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“Operations Management Training Workshop

For

Engineers from Steel Plants of Comesa Member Countries

(6TH July, 1998 - 24TH July, 1998)

Dar es Salaam-Tanzania.

Jointly Organized by

The United Nations Industrial

Development Organization
(UNIDO)

and

The Common Market for E^ustern and Southern Africa.

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1. INTRODUCTION:

The Operations Management Workshop for Engineers from Steel Plants, in the Common Market for Eastern and Southern Africa (COMESA) countries was held at the Tanzania Telecommunication Company College, in Dar es Salaam Tanzania from Monday, 6th July to Friday 24th July, 1998.

The Workshop was attended by 48 participants mainly from steel plants, allied metal and Engineering Industries in Zimbabwe, Zambia, Tanzania and Ghana. The resource person for the Training Workshop came from Egypt, Uganda, Zambia, Tanzania, and Zimbabwe. These countries are members of COMESA. The Workshop Coordination and general management was entrusted to the Iron and Steel Association under the guidance of the Associations Secretary General.

The list of participants, resource person and the Workshop Coordinating staff is hereby attached as schedule 1.

OFFICIAL OPENING OF THE WORKSHOP:

The Workshop was officially opened by the Principal Secretary Ministry of Industries and Trade (Hon Prof. Doriye) with a speech read on his behalf by Mr. Nyiti, acting Director of Industries.

Statements were also made by the Secretary General of the Iron and Steel Association (Mr. Lawrence Manyama) and by the COMESA Secretary General, Mr. Mwencha in a statement read on his behalf by Mr. J.A.A. Opio, Acting Director of Industry and Environment (COMESA).

2.0 THE WORKSHOP PROGRAMME DETAILS:

2.1 MODULE 1-IRON STEEL MELTING & CASTING: 6TH-17TH JULY 1998

- 2.1 Description of electric arc furnace equipment and ancillaries.
- 2.2 Raw materials.
 - i) Iron and Steel scrap: description of sources, classification, preparation.
 - ii) Oxidizing raw materials: iron ore, mill scale, oxygen.
 - iii) Ferro-alloys: description, qualities, usage.
 - iv) Non-metallic raw materials: Limestone, burnt lime, dolomite, fluorspar, sand, coke.
- 2.3 Charge and charge calculations
- 2.4 Melting, oxidizing and refining.
- 2.5 Furnace tapping procedure

2.6 Furnace repairs

2.7 Ingot casting

- i) Top pouring
- ii) Bottom pouring
- iii) Mould preparation on maintenance
- iv) Ingot optimisation.

2.9 Steel ingots and their defects: Segregation, pipes, blow-holes, ingotism, scabs seams and silvers.

2.10 Continuous casting of steel:

- i) Historical development
- ii) Description of typical common continuous caster and components; tundish, mould, dummy bar.
- iii) Strand withdrawal
- iv) Mould cooling and secondary cooling systems
- v) Process control and instrumentation
- vi) Quality control in continuous casting.

2.11 Safety aspects and protective clothing, safety committees, legal responsibility.

2.12 Foundry casting practises.

2.13 Refractories in steelmaking: Description, properties, manufacturing, usage, maintenance, refractory failures, latest technology and developments.

2.14 INDUCTION FURNACES:

- i) General Introduction
- ii) Types of Induction furnaces
- iii) Cast Iron Production using induction furnaces
- iv) Sample calculations
 - . Carbon in Nodular Cast Iron Returns
 - . Silicon in Nodular Cast Iron Returns
 - . Sulphur in Nodular Cast Iron Returns.
- v) Charging practise
- vi) Charge pre-heating
- vii) Induction furnace bath melting
- viii) Induction Furnace continuous melting
- ix) Nodular Cast Iron Base Metal controls and Analysis.
- x) Induction Furnace Duplexing of Cupola melted Iron.
- xi) Steel cast making using Induction furnaces.
- xii) Induction furnace Maintenance.

2.15 CRUCIBLE AND ROTARY FURNACES:

- . General Introductions
- . Indirect fuel fired furnaces
- . Types of furnaces
- . Construction of furnaces and accessories.
- . Principles of operation for crucible furnaces.

2.16 MANAGEMENT OF QUALITY IN IRON AND STEEL MAKING:

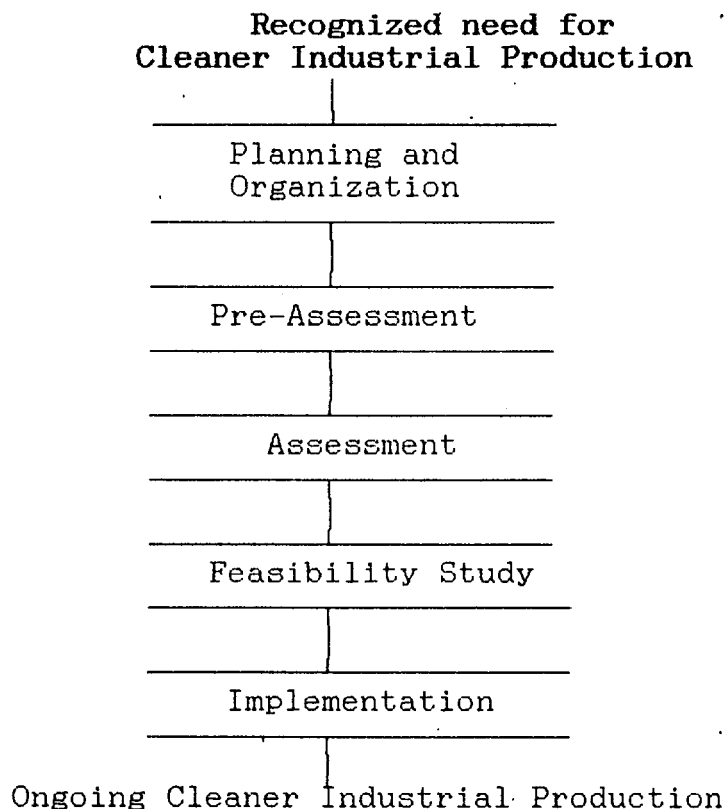
- Background ISO 9000
- Quality Management and quality Assurance Standards
- Basic control mechanisms
- Management responsibility, organization
- Organisation and verification
- Quality system procedures
- Quality planning
- Document control
- Purchasing data
- Control of customer supplied product
- Product identification and trace ability
- Inspection and test status
- Control of non conforming product
- Corrective and preventive action
- Handling, storage, packaging, preservation and delivery.
- Control of quality records, internal quality audits.

2.16 Preparation of back to office action plans.

2.17 CLEANER PRODUCTION:

- . Definitions: What is Cleaner Production
- . Justification: Why Cleaner Production some of the C.P. Options i.e. material substitutions, recycling process modifications and redesign treatment alternative etc.
- . Relationship between Cleaner Production and Environmental Management System and how the two approaches are inter-related in promoting better Environmental Management.
- . Environmental Bench marking and Cleaner Production.

Five phases are distinguished in the Cleaner Production Assessment, each comprising several steps. Below are the phase of Cleaner Industrial Production.



2.18 **MAN MANAGEMENT:** This topic was presented as under:

2.181 **PART ONE: HANDLING AND MOTIVATING PEOPLE:**

This covered:

- . Human Relations and Motivation
- . Human Individuality
- . Attitudes and Aspirations
- . Cooperation and Resistance
- . Influencing the Behaviour system.
- . The hierarchy of needs (Maslow's hierarchy of motivation needs) (five categories of needs).
- . How to use the Hierarchy of needs.
- . The needs for Achievement Power, and Affiliation.
- . How people act when needs are not fulfilled.
- . Influence of group dynamics. .

2.182 **PART TWO: LEADING PEOPLE:**

- . Leadership - The power that turns the wheel of Management.
- . Process of leadership, leadership role, ruling, governing and administering.
- . The real source of leadership power.
- . Management and leadership.
- . Expectations that cause role conflicts in Managers/Supervisors.

2.183 **PART THREE: MANAGING THE BOSS AND KNOWING YOURSELF:**

In this presentation the following were covered:

- . Managing the Boss
 - Analyze your Boss
 - Aims/values
 - Strengths and weaknesses
 - Style
 - Circumstances.
- . What type of person are you
- . Concentrate on your strengths
- . Jung's four functions.
 - Thinker
 - Sensor
 - Intuitioner
 - Feeler.
- . What do you value?
 - Do you value conformity and structure?
 - Do you value freedom and Flexibility
 - Do you value achievement
 - Do you value power
 - Do you value a tangible production.
 - Do you value facts and figures
 - Do you value working with people
 - Do you value financial success.
- . Be aware of the future:
 - Facing up to the future
 - Starting out
 - Getting established
 - Consolidating
 - Staying on course.

2.19 **ENERGY MANAGEMENT:**

- Assessing the situation
- Energy demand management organisation structure
- Action programme
- Training in energy management
- Getting line management accountable
- Benefits of effective energy demand management.

3.0 MODULE 2 - STEEL ROLLING 13TH JULY - 24TH JULY, 1998

- 3.1 Reheating furnaces: design, refractories, fuels, firing, energy management, repairs and maintenance.
- 3.2 Rolling mills: types, layouts, ancillaries mill setting and operation.
- 3.3 Defects in rolled steel products, their identification, possible causes and remedies, fins, laps, overfill, wrinkles, roll marks, cracks, scratches, surface decarburization.
- 3.4 Roll pass design appreciation:
 - i) Basic principles of rolling
 - ii) Spread and elongation
 - iii) Functions of the roll pass designer
 - iv) Roll pass design stages
 - v) Roll gap
 - vi) Principles of roll pass design for continuous rolling
 - vii) Calculation of rolling forces, speeds, motor selection.
- 3.5 Quality Management in Iron and Steel making. Topics covered are similar to those depicted under module 1.
- 3.6 Energy Management.
 - i) Assessing the situation
 - ii) Energy demand management organisation structure
 - iii) Action programme
 - iv) Training in energy management
 - v) Getting line management accountable.
 - vi) Benefits of effective energy demand management.
- 3.7 Principles of management - similar to topics covered under module 1.
- 3.8 Cleaner Production: Topics covered are similar to those depicted under module 1.
- 3.9 Occupational health and safety.
- 3.10 Preparation back to office action plans.

4.0 MODULE 3-MAINTENANCE MANAGEMENT 6TH JULY-24TH JULY, 1998

- 4.1 Strategic maintenance management: Stating and analysing the global maintenance problem, implementation and operation of maintenance systems.
- 4.2 Maintenance management systems: Maintenance organisation/classifications and the maintenance cycle, maintenance costs, life cycle costing and maintenance materials management, planning and scheduling.

- 4.3 Availability calculation and engineering maintenance performance monitoring.
- 4.4 Quality maintenance systems: quality aspects of maintenance total productive maintenance, implementation strategies, maintenance audits etc.
- 4.5 Preparation of back-to-office action plans.
- 4.6 Plant rehabilitation and upgrading.
 - i) Definitions: re-manufacturing, updating, re-building, re-conditioning, restoration, tune-up.
 - ii) Justification for rehabilitation or upgrading.
 - iii) Procedures to follow: inspection report, evaluation, in-houses vs outside contracting.
 - iv) Steps in re-manufacturing/re-building: engineering design, disassemble and cleaning, reworking of retained components, assembly, performance testing.
 - v) Retrofit methods.
 - vi) Support planning.
- 4.7 Non-destructive testing in the steel industry.
 - i) Discontinuities/defects in steels: definition, characterisation, metallurgy.
 - ii) NDT methods: applications and limitations
 - iii) Selection of NDT methods.
- 4.8 Cleaner Production, topics similar to those depicted under module 1.
- 4.9 Principles of Man-Management - Topics similar to those covered under module 1.
- 4.10 Design Consideration in Maintenance Management.
 - Management concepts i.e., system operational requirement organisational, maintainability assessment, human factor analysis, failure model effects and criticality analysis, design and manufacture of spares classification of spare parts, according to materials, weight, technology, and accuracy type of machine or equipment etc.
- 4.11 Material selection.

4.12 Welding.

- Welding process and equipment
- Material and their behaviour during welding
- Construction and design
- Fabrication, applications engineering
- Non destructive testing.
- Examples of testing methods, application and limitations to specific discontinuities.
- Evaluation and reliability of NDT results
- Applications in maintenance: inspection and conditioning monitoring
- Practical demonstration of ultrasonics, dye-penetrant, magnetic particle, eddy-current methods.

4.13 Energy demand management framework:

- i) Assessing the situation
- ii) Energy demand management organisation structure
- iii) Acting programmes
- iv) Training in energy management
- v) Getting line management accountable
- vi) Benefits of effective energy demand management.

5.0 TOURS:

Educational tours were undertaken to the following related downstream and upstream companies in Tanzania.

- . Tanzania Automotive Technology Centre - Nyumbu Kibaha.
- . M.M. Integrated Steel Mills - Mikocheni Industrial area - Dar es Salaam.
- . Iron and Steel Limited - Dar es Salaam.
- . Institute of Product Innovation - University of Dar es Salaam.
- . Tanzania Bureau of Standards - Ubungo, Dar es Salaam.
- . Tanzania - Zambia - Railways Authority (TAZARA) Workshop Dar es Salaam.

Social tours were also made to attractive and historical sites in Dar es Salaam and Zanzibar.

6.0 WORK EXECUTED SERVICES AND FACILITIES PROVIDED DURING THE WORKSHOP:

6.1 WORK EXECUTED:

- . Undertaking protocols and logistics required for the government approval to host the training Workshop in Tanzania.
- . Contacting and visiting relevant, Industries, plants and Institutions to nominate participants to the Workshop.

- . Arrangement of Industrial visits.
- . Evaluation of applicants CV's
- . Search for the Workshop venue
- . Workshop promotion.
- . General Management and coordination of the Workshop including undertaking public relations.
- . To ensure smooth and effective running of the Training Workshop.

6.2 SERVICES PROVIDED:

- . Assisting participants and resource person through immigration formalities at Dar es Salaam International Airport during their arrivals and departures.
- . Booking Hotel accommodation for participants and resource person.
- . Provide transport from Airport to respective hotels on arrival.
- . Provide transport from Hotels to Airport on departure.
- . Provide transport daily to and from Hotel and Workshop venue.
- . Provide morning, tea and bites lunch, and afternoon with soft drink and mineral drinking water daily.
- . Confirmation for participants and resource reasons departure flights.
- . Arrange visits to industries, and provide transport for the same.
- . Arrange social site visits.
- . Ensure comfort of the participants and resource person throughout the workshop term.
- . Arrangement of official opening and closing occasions of the Workshop (making necessary contacts and actions to facilitate availability of the guests of honour for the occasion.
- . Provide cocktail as part of the Training Workshop closing ceremony.
- . Printing of the certificates (samples are attached), provide copies of lecture material to each participant.

6.3 FACILITIES PROVIDED INCLUDE:

- . Computers, printers, scanner,
- . Photocopies, P.A. system
- . Secretarial services
- . Stationeries document folders, files, pencils, pens, erasers, clips, pins, writing pads, transparent papers, flip chart and flip chart paper, chalks, blackboards marker pens, overhead projectors (3) slide projector, video and television.
- . Class rooms and dinning room and Secretariat Office.
- . E-mail, Telephone and fax facilities were provided.

6.4 MANAGEMENT OF WORKSHOP:

- . The Workshop was well advertised. Many adverts showing the training Workshop tittle, sponsors and venue were placed invarious parts of Dar es Salaam.
- . The Workshop was advertised in Radio and hence had a wide coverage in Tanzania..
- . On the Official opening of the Workshop the occasions was featured for 5 minutes in DTV (Television) news Broadcast.
- . Through effective Management, all facilities, and services to facilitate smooth running of the Workshop were timely provided.

TRAINING WORKSHOP EVALUATION AND RECOMMENDATIONS:

All the participants completed the UNIDO evaluation forms for in plant group training programmes.

Their comments were, inter-alia.

1. UNIDO/COMESA were highly commended and thanked for organising the Workshop which for several participants was the first such training programme they had attended.
2. There were calls that similar Workshops should continue to be held also for the different levels from policy makers to shop-floor workers.
3. The uses of locally - based resource persons (within COMESA Region) was hailed and supported fully as they were close to the participants and understood their respective situations, problems and peculiarities well. There was excellent rapport and group spirit throughout the modules and plant/industrial visits.
4. COMESA was called upon to enhance promotion activities regarding mutual plant visits and personnel exchange programmes between plants within the COMESA Region. Study tours for the resource person to acquaint themselves with more advanced practices were also recommended.
5. Cleaner Production generated much interest and debate. It was the view of participants that Cleaner Production awareness programme be held more regularly.
6. COMESA was called upon to assist by making available local experts for technical assistance and consultancy services as well as on the job training.
7. The back to office action plans should be followed up by UNIDO/COMESA so that the momentum for change and cooperation is maintained.
8. The Participants and resource person ranked the Workshop as very successful.

SCHEDULE 1

LIST OF PARTICIPANTS

MODULE I - IRON & STEEL MELTING & CASTING:

1. Maj. W.M. Mayenga, Chief Foundry Engineer, Tanzania Automotive Technology Centre, P.O. Box 77, Nyumbu Kibaha, Tel: 052-402216/8
2. Mr. N.K. Mlacha, Workshop Instructor, University of Dar es Salaam, Faculty of Engineering, P.O. Box 35131, Tel: 410128; Dar es Salaam-Tanzania.
3. Mr. Godfrey Rutechura, Engineer, MMI Steel Mills Limited, P.O. Box 3030, Tel: 71309; Dar es Salaam-Tanzania.
4. Mr. Omari A. Mlacha, Pattern Making, Kitutu Pattern Making, P.O. Box 33256, Tel: 451073; Dar es Salaam-Tanzania.
5. Tito Esau Mwinuka, M.M. Integrated Steel Mills Limited, P.O. Box 3030, Tel: 71309; Dar es Salaam-Tanzania.
6. David Murimi, Tazara Workshop, P.O. Box 40110, Dar es Salaam-Tanzania.
7. Meckdavid A. Salama, K.P.M. - UBUNGO, P.O. Box 33256, Tel: 451073; Dar es Salaam-Tanzania.
8. Ghulum Abbas, Iron & Steel Limited, P.O. Box 20427, Tel: 700360, Fax: 700361; Dar es Salaam-Tanzania.
9. Lameck E. Kamando, Tanzania, Zambia Railway Authority (TAZARA) P.O. Box 1509, Tel: 065-3695; Mbeya-Tanzania.
10. Mr. Amon M. Mbwilo, Tanzania, Zambia Railway Authority (TAZARA) P.O. Box 1509, Tel: 065-3695; Mbeya-Tanzania.
11. Mr. Ernest Ato Ansa-Sam, Production Engineer, Wahome Steel Limited, P.O. Box 1518, Tema, Ghana, Tel: 233-22-306981, 304311, 306975, Fax: 233-22-302195.
12. Mr. S.D. Swai, Mechanical Draftsman, Institute of Production Innovation, P.O. Box 35075, Tel: 43377, Fax: 43376; Dar es Salaam-Tanzania.
13. Mr. Mushtaq Ahmed, Foreman Iron & Steel Limited, P.O. Box 1518, Dar es Salaam-Tanzania.

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2. Mr. Naeem-UR-Rahman, Metallurgist, Iron & Steel Limited, P.O. Box 20427, Tel: 700360, Fax: 700361, E-mail: isl@raha.com Dar es Salaam-Tanzania.
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5. Mr. N.J.M. Ngosomwiles, Works Manager, Tanzania Railway Corporation (TRC), P.O. Box 1250, Tel: 116202; Dar es Salaam-Tanzania.
6. Meriane S. Mwinuka (Mrs), Standards Officer, Mechanical Engineering Dept., Tanzania Bureau of Standards, P.O. Box 9524, Telegram: 450288/48042, Fax: 450298; Dar es Salaam-Tanzania.
7. Mr. M.O. Msangi, Foundry Technician, Tanzania Railways Corporation, P.O. Box 4349, Dar es Salaam-Tanzania.
8. Ghulum Abbas - Iron & Steel Limited, P.O. Box 20427, Dar es Salaam - Tanzania.
9. Ernest Ato Ansasam, Production Engineer Wahome Steel Limited; Tema-Ghana.

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1. Mr. A.F.M. Mwalupani, Mechanical Engineer, Aluminium Africa Limited, P.O. Box 9464, Tel: 863628; Dar es Salaam-Tanzania.
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3. R. Oncemorre Ng'onomo, Engineering & Maintenance Manager, ZAMEFA, P.O. Box 90295, Tel: 260-2-510599, Fax: 512542/511109; Luanshya-Zambia.
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5. Mr. Bonaventure Lubinga, Assistant Maintenance Engineer, Chilanga Cement, P.O. Box 71572, Tel: 611938/41, Fax: 278535; Ndola-Zambia.
6. Mr. Josiah Samson Nyamkara, Principal Technician (Mech.) University of Dar es Salaam, Tanzania, P.O. Box 35131, Tel: 410754 Ext. 2950; Dar es Salaam-Tanzania.
7. Mr. Lwehalla H.B., Principal Technician, University of Dar es Salaam, P.O. Box 35131, Tel: 43501 Ext. 2595; Dar es Salaam-Tanzania.
8. Mr. Y.M. Kishashu, Managing Consultant, P.O. Box 11221, Tel: 182641/182502, Fax: 182502; Dar es Salaam-Tanzania.
9. Mr. M.D. Leon, Research Officer, Tanzania Automotive Technology Centre, P.O. Box 77, Tel: 2216/8; Nyumbu-Kibaha.
10. Mr. Albert Kalongole, Technician Officer, Small Scale Industries Organisation (SIDO), P.O. Box 760, Tel: 064-2461, FAX: 064-2056; Iringa-Tanzania.
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14. Mr. Andrew R.K. Tumwimbile, Maintenance Engineer, MM Integrated Steel Mills Limited, P.O. Box 7072, Tel: 71309 Dar es Salaam-Tanzania.
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2. Ms. Regina Ishemwabura, Secretary, Iron & Steel Association, P.O. Box 70217; Dar es Salaam-Tanzania.
3. Ms. Mgeni Gutta, Secretary, Iron & Steel Association, P.O. BOX 70217; Dar es Salaam-Tanzania.
4. Mr. Ally Kolwa, Technician, Iron & Steel Association, P.O. Box 70217; Dar es Salaam-Tanzania.
5. Mr. Christopher Karunde, Office Attendant, Iron & Steel Association, P.O. Box 70217, Dar es Salaam-Tanzania.
6. Ms. Gloria Mrema, Office Attendant, Iron & steel Association, P.O. Box 70217; Dar es Salaam-Tanzania.

COMESA SECRETARIAT:

1. Mr. J.A. Alele Opio, Acting Director of Industry, Energy and Environment.
2. Dr. M. Kanyangarara, Metallurgy Consultant.
3. Ms. L. Jere, Secretary.



**OPERATIONS MANAGEMENT
WORKSHOP**



Certificate of Attendance

This is to certify that

**has satisfactorily attended a Course on
Iron & Steel Melting & Casting
sponsored by UNIDO and COMESA
and Coordinated by**

IRON AND STEEL ASSOCIATION (TANZANIA)

from 6th July, 1998 to 24th July, 1998

at Dar es Salaam, Tanzania

For COMESA

For/UNIDO

For/ISA



**OPERATIONS MANAGEMENT
WORKSHOP**



Certificate of Attendance

This is to certify that

has satisfactorily attended a Course on

Steel Rolling

sponsored by UNIDO and COMESA

and Coordinated by

IRON AND STEEL ASSOCIATION (TANZANIA)

from 6th July, 1998 to 24th July, 1998

at Dar es Salaam, Tanzania

For COMESA

For/UNIDO

For/ISA



**OPERATIONS MANAGEMENT
WORKSHOP**



Certificate of Attendance

This is to certify that

has satisfactorily attended a Course on

Maintenance Management

sponsored by UNIDO and COMESA

and Coordinated by

IRON AND STEEL ASSOCIATION (TANZANIA)

from 6th July, 1998 to 24th July, 1998

at Dar es Salaam, Tanzania

For COMESA

For/UNIDO

For/ISA