total estimated cost of the project is US$190,000, the amount requested from PGTF being US$120,000.

162. This proposal was originally submitted at the eighth meeting of the Committee of Experts

in 1993. On that occasion the Committee considered that the issue of international migration was currently on the international agenda. The United Nations Conference on Population and Development to be held in Cairo in September 1994, would deal also with the issue of migration. Regional preparatory conferences would be held with a view to adopting action-oriented regional programmes of action. Therefore, the Committee considered that this project proposal should be viewed in the light of the outcome of such meetings. The Committee considered that this position still stands valid and that no action should be taken with regard to this proposal.

163. Moreover, the Committee considered that the proposal contains a certain amount of duplication with activities carried out by UNDP, in particular the TOKTEN project.

164. The Committee considered that this project should not avail from the financing of PGTF.

Project proposal No. 32 - ***Catering and Tourism Training Institute Expansion Project***

165. The proposal was submitted by the Government of Ethiopia.

166. According to the information provided, the general objective of the project is to carry out the construction of a new, larger and improved Tourism Training Institute that could enhance the development of the tourism sector of Ethiopia, the Sudan and Eritrea. The immediate objective of the project is to assess the type of training institute needed in view of its size, location, facilities, capacity, programmes and capital needed for construction and operation.

167. Total estimated cost of the project, to be carried out in six months, is US$250,000. Contribution requested from PGTF amounts to US$200,000.

168. The Committee considered that since the undertaking of a detailed study to create a new larger and improved tourism training center was a result of a recommendation made by the World Tourism Organization (WTO) in 1987, resources for this activity should be made available by this U.N. agency. Given that the resources of PGTF should not be used as a substitute for resources available to the U.N. agencies, the Committee concluded that this proposal is not eligible for funding from PGTF. Moreover, the Committee noted that tourism is not included in the priority sectors identified in the Caracas Programme of Action (CPA).

169. The Committee therefore recommended that this proposal should not avail from the financing of PGTF.

Project proposal No. 33 - ***Employment and income generation in West and Central Africa***

170. This proposal was submitted by the Government of Benin.

171. According to the information provided, the objective of the project is to provide financial support in the form of short-term, low-interest loans to local groups involved in small-scale

economic activities, as a means of providing employment, training and revenues to youth groups and women associations. Reimbursements are to be used to set up guaranty funds with local banks in order to facilitate local funding of new entreprenurial activities.

172. The beneficiaries of the project would be twelve local groups in six African countries (Benin, Togo, Burkina Fasso, Mali, Senegal and Cameroon).

173. Total cost of the project, to be carried out over a two-year period, is estimated at US$97.000, the totality of which is the contribution requested from PGTF.

174. The Committee considered that this proposal complies with the guidelines for utilization of PGTF.

Project proposal No. 34 - ***The Latona Project (Honduras)***

175. According to the text of the proposal, the objective of the project is to prepare a feasibility study, preliminary to the installation of facilities for the disposal and processing, through biological agents, of municipal solid wastes and sewage sludge into non-polluting material (compost), in various locations of Honduras. The study includes surveys of prospective landfill sites, environmental impact studies, field management plans for each selected site, evaluation of the waste streams and of all existing disposal practices, including their effect on health.

176. Total cost of the project, to be carried out over a five-year period, is estimated at US$7,890.000. The contribution requested from PGTF amounts to US$4,960.000.

177. In the light of the information provided, the Committee considered that this proposal corresponds to a national project that is not eligible for funding from PGTF. Furthermore, the Committee considered that the contribution sought from PGTF exceeds by far its current funding capacity.

178. The Committee recommended that this project should not avail from financing of PGTF.

Project proposal No. 35 - ***Control of eutrophication and pollution in Iraqi Lakes***

179. The proposal was submitted by the Government of Iraq.

180. According to the text of the proposal, the objective of the project is to prepare a programme for controlling eutrophication and pollution in Iraqi lakes, that includes estimating quality and quantity of pollutants, studying of accidental oil spills, recent sediments pollutants and probable changes in water quality, as well as making recommendations and control measures for supressing the irrigation return flow to the lakes.

181. Total cost of the project is estimated at US$500,000, the totality of which is the amount sought from PGTF.

182. The Committee considered that this proposal corresponds to a national project, that is not eligible for funding from PGTF. The Committee therefore recommended that this proposal should not avail from the financing of PGTF.

Summary of project proposals recommended for adoption

183. In summary, the following eight (8) project proposals comply with the guidelines for utilization of PGTF:

(1) ***Training on the use of a computer simulation model for food security analysis in developing countries of the NAM***
(2) ***Optimization of the process for obtaining crude PMSG for animal reproduction***
(3) ***Technical assistance to members of the Group of 77 participating in the Second Round of Negotiations within the Global System of Trade Preferences among Developing Countries (GSTP) and seeking membership in the GSTP, as well as related technical, secretariat and other support to the GSTP***
(4) ***Program for the Development of Communications and Cooperation among Latin American and Caribbean Educators (AELAC)***
(5) ***Establishment of TIN Management Center to coordinate the global establishment of the network with a Project Coordinating Committee***
(6) ***Low cost housing technology programme***
(7) ***Foreign direct investment in MERCOSUR countries***
(8) ***Employment and income generation in West and Central Africa***

184. Since the contributions requested from PGTF in the foregoing project proposals exceed significantly the availability of resources for the present year, of the order of US$300,000, the Committee of Experts had to address the subject of establishment of priorities for actual allocation of resources to projects. A detailed breakdown of the financial status of PGTF is provided in annex III.

185. Bearing in mind the need to strike an adequate balance between providing meaningful support to projects and ensuring the widest possible spread of the benefits of the resources available, the Committee noted that it was not possible to attain an equitable distribution while fully supporting any project proposal. Therefore, the Committee recommended that partial contributions be given to the four inter-regional projects, since they provide for the more general spread of benefits for the member countries of the Group of 77, as follows:

		PGTF contribution (US$) Requested	Recommended
(1)	*Training on the use of a computer simulation model for food security analysis in developing countries of the NAM*	155,850	70,000
(2)	*Technical assistance to members of the Group of 77 participating in the Second Round of Negotiations within the Global System of Trade Preferences among Developing Countries (GSTP) and seeking membership in the GSTP, as well as related technical, secretariat and other support to the GSTP*	177,000	80,000
(3)	*Establishment of TIN Management Center to coordinate the global establishment of the network with a Project Coordinating Committee*	130,000	60,000
(4)	*Low cost housing technology programme*	65,000	30,000
		Sub-total	240,000

186. The Committee recommended that disbursement of the PGTF contribution for the second project, namely "Technical assistance to members of the Group of 77 participating in the Second Round of Negotiations within the Global System of Trade Preferences among Developing Countries (GSTP) and seeking membership in the GSTP, as well as related technical, secretariat and other support to the GSTP" should be made only after the executing organization submits the outstanding financial and terminal reports for the previous phase of the project.

187. In addition, the Committee recommended that a contribution of US$30,000 be given to two of the regional projects that comply with the guidelines for utilization of PGTF, selected on the basis of the widest coverage of countries in their respective regions.

		PGTF contribution (US$) Requested	Recommended
(5)	***Program for the Development of Communications and Cooperation among Latin American and Caribbean Educators (AELAC)***	150,000	30,000
(6)	***Employment and income generation in West and Central Africa***	97,000	30,000
	Sub-total		60,000

188. The foregoing allocation of resources amounts to a total of US$300,000 thereby exhausting the availability of resources for this year.

189. With regard to the two remaining projects that comply with the guidelines for utilization of PGTF, but that could not be given support because of the limited resources available, namely "Optimization of the process for obtaining crude PMSG for animal reproduction" and "Foreign direct investment in MERCOSUR countries", the Committee recommended that the allocation of resources should be examined at the next session of the Committee, in the light of the availability of resources and with due regard to equitable geographical distribution.

VI. ASSESSMENT OF THE IMPLEMENTATION OF APPROVED PROJECTS

190. The Committee examined the status of implementation of the projects adopted by IFCC-VI held in Havana in September 1987, by the Twelfth Annual Meeting of the Ministers for Foreign Affairs of the Group of 77 held in New York in September 1988, by IFCC-VII held in Kuala Lumpur in July-August 1989, by the Thirteenth, Fourteenth, Fifteenth and Sixteenth Annual Meetings of Ministers for Foreign Affairs of the Group of 77 held respectively in New York in September 1989, October 1990, September 1991 and October 1992, and by IFCC-VII held in Panama City in August-September 1993.

191. According to the status of their implementation, approved projects can be grouped into several categories:

(a) Projects completed;
(b) Projects under implementation;
(c) Projects under preparation still to be implemented;
(d) Projects not implemented and allocated funds reverted to PGTF

A. Projects completed

(1) ***Group of 77 Information Bulletin***
Submitter: Office of the Chairman of the Group of 77/Inter Press Service (IPS)
PGTF input: US$109,520
Duration: Four years
Approval: IFCC-VI (Havana, 7-12 September 1987) and IFCC-VII (Kuala Lumpur, 31 July-5 August 1989) for one-year extension
Number: INT/88/K01/C/95/99
Date of signature of relevant documents: Project document was signed by UNDP and G-77 on 11 January 1988. Sub-contract agreement between the Group of 77 and Inter Press Service is dated 8 March 1988.
Status of submission of financial reports: IPS and G-77 submitted their financial statements.

192. The implementation of this project was completed on 31 December 1991 and all the required reports have been submitted.

(2) ***Feasibility study on development of developing countries' consultancy and engineering capacities***
Submitter: International Centre for Public Enterprises in Developing Countries(ICPE)/International Association of State Trading Organizations of Developing Countries (ASTRO)
PGTF input: US$70,000
Approval: IFCC-VI (Havana, 7-12 September 1987)
Number: INT/88/K03/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and ICPE respectively on 13 October 1988 and 8 November 1988. Sub-contract agreement was not required.
Status of submission of financial report: ICPE submitted its financial statements.

193. The feasibility report was circulated to Member States by the Office of the Chairman on 2 November 1989. The executing organization has submitted all the required reports.

(3) ***Action Committee of G-77 for Cooperation in Consultancy, Construction and Engineering among Developing Countries***
Submitter: Action Committee for Cooperation in Consultancy, Construction and Engineering (Havana, Cuba)
PGTF input: US$38,500
Duration: Six months
Approval: IFCC-VI (Havana, 7-12 September 1987)
Number: INT/88/K04/A/95/99

Date of signature of relevant documents: Project document was signed by UNDP and G-77 on 8 December 1989. Sub-contract agreement between the Group of 77 and the Action Committee is dated 19 September 1990.
Status of submission of financial reports: The Action Committee submitted its financial statement.

194. The project's terminal report was circulated to Member States on 16 June 1993.

(4) ***Feasibility study on information system on technologies and projects (ISTP)***
Submitter: Centre for International Cooperation and Development (CICD) of Yugoslavia
PGTF input: US$45,450
Duration: Six months
Approval: 12th Annual Ministerial Meeting (New York, 28-30 September 1988)
Number: INT/89/K01/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and G-77 respectively on 4 and 28 August 1989. Sub-contract agreement between the Group of 77 and CICD is dated 14 September 1989.
Status of submission of financial report: CICD and the G-77 submitted their financial statements.

195. The feasibility report was circulated to Member States by the Office of the Chairman on 24 October 1990.

(5) ***The Caribbean into the Twenty-first Century***
Submitter: The Nation Organization of Barbados/Eastern Caribbean Research Center (ECRC) of Saint Lucia
PGTF input: US$50,000
Duration: Four days
Approval: 13th Annual Ministerial Meeting (New York, 28 September 1989)
Number: INT/89/K11/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 11 and 13 December 1990. Sub-contract agreement between the Group of 77 and the Government of Saint Lucia on ECRC's behalf is dated 12 December 1990.
Status of submission of financial report: No financial statements have been submitted by ECRC.

196. The written report of the project was submitted by ECRC in May 1991. By letter dated 14 April 1992, the Chairman of the Group of 77 requested the Permanent Representative of Saint Lucia to the United Nations (who signed the sub-contract on behalf of ECRC) to submit the outstanding audio and video reports of the project as well as a cumulative statement of expenditure of funds provided by PGTF for the implementation of the project.

197. The Seventh Meeting of the Committee of Experts of PGTF (New York, 29-30 June 1992). recommended that an extension be given to ECRC to deliver the reports by 31 December 1992. The Chairman of the Group of 77 communicated this decision to the Permanent Representative of Saint Lucia to the United Nations in a letter dated 26 October 1992. A follow-up letter dated 19 May 1993 was sent to the Permanent Representative of Saint Lucia requesting the outstanding reports.

198. The Eighth Meeting of the Committee of Experts of PGTF (New York, 29-30 June 1993) expressed its concern that two letters from the Chairman of the Group of 77 had not been acknowledged and recommended that the Chairman of the Group of 77 reiterate his request for the outstanding reports. This was done by the Chairman of the Group of 77 in a letter addressed to the Permanent Representative of Saint Lucia to the United Nations dated 25 February 1994.

199. Both the video report and the financial statement of expenditure have not been submitted by ECRC.

200. The Committee noted with deep concern that in spite of the repeated efforts deployed by the Chairman of the Group of 77 to obtain the outstanding reports. no response has been received so far. The Committee recommended that a final notice be sent to the sub-contractor requesting the forwarding of the outstanding material before 31 December 1994. Should this last effort prove to be fruitless, the Chairman of the Group of 77 should be requested to approach the sub-contractor and request the return of the funds unaccounted for. In this case, the sub-contractor should not be eligible for submitting any futher proposals for funding from PGTF.

(6) ***South-North Development Monitor (SUNS)***
Submitter: South Commission
PGTF input: $120.000
Duration: One year
Approval: 13th Annual Ministerial Meeting (New York, 28 September 1989)
Number: INT/89/K13/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and the G-77 in December 1990. Sub-contract agreement between the Group of 77 and Third World Network (TWN) is dated 21 December 1990.
Status of submission of financial report: TWN and G-77 submitted their financial reports.

201. The implementation of this project was completed on 31 January 1992 and the sub-contractor has submitted all the required reports.

(7) ***Assistance to the Fifth Meeting of the Committee of Experts of the Perez-Guerrero Trust Fund***
Submitter: Office of the Chairman of the Group of 77
PGTF input: US$25,000
Duration: One week

Approval: IFCC-VII (Kuala Lumpur, 31 July-5 August 1989)
Number: INT/89/K14/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and G-77 on 29 May 1990.
Status of submission of financial report:G-77 submitted its financial reports.

202. The cost of participation of Committee members at the fifth and sixth meetings was covered by this project. Travel, subsistence, and terminal expenses for four members who attended the Fifth Meeting of the Committee of Experts of PGTF (New York, 5-7 July 1990) was $11,971. The financial report of expenditures for this meeting was submitted to UNDP on 27 December 1990. Travel, subsistence, and terminal expenses for four members who attended the Sixth Meeting of the Committee of Experts of PGTF (New York, 24-26 June 1991) was $12,102. The financial report of expenditures for this meeting was submitted to UNDP on 20 May 1992.

203. A cash balance of $972 was utilized to finance the participation of members attending the Seventh Meeting of the Committee of Experts of PGTF (New York, 29-30 June 192), the remaining cost of which was covered by project INT/90/K08 - Support to the Committee of Experts of the PGTF.
The financial report of the spent cash balance was submitted to UNDP on 19 August 1993.

(8) ***Regional symposium on the economic and social impact of money derived from illicit drug trafficking in the development of Latin America and the Caribbean***
Submitter: Center for the Study of International Relations and Development (CERID) of Bolivia.
PGTF input: $78,000
Duration: Five and a half months
Starting date:
Completion date:
Time to complete:
Approval: 14th Annual Ministerial Meeting (3 October 1990)
Number: INT/90/K04/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and G-77 in December 1990. Sub-contract agreement between the Group of 77 and CERID is dated 17 December 1990.
Status of submission of financial report: CERID submitted its financial reports.

204. The terminal report of the project was submitted by CERID on 13 August 1991.

(9) ***Technical, secretariat and other support to the Global System on Trade Preferences among developing countries (GSTP), and technical assistance to countries participating in the GSTP***
Submitter: Office of the Chairman of the Group of 77
PGTF input: US$350,000

Duration: Sixteenth months
Approval: 13th Annual Ministerial Meetings (New York, 28 September 1989)
Number: INT/90/K07/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and the G-77 in December 1990. Sub-contract agreement between the Group of 77 and UNCTAD is dated 14 December 1990.
Status of submission of financial report: UNCTAD submitted its financial statement.

205. The terminal report of this project was distributed to Member States on 16 June 1993.

(10) ***Technical Cooperation among Member States of SELA in the Field of Artificial insemination and embryo transplant***
Submitter: Latin American Economic System (SELA) in Venezuela
PGTF input: US$83,700
Duration: Two years and four months
Approval: 12th Annual Ministerial Meeting (28-30 September 1988)
Number: INT/89/K03/A/95/99
Date of signature of relevant documents: Project document signed by UNDP and SELA on 20 September 1989. Sub-contract agreement was not required.
Status of submission of financial report: SELA submitted its financial statements.

206. Copies of the terminal and financial reports forwarded by SELA to UNDP on 12 February 1993 were made available by SELA to the Office of the Chairman.

(11) ***Export promotion and cooperation in favor of less developed countries within the Latin American Integration Association (ALADI)***
Submitter: Latin American Integration Association (ALADI) in Uruguay
PGTF input: US$120,000
Duration: Twelve months
Approval: IFCC-VII (Kuala Lumpur, 31 July-5 August 1989)
Number: INT/89/K05/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 12 and 21 December 1990. Sub-contract agreement between the Group of 77 and ALADI is dated 18 December 1990.
Status of submission of financial report: ALADI submitted its financial statements.

207. The terminal report of this project was forwarded by ALADI on 7 April 1993.

(12) ***Establishment of a Maghreb Unit in the National Center for Information and Economic Documentation (CNIDE) of Algeria***
Submitter: Government of Algeria
PGTF input: US$65,450
Duration: One year

Approval: IFCC-VII (Kuala Lumpur, 31 July-5 August 1989)
Number: INT/89/K06/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and G-77 respectively on 13 and 12 October 1989. Sub-contract agreement between the Group of 77 and CNIDE is dated 9 November 1989.
Status of submission of financial report: CNIDE submitted its financial statement.

208. The project's analytical report and financial statement were forwarded to the Office of the Chairman of the Group of 77 on 17 August 1993.

209. The analytical report was circulated at IFCC-VIII (Panama City, 30 August-3 September 1993) and distributed to all the Permanent Missions of Member States in New York on 15 December 1993.

(13) ***Intensifying the utilization of operations research techniques in the management of agriculture development projects in ASEAN countries***
Submitter: Department of Agriculture of Malaysia
PGTF input: US$110,000
Duration: Two years
Approval: 14th Annual Ministerial Meeting (New York, 3 October 1990)
Number: INT/90/K05/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 20 and 21 December 1990. Sub-contract agreement between the Chairman of the Group of 77 and the Permanent Representative of Malaysia to the United Nations (on behalf of the Department of Agriculture of Malaysia) is dated 8 March 1991.
Status of submission of financial report: The Government of Malaysia submitted its financial statement.

210. The terminal report of the project with a financial statement of expenditures was forwarded to the Office of the Chairman by the Permanent Mission of Malaysia to the United Nations on 17 August 1993.

(14) ***Provision of consultancy services by CARICAD***
Submitter: Caribbean Center for Development Administration (CARICAD) of Barbados
PGTF input: $45,000
Duration: Two years
Approval: 13th Annual Ministerial Meeting (New York, 28 September 1989)
Number: INT/89/K10/A/95/99
Date of signature of relevant documents: Project document signed by G-77 and UNDP respectively on 1 and 27 June 1990. Sub-contract agreement between the Group of 77 and CARICAD is dated 5 October 1990.
Status of submission of financial report: CARICAD submitted its financial statement.

211. The Eighth Meeting of the Committee of Experts of PGTF (New York, 28-30 June 1993) expressed its concern on the unauthorized reallocation and expenditures of PGTF resources by CARICAD and recommended that the Chairman of the Group convey this concern to the CARICAD Secretariat and the concerned governments. The Committee of Experts was further of the view that these practices should not occur in the future.

212. The Chairman of the Group of 77 communicated the above concern to the Executive Director of CARICAD in a letter dated 14 March 1994.

213. In response to the Chairman's letter of 14 March 1994, the Executive Director of CARICAD transmitted the analytical report of the project in a letter dated 25 March 1994 thus fulfilling the project's reporting requirements.

(15) ***Recovery, preservation and dissemination of printed historical documentation of the 16th, 17th and 18th centuries in the Americas, existing in signatory countries of the Andres Bello Convention***
Submitter: Autonomous Institute of the National Library of Venezuela
PGTF input: US$94,500
Duration: Three years
Approval: 14th Annual Ministerial Meeting (New York, 3 October 1990)
Number: INT/90/K02/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 19 and 20 June 1991. Sub-contract agreement between the Group of 77 and the National Library of Venezuela Preservation Center (NLVPC) is dated 17 July 1991.
Status of submission of financial report: NLVPC submitted its financial statements.

214. The terminal report of the project was forwarded by NVLVPC to the Office of the Chairman on 15 December 1993.

(16) ***Economic Integration in the Southern Cone Common Market***
Submitter: Government of Argentina
PGTF input: US$88,000
Duration: One year
Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992)
Number: INT/92/K01/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 22 and 28 October 1992. Sub-contract agreement between the Chairman of the Group of 77 and the President of the "Centro de Investigaciones para la Transformación (CENIT) of Argentina is dated 6 November 1992.
Status of submission of financial report: CENIT has not submitted its financial statement.

215. The terminal report of the project was forwarded by the Permanent Mission of Argentina to the United Nations to the Office of the Chairman on 3 March 1994.

216. In a letter dated 28 March 1994, the Chairman of the Group of 77 requested CENIT to forward the outstanding financial statement in order to fulfill the project's reporting requirements.

217. The requested report was received on 6 April 1994 by the Office of the Chairman, during the ninth meeting of the Committee of Experts.

(17) ***Cooperation among developing countries' consultancy and engineering design organizations for better access and position in international consultancy and engineering market***
Submitter: International Center for Public Enterprises of Developing Countries (ICPE)/International Association of State Trading Organizations of Developing Countries (ASTRO), in former Yugoslavia (Slovenia)
PGTF input: $90,000
Duration: Eighteen months
Approval: IFCC-VII (Kuala Lumpur, 31 July-5 August 1989)
Number: INT/89/K04/A/95/99
Date of signature of relevant documents: Project document was signed by ICPE and UNDP respectively on 11 and 18 June 1991. Sub-contract agreement was not required.
Status of submission of financial report: ICPE has not submitted its financial statement.

218. ICPE transmitted the terminal report of the project on 29 March 1994.

219. The Committee recommended that the Chairman of the Group of 77 request the outstanding financial report to be submitted not later than 31 December 1994.

(b) Projects under implementation

(1) ***Feasibility study for establishing a raw materials research and development center information system***
Submitter: Government of Nigeria
PGTF input: US$100,000
Duration: 12 months
Approval: 13th Annual Ministerial Meeting (New York, 28 September 1989)
Number: INT/89/K09/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 19 and 20 June 1991. Sub-contract agreement between the Chairman of the Group of 77 and the Permanent Representative of Nigeria to the United Nations (on behalf of the Raw Materials Research and Development Council of Nigeria) is dated 1 November 1991.
Status of submission of financial report: No financial reports have been submitted by the

sub-contractor.

220. A draft feasibility report was submitted by the executing organization in November 1993.

221. The Chairman of the Group of 77 requested the executing organization to submit to the Office of the Chairman the feasibility report in its final version in a letter dated 14 March 1994.

222. The Committee of Experts recommended that the executing agency should be requested to submit the final feasibility report and the financial reports not later than 31 December 1994.

(2) ***Regional programme for cooperation and coordination on plant germ plasm***
Submitter: Latin American Economic System (SELA) in Venezuela
PGTF input: US$58,000
Duration: Two years
Approval: 13th Annual Ministerial Meeting (New York, 28 September 1989)
Number: INT/89/K12/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and SELA respectively on 2 and 19 October 1991. No sub-contract agreement was required.
Status of submission of financial report: No financial reports have been submitted.

223. This project began to be implemented by SELA in the second half of 1993 following a disbursement by UNDP of US$20,000 from PGTF.

224. The Committee recommended that the Chairman of the Group of 77 request the executing organization to submit a progress report and the outstanding financial reports not later than 31 December 1994.

(3) ***Integrated management of the associated resources to the mangrove areas in the Pacific coast of Central America***
Submitter: National University of Costa Rica
PGTF input: US$84,800
Duration: Two years
Approval: 14th Annual Ministerial Meeting (New York, 3 October 1990)
Number: INT/90/K01/A/95/99
Date of signature of relevant documents: Project document was signed by UNDP and G-77 respectively on 1 and 16 July 1991. Sub-contract agreement between the Group of 77 and the Foundation of Science, Art and Culture of the National University of Costa Rica (FUNA) is dated 15 October 1991.
Status of submission of financial report: FUNA has submitted financial statements for Year 1 of the project only.

225. The Chairman of the Group of 77 requested FUNA to submit the terminal and outstanding financial reports of the project in a letter dated 14 March 1994. A request for

disbursement of funds for Year 2 of the project was submitted to UNDP on on 22 February 1993.

226. The Committee recommended that the Office of the Chairman request the sub-contractor to submit a progress report and the outstanding financial statement not later than 31 December 1994.

(4) ***In-depth review of the actions taken by the international community in favor of the particular needs and problems of land-locked developing countries and a basis for a new strategy to overcome these needs and problems in the future***
Submitter: Center for the Study of International Relations and Development (CERID) of Bolivia
PGTF input: US$95,000
Duration: Nine months
Approval: 14th Annual Ministerial Meeting (New York, 3 October 1990)
Number: INT/90/K03/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 24 April and 6 May 1991. Sub-contract agreement between the Group of 77 and CERID is dated 24 April 1991.
Status of submission of financial report: CERID submitted a financial statement for expenditure of US$78,750 on 24 April 1992.

227. The Chairman of the Group of 77 requested the Director of CERID to submit the terminal report of the project as well as the cumulative financial statement of expenditure in a letter dated 14 March 1993.

228. The Director of CERID replied to the Chairman's letter on 29 March 1994 stating that the final output of the project together with the financial statements had been sent to the Office of the Chairman at the end of July 1993. CERID is making arrangements to resend the project reports.

(5) ***Organic rice farming system***
Submitter: Malaysian Agricultural Research and Development Institute (MARDI)
PGTF input: US$85,000
Duration: Two years
Approval: 14th Annual Ministerial Meeting (New York, 3 October 1990)
Number: INT/90/K06/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 20 and 21 December 1991. Sub-contract agreement between the Chairman of the Group of 77 and the Permanent Representative of Malaysia to the United Nations (on behalf of MARDI) is dated 8 March 1991.
Status of submission of financial report: MARDI has submitted its periodic financial statement.

229. The Chairman of the Group of 77 requested MARDI to submit an updated progress report

as well as a statement of expenditures in a letter dated 14 March 1994.

(6) ***Support to the Committee of Experts of the Perez-Guerrero Trust Fund***
Submitter: Office of the Chairman of the Group of 77
PGTF input: US$214.800
Duration: Five years
Approval: 14th Annual Ministerial Meeting (New York, 3 October 1990)
Number: INT/90/K08/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 18 March and 4 April 1991.
Status of submission of financial report: G-77 has submitted its financial statements.

230. Travel, subsistence, and terminal expenses for four members who attended the Eighth Meeting of the Committee of Experts of PGTF in June 1993 was US$15,746.

231. By letter dated 8 March 1994, the Chairman of the Group of 77 requested UNDP to disburse, to the Office of the Chairman, the amount of US$20,480 to finance the participation of six experts attending the Special Meeting of PGTF on 4-8 April 1994.

(7) ***Establishment of the Regional Business and Trade Information Network for Chambers of Commerce and Industry (CCI) of Developing Countries Members of the Group of 77***
Submitter:Steering Committee of the Chambers of Commerce and Industry (CCI) of Developing Countries Members of the Group of 77
PGTF input: US$150,000
Duration: Two years
Approval: 15th Annual Ministerial Meeting (New York, 1 October 1991)
Number: INT/91/K01/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 13 and 21 November 1991. Sub-contract agreements have been signed separately with chambers of commerce and industry of the following countries acting as regional focal points: Chamber of Commerce, Industry and Mines of Cameroon (23 January 1992), the Chamber of Commerce of Bogota (4 March 1992), and the Federation of Pakistan Chambers of Commerce and Industry (14 December 1992).
Status of submission of financial report: financial reports have been submitted by the Federation of Pakistan Chambers of Commerce and Industry and the Chamber of Commerce, Industry and Mines of Cameroon. No financial statement has been submitted from the Bogota Chamber of Commerce.

232. The Chairman of the Group of 77 requested the heads of the three regional focal points of TIN to submit their respective progress and financial reports in a letter dated 14 March 1994.

233. Progress reports were received from the Federation of Pakistan Chambers of Commerce and Industry and the Chamber of Commerce, Industry and Mines of Cameroon.

234. The Committee recommended that the Office of the Chairman request the Bogota Chamber of Commerce to submit the progress report and the outstanding financial reports not later than 31 December 1994.

(8) ***Public Enterprises Rationalization Project***
Submitter: Government of Saint Lucia
PGTF input: US$60.800
Duration: Six months
Approval: 15th Annual Ministerial Meeting (New York, 1 October 1991)
Number: INT/91/K02/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 13 and 21 November 1991. Sub-contract agreement between the Chairman of the Group of 77 and the Permanent Representative of Saint Lucia to the United Nations (on behalf of the Government of Saint Lucia) is dated 4 December 1991.
Status of submission of financial report: No financial reports have been submitted to date by the sub-contractor.

235. By letter dated 15 April 1992, the Chairman of the Group of 77 requested the Government of Saint Lucia to submit a progress report. This request was reiterated in a letter from the Chairman of the Group of 77 dated 19 May 1993.

236. The Eighth Meeting of the Committee of Experts (New York, 28-30 June 1993) took note that no progress report had yet been submitted by the sub-contractor and recommended that the Chairman of the Group of 77 request the outstanding reportings on the status of implementation of this project.

237. The Chairman of the Group of 77 reiterated his request for a progres report in a letter adressed to the Permanent Representative of Saint Lucia to the United Nations dated 14 March 1994.

238. The Committee noted with deep concern that in spite of the repeated efforts deployed by the Chairman of the Group of 77 to obtain the outstanding reports, no response has been received so far. The Committee recommended that a final notice be sent to the sub-contractor requesting the forwarding of the outstanding material before 31 December 1994. Should this last effort prove to be fruitless, the Chairman of the Group of 77 should be requested to approach the sub-contractor and request the return of the funds unaccounted for. In this case, the sub-contractor should not be eligible for submitting any futher proposals for funding from PGTF.

(9) ***Raul Prebisch: Completed Works, 1919-1948, Comparative Experiences of Monetary Policies of Developing Countries, Vols. III and IV***
Submitter: Raul Prebisch Foundation
PGTF input: US$60,700
Duration: 3 months

Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992)
Number: INT/92/K02/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 6 November 1992 and 9 March 1993. Sub-contract agreement between the Chairman of the Group of 77 and the President of the Raul Prebisch Foundation is dated 14 December 1992.
Status of submission of financial report: No financial statements have been submitted.

239. The executing organization informed the Office of the Chairman of the Group of 77 on 22 February 1994 that it was making arrangements to deliver sets of the vols. III and IV of the collected works of Raul Prebisch to the Office of the Chairman for distribution to all member states of the Group of 77.

240. The Committee recommended that the Chairman of the Group of 77 request the sub-contractor to submit the outstanding financial statements not later than 31 December 1994.

(10) ***Technical, Secretariat and Other Support to the Global System of Trade Preferences among Developing Countries (GSTP), and Technical Assistance to Countries Participating in the GSTP***
Submitter: Group of 77 in Geneva
PGTF input: US$250,000
Duration: One year
Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992)
Number: INT/92/K03/A/90/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 16 November and 12 December 1992. Sub-contract agreement between the Chairman of the Group of 77 and UNCTAD is dated 14 December 1992.
Status of submission of financial report: No financial statements have been submitted.

241. The Chairman of the Group of 77 requested the executing organization to submit the terminal report of the project in a letter dated 14 March 1994.

242. The Committee recommended that the Chairman of the Group of 77 request the executing organization to submit the terminal report and the outstanding financial reports not later than 31 December 1994.

(11) ***The development and use of a computer simulation model for supply, demand and prices of agricultural commodities in ASEAN countries***
Submitter: Ministry of Agriculture of the Republic of Indonesia
PGTF input: US$81,600
Duration: One year
Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992)
Number: INT/92/K04/A/95/99

Date of signature of relevant documents: Project document was signed by G-77 and UNDP on 10 December 1992. Sub-contract agreement between the Chairman of the Group of 77 and the Permanent Representative of Indonesia to the United Nations (on behalf of the Ministry of Agriculture of Indonesia) is dated 10 February 1993.
Status of submission of financial report: The Government of Indonesia has submitted a financial statement.

243. The executing organization submitted a progress report with a financial statement on 24 February 1994.

(12) ***African Agency for Biotechnology***
Submitter: Government of Algeria
PGTF input: US$150,000
Duration: One year
Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992)
Number: INT/92/K06/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 16 and 20 April 1993. Sub-contract agreement between the Chairman of the Group of 77 and the Chargé d'Affaires a.i. of Algeria to the United Nations (on behalf of the Secretariat of State for Scientific Research of Algeria) is dated 3 May 1993.
Status of submission of financial report: No financial reports have been submitted.

244. A request for disbursement of funds was made on 7 May 1993.

245. The Committee recommended that the Office of the Chairman request the sub-contractor to submit the progress and the outstanding financial reports not later than 31 December 1994.

(13) ***African Agency for Biotechnology (Phase II)***
Submitter: Government of Algeria
PGTF input: US$150,000
Duration: One year
Approval: IFCC-VIII (Panama City, 30 August-3 September 1993)
Number: INT/93/K01/A/95/99
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 12 and 14 January 1994. Sub-contract agreement between the Chairman of the Group of 77 and the Permanent Representative of Algeria to the United Nations (on behalf of the Ministry of Universities and Scientific Research of the Government of Algeria) is dated 15 December 1993.
Status of submission of financial report: No financial reports have been submitted.

246. A request for disbursement of funds was made on 14 February 1994.

247. The Committee recommended that the Office of the Chairman request the sub-contractor to submit the progress and the outstanding financial reports not later than 31 December 1994.

(14) ***ECDC/TCDC Information Support to Group of 77 Chapters (Journal of the Group of 77)***
Submitter: Office of the Chirman of the Group of 77/Inter Press Service
PGTF input: US$51,120
Duration: Two years
Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992) and IFCC-VIII (Panama City, 30 August-3 September 1993)
Number: INT/93/K02
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 12 and 13 January 1994. Sub-contract agreement between the Chairman of the Group of 77 and the Administrator of IPS for North America is dated 12 January 1994.
Status of submission of financial report: No financial reports have been submitted to UNDP either by IPS or G-77.

248. Implementation of this project began in January 1993. A request for disbursement of funds for Year 1 (1993) was made on 14 March 1994.

(15) ***Information Support to the Group of 77 Chapters - South-North Development Monitor (SUNS)***
Submitter: Third World Network, Penang, Malaysia
PGTF input: US$59,881
Duration: One year
Number: INT/93/K03
Date of signature of relevant documents: Project document was signed by G-77 and UNDP respectively on 12 and 13 January 1994. Sub-contract agreement between the Chairman of the Group of 77 and the Geneva Representative of TWN is dated 12 January 1994.
Approval: Eighth Meeting of the Intergovernmental Follow-up and Coordination Committee on ECDC (IFCC-VIII), Panama City, Panama, 30 August-3 September 1993.
Status of submission of financial report: No financial reports have been submitted.

249. Implementation of this project began on 1 March 1994.

(c) Projects under preparation still to be implemented

(1) ***Monetary Cooperation Fund of the Non-Aligned and other Developing Countries***
Submitter: Government of Madagascar
PGTF input: US$30,000
Duration: To be determined

Approval: 13th Annual Ministerial Meeting (New York, 28 September 1989)
Number: INT/89/K08/A/95/99

250. The Seventh Meeting of the Committee of Experts of PGTF (New York, 29-30 June 1992) recommended that the allocated funds to this project would revert to PGTF if the Government of Madagascar did not identify the name of the executing organization by the next regular session of the Committee of Experts.

251. In a Note dated 9 June 1993, the Permanent Mission of Madagascar to the United Nations communicated the name of the executing organization, stating that the proposed institution needed US$150.000 to carry out the feasibility study.

252. In this connection. the Eighth Meeting of the Committee of Experts of PGTF (New York, 28-30 June 1993) considered that the terms of the project and the allocatin of funds for this project had already been approved by the Fourteenth Annual Ministerial Meeting of the Group of 77 held in New York in 1989 and that, therefore. it was not within the Committee's competence to amend such a decision and the project should be implemented within the approved terms of reference and budget.

253. The Committee recommended that the allocated funds should be reverted to PGTF, since the project had not been implemented by the Ninth Meeting of the Committee of Experts.

(2) ***Upgrading of veterinary field health services through development of an animal disease information center***
Submitter: Government of Malaysia
PGTF input: US$140,000
Duration: 18 months
Approval: 14th Annual Ministerial Meeting (New York, 1-2 October 1990)
Number: INT/90/K09/A/95/99
Date of signature of relevant documents: Project document signed by UNDP and G-77 on 21 November 1991. Sub-contract agreement between the Group of 77 and the Government of Malaysia has to be drawn up.

254. According to information received from the Permanent Representative of Malaysia to the United Nations in a copy of a letter dated 21 April 1992 addressed to the Director of the Special Unit for TCDC of UNDP, the project has not been implemented due to the decision of UNDP not to approve its request for financial support in the amount of US$186,500.

255. The request of the Government of Malaysia to UNDP was made on the basis of information provided by the Deputy-Director of the Special Unit for TCDC to the Fifth Meeting of the Committee of Experts of PGTF (New York, 5-7 July 1990), that the Special Unit for TCDC would be prepared to consider a request from the Government of Malaysia for providing catalytical financial support.

256. The Eighth Meeting of the Committee of Experts of PGTF (New York, 28-30 June 1993) took note of the decision by UNDP not to provide catalytic financial support to this project and recommended that other sources of financing for the project be found by the sponsors of the project.

257. By letter dated 14 March 1994, the Chairman of the Group of 77 requested the executing organization to provide information on other sources of funding for the project.

258. The Committee recommended that the allocated funds should be reverted to PGTF if the project implementation does not start by 31 December 1994.

(3) ***Development of Agriculture Database for ASEAN***
Submitter: Government of Malaysia
PGTF input: US$94.000
Duration: Two years
Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992)

259. By letter dated 22 October 1992, the Chairman of the Group of 77 informed the Permanent Representative of Malaysia to the United Nations that the request for project funding had been approved.

260. The project document and sub-contract agreement, which are required to start the implementation of the project, have not been prepared in view that the Government of Malaysia has yet to take appropriate steps toward their preparation.

261. By letter dated 14 March 1994, the Chairman of the Group of 77 requested the executing organization to expedite the submission of the project document.

262. The Committee recommended that the allocated funds should be reverted to PGTF if the project implementation does not start by 31 December 1994.

(4) ***Study of Production and Distribution of Pasture Seeds and Legumes to Smallholder Dairy Farmers***
Submitter: Southern African Development Community (SADC), Gaborone, Botswana
PGTF input: US$90,000
Number: INT/92/K07
Duration: 16 months
Approval: 16th Annual Ministerial Meeting (New York, 1 October 1992)
Date of signature of relevant documents: The project document was signed by the G-77 and UNDP on 26 August 1993.

263. By letter dated 14 March 1994, the Chairman of the Group of 77 requested the executing organization to expedite the submission of the draft sub-contract agreement which has been

under review by SADC since July 1993.

264. SADC replied in a letter dated 17 March 1994 that the sub-contract agreement was receiving urgent attention and that they would revert on the subject again soon.

(5) ***Guidelines and tools for a common industrial policy for Mercosur***
Submitter: Government of Brazil
PGTF input: US$120,000
Duration: 8 months
Number: INT/93/K05/A/95/99
Approval: IFCC-VIII (Panama City, 30 August-3 September 1993)

265. The project document has already been submitted by the executing organizaton for signature by the G-77 and UNDP.

(6) ***Feasibility study for establishing a Central American hydrographic cooperation programme***
Submitter: Government of Panama
PGTF input: US$38,500
Approval: IFCC-VIII (Panama City, 30 August-3 September 1993)

266. By letter dated 28 February 1994, the Chairman of the Group of 77 requested the executing organization to expedite the submission of the project document which is required to start the implementation of the project.

(7) ***Feasibility study for a subregional center for agricultural machinery in the CEPGL subregion***
Submitter: Communaute Economique des Pays des Grands Lacs (CEPGL)
PGTF input: US$43,000
Number: INT/93/K07/A/95/99
Duration: 81 days
Approval: IFCC-VIII (Panama City, 30 August-3 September 1993)

267. The Office of the Chairman received the draft project document from CEPGL on 22 March 1994. It is being reviewed by both G-77 and UNDP.

(8) ***Project implementation plan of development of Agriculture database for ASEAN in the utilization of operations research***
Submitter: Government of Malaysia
PGTF input: US$94,000
Duration: To be determined
Approval: IFCC-VIII (Panama City, 30 August-3 September 1993)

268. By letter dated 14 March 1994, the Chairman of the Group of 77 requested the executing organization to expedite the submission of the project document which is required to start the implementation of the project.

(d). Projects not implemented and allocated funds reverted to PGTF

(1) ***Interregional Trade Financing Facility***
Submitter: UNCTAD
PGTF input: US$40,000
Approval: IFCC-VI (Havana, 7-12 September 1987)
Number: INT/88/K02/A/95/99

269. The approved amount was reverted to PGTF in 1989 in accordance with the recommendation of the Third Meeting of the Committee of Experts of PGTF (Kuala Lumpur, 27-29 July 1989). The Committee of Experts made such a recommendation following information received that UNCTAD had been mandated in June 1989 by the Trade and Development Board to undertake a project having the same characteristics as the one approved for funding by PGTF, and provide the necessary financing.

(2) ***Facilitating the implementation of the Multisectoral Information Network (MSIN)***
Submitter: Technological Information Pilot System (TIPS)/Inter Press Service (IPS)
PGTF input: US$15,000
Approval: IFCC-VI (Havana, 7-12 September 1987)
Number: INT/88/K05/A/95/99

270. The approved amount was reverted to PGTF in 1990 after the Fifth Meeting of the Committee of Experts of PGTF (New York, 5-7 July 1990) considered that there were no clear prospects for the implementation of this project three years after its approval.

271. IFCC-VI recommended in para. 72(1) of its report that: (a) the project document related to the feasibility report offered to be prepared by TIPS/IPS should be submitted for the consideration of the panel of experts on the MSIN pilot project scheduled to be convened in the first half of 1988; and (b) the disbursement of the approved funds would be released after the meeting of the panel of experts on MSIN had expressed its views on the project document.

272. The meeting of the panel of experts on MSIN which was to have considered the project document related to the feasibility report, was not been convened given that the required number of 15 countries needed to launch the project could not be reached. The Committee of Experts of PGTF considered that this project proposal may be resubmitted at an appropriate time.

(3) ***Action Committee on Inter-enterprise Cooperation***
Submitter: International Center for Public Enterprises (ICPE)/Research Center for Cooperation with Developing Countries (RCCDC) of Yugoslavia

PGTF input: US$35,000
Approval: 12th Annual Ministerial Meeting (New York, 28-30 September 1988)
Number: INT/89/K02/A/95/99

273. The approved amount was reverted to PGTF in 1992 as no matching contribution was received by 31 December 1991.

274. In accordance with the decision of the 14th Annual Ministerial Meeting (New York. 1-2 October 1990), the approved amount for this project would be reverted to PGTF if the matching contribution of US$ 35,000 from the Action Committee was not received by 31 December 1991.

275. In accordance with the decision of IFCC-VI contained in paragraph 72(5) of its Report, the Action Committee would receive the matching amount of US$35,000 from PGTF only after it has received a matching contribution of the same amount from its member countries.

276. The 14th Annual Ministerial Meeting decided that this project proposal could be resubmitted at an appropriate time if no matching contribution was received by 31 December 1991.

VII. OTHER MATTERS

277. The Committee agreed that the deadline for the submission of project proposals by Member States for consideration at its next regular session will be 31 March 1995. At this session, the Committee will also consider the project proposals referred to para. 41 of this report.

Mr. Ahmed Djoghlaf

Mr. William Ehlers

Mr. Edward Kufuor

Mr. Eduardo Praselj (Chairman)

Mrs. Lakshmi Puri

Mrs. Saodab B.A. Syahruddin

Annex I

LIST OF PARTICIPANTS

Committee of Experts of the Perez-Guerrero Trust Fund for ECDC/TCDC

Dr. Ahmed Djoghlaf
Adviser to the Prime Minister on Environment
Prime Minister's Office
Algiers, Algeria

Mr. William Elhers
First Secretary
Office of the Minister
Ministry of Foreign Affairs
Montevideo. Uruguay

Mr. Edward Obeng Kufuor
Director
Ministry of Foreign Affairs
Accra, Ghana

Dr. Eduardo Praselj
Director
Petroquímica de Venezuela
Former Deputy Minister of Energy and Mines
Caracas. Venezuela

Mrs. Lakshmi Puri
Joint Secretary
Ministry of External Affairs
New Delhi. India

Mrs. Saodah B.A. Syahruddin
Director for Economic Relations among Developing Countries
Department of Foreign Affairs
Jakarta Pusat, Indonesia

Office of the Chairman of the Group of 77

H.E. Mr Rabah Hadid
Deputy Permanent Representative of Algeria
to the United Nations

Mr. Mourad Ahmia
First Secretary
Permanent Mission of Algeria
to the United Nations

Mr. Arturo Lozano
Documents Officer

Mr. Rafiqul Alam Khan
Administrative Clerk

Annex II

SUMMARY OF THE UTILIZATION OF PGTF RESOURCES

PGTF PROJECTS
SECTORAL DISTRIBUTION

PGTF contribution in US$ and (number of projects)

	Interregional	Regional	Subregional	Action Committes	TOTAL
Trade	790.000 (4)	120.000 (1)			910.000 (5)
Energy					
Finance	30.000 (1)	78.000 (1)			108.000 (2)
Technology	60.450 (2)	258.000 (3)			418.450 (5)
Food&Agricult.	140.000 (1)		682.400 (8)		822.400 (9)
Raw Mater.	100.000 (1)				100.000 (1)
Industrialization			120.000 (1)		120.000 (1)
TCDC (C\S)[1]	160.000 (2)		45.000 (1)	38.500 (1)	243.500 (4)
Other TCDC		83.700 (1)	155.300 (2)	35.000 (1)	274.000 (4)
Information	697.021 (6)		153.450 (2)		850.471 (8)
Other	120.000 (2)		88.500 (2)		208.500 (4)
TOTAL	2.097.471 (19)	639.700 (6)	1.244.650 (16)	73.500 (2)	4.055.321 (43)

[1]TCDC (C\S): TCDC Consultancy/Services

Annex III

FINANCIAL STATEMENT OF THE PEREZ-GUERRERO TRUST FUND FOR ECDC/TCDC
AS OF 31 MARCH 1994

Unexpended resources as of 1 January 1994 (Bal. of funds)		$6,134,759.18
Add: Interest earned as of 31 March 1994		$70,000.00[2]
Total resources		$6,204,759.18
Less: Project disbursements recorded in 1994:		
INT/89/K13 - SUNS	$200.00	
INT/90/K08 - PGTF, Phase II	$20,480.00	
INT/93/K02 - ECDC/TCDC Information, Phase II	$25,560.00	
INT/93/K03 - SUNS, Phase II	$31,399.00	
	$77,639.00	
		$6,204,759.18
		$77,639.00
Balance of funds (Total resources less disbursed funds)		$6,127,120.18
Less: Reserved resources (Fund's capital)		$5,000,000.00[3]
Remaining funds		$1,127,120.18

Consisting of obligated/earmarked funds as follows:

(i) Obligated

Budget of approved projects (balance as of 1991 and onwards):

INT/89/K12 - SELA, Germ Plasm	$38,000.00
INT/90/K01 - Mangrove	$35,300.00
INT/90/K08 - PGTF, Phase II	$156,443.40

[2]Estimated 1994 interest for period 1 Jan-31 Mar from bonds and time deposits; $70,000.00 to be posted in account at the end of 1994.

[3]Deposited in long-term high-yield bonds.

INT/90/K09 - Veterinary	$140,000.00
INT/92/K03 - GSTP	$50,000.00
INT/92/K07 - SADC	$90,000.00
INT/93/K01 - African Agency Biotechnology	$150,000.00
INT/93/K02 - ECDC/TCDC Information, Phase II	$25,560.00
INT/93/K03 - SUNS, Phase II	$28,482.00
	$713,785.00

(ii) Earmarked funds approved:

INT/93/K04 - ASEAN, Agri Databank	$94,000.00
INT/93/K05 - Mercosul. Industrial Policy	$120,000.00
INT/93/K06 - Cen. America, Hydrographic Cooperation Programme	$38,500.00
INT/93/K07 - CEPGL, Agrimachinery	$43,000.00
	$295,500.00

Total obligated/earmarked funds ($713,785.00 + $295,500.00 = $1,009,285.00

Available for new projects ($1,127,120.18 - $1,009,285.00) = $117,835.18[4]

[4] This does not include the interest earnings for 1994 for the April-December period estimated at $200,000 to $220,000 to be posted to the account at the end of the year.