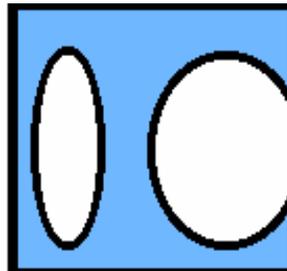




*Assistance à la **D**ynamisation de l'**A**gribusiness au **R**wanda*

COFFEE FACTORY DEVELOPMENT AND MANAGEMENT

FINAL REPORT



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1.0 INTRODUCTION

1.1 Preface

This report is on the *Training for Rwandese Engineers on Coffee Factory Development and Management and The Production of Drawings and other Design Documents*. The course was held on 5 – 16 August 2002 at the Kenya School of Monetary Studies, Nairobi, Kenya. Field visits were also made during the training period. The second part of the training was conducted at Ntongwe and Kigali, Rwanda, on 26- 31 August 2002.

The reports submitted by the consultant, Log Associates, to the client, ADAR, include:

1. Consultancy Report: Comprising the following appendices
 - Model Coffee Factory Drawings
 - Training Notes on Coffee Processing, Engineering Graphics including AutoCAD, Topographic Survey, Coffee Factory Design, Feasibility Studies, Site Investigations, Bills of Quantities, Construction Management, Electrical Installations, Water Supply, Waste Management, Machinery and Equipment, Maintenance Management and Environmental Considerations
 - Model Bills of Quantities

2. UCAR Design Documents, i.e. the design documents for the proposed *Union de Caféculteurs du Rwanda Central* coffee factory at Ntongwe, Gitarama Province, Rwanda including: Design Report including a feasibility Study; Drawings and specifications; Bills of Quantities; and Costed Bills of Quantities.

1.2 Background

The sustained production and processing of high quality coffee is to a very large extent dependent on efficient and cost effective engineering inputs. Coffee quality is dependent on production management practices at the farm level such as fertilization, spraying against infection, tillage practices, and irrigation and harvesting. The quality is also dependent on processing operations at factories such as reception, pulping, pre-grading, fermentation, grading, conditioning, drying, storage and waste management. Transport of cherry and parchment must also be effected efficiently to ensure a cost effective operation. Precise milling of coffee also contributes to the final quality and productivity.

The successes or failure of a professional is determined by his/her ability to apply theory to practical problems in the work situation. More often than not this ability cannot be fully acquired within 3 – 5 years spent in the University. Thus in Kenya a graduate engineer requires at least two years of approved practical experience, and one more year in a responsible position before they can be registered as Professional Engineers. The Engineers Registration Act Cap 530 (1969) requires that practical training of a Graduate Engineer be carried out under the supervision of Registered Engineers. Engineers in Rwanda have not had any training in coffee factory design, construction supervision, operation and maintenance.

The duties of a coffee factory engineer include

1. To advise the Coffee Factory Technicians on all technical matters relating to Coffee Processing
2. To advise on the carrying out feasibility studies and recommendation for both factory improvements and new factories
3. To make technical drawings for all factory improvements and construction projects
4. To advise on siting of new factories
5. To advise on bidding procedures for factory improvement and construction projects
6. To ensure that the construction is done according to the plans and specifications and ensure that the factory technicians follow these
7. To advise the factory technicians on matters relating to factory construction supervision
8. To certify final completion of factory contracts and final payments
9. To advise technicians on coffee factory machinery maintenance and operations
10. To advise technicians on coffee factory civil works maintenance
11. To study and investigate on new techniques and improvements of coffee processing in liaison with various agencies
12. To train and guide coffee factory technicians on new techniques of coffee processing;
13. To advise technicians, societies and co-operative unions on selection of coffee factory machinery and construction materials.

The objectives of the training programme were to expose the Rwandese Engineers to the theory and practice of Coffee factory design and construction supervision so that they can participate in Coffee factory development in Rwanda.

1.3 Scope of Works

The scope of work involved:

1. Training of Engineers in the following two phases:
 - 1.1 Induction and orientation;

In this phase, the trainees were exposed to all relevant theory with some practical exposure.

1.2 Case Study;

In this phase, the trainees were engaged in practical field work.

2. Production of coffee factory design documents including drawings, specifications and bills of quantities based on the most recent Kenyan design.

2.0 TRAINING PROGRAMME AND PRODUCTION OF DRAWINGS

The training programme included two phases:

- Induction and orientation
- Case study

2.1 Induction and Orientation

The induction and orientation phase of the training was held at the Kenya School of Monetary Studies on 5 – 16 August 2002. This was the first stage in the training of the Rwandese engineers.

This training involved an intensive program in which the trainees were exposed to all the relevant theory with some practical applications including field and industrial visits. This training was conducted in an institute, which offered both accommodation as well as training facilities including computers, overhead projectors, and flipcharts.

The training room was equipped with computers for demonstration of the computer drawings. The site investigations and the topographic survey practicals were conducted within the compound of the institute and the consultant provided all the equipment required.

The training covered the following areas:

- i. Overview of Coffee Processing
- ii. Computer Aided Design (CAD)
- iii. Feasibility Study
- iv. Site Investigation
- v. Topographic Survey
- vi. Machinery & Equipment
- vii. Water Supply
- viii. Waste Management
- ix. Electrical Installations
- x. Bills of Quantities
- xi. Construction Management
- xii. Maintenance

Field and industrial visits were made to the following places:

- i. Kiairia Coffee Factory, Kiambu.
- ii. Kamiti Coffee Farm, Thika.
- iii. Kenya Coffee Planters Cooperative Union (KPCU) Coffee Mills, Nairobi.

Kiairia Coffee Factory is a coffee washing and pulper unit located in Kiambu, Kenya. It is the biggest of 13 factories owned by Gititu Co-operative Society. On 5 August 2002, the Rwandese Engineers were taken on a visit to this factory during which they were able to

observe hoppers, pulpers, the argard pre-grader as well as the washing procedures in coffee processing. The Kiairia Pulper and Washing Factory has a processing capacity of 1.8 million kilogram's of cherries per year.

The Rwandese were also able to observe various life stages of coffee as well as the crop under sprinkler irrigation at Kamiti Farm, Thika, Kenya.

During the visit to the Kenya Planters Co-operative Union coffee milling plant, Nairobi on 6 August 2002, the Rwandese Engineers were able to appreciate techniques used in secondary processing of coffee as well as maintenance, machinery and electrical system associated with the whole process. The main processes undertaken at this coffee milling plant are husking, polishing, winnowing, sizing, sorting and bagging.

Table 2.1 outlines the list of participants for the induction and orientation phase of the training.

Tables 2.2 and 2.3 outline the training timetable for the induction and orientation Phase of training.

2.2 Case Study

The Case Study phase of the training was conducted at Kigali and Ntongwe, Rwanda, on 26-31 August 2002. The training covered following areas:

- Topographical Survey
- Site Investigation
- Feasibility Study
- Preparation of Plans and Maps
- Bills of Quantities
- Setting out

The consultant and the Rwandese engineers conducted a preliminary assessment of the site and collected information necessary for the feasibility study on 26 August 2002. The topographical survey of the site at Ntongwe, was effected on 27 August 2002. The trainees then used the data collected to prepare plans for the site as well as bills of quantities. This was done between 28 and 30 August 2002. On 31 August 2002 the setting out of the factory at Ntongwe was effected.

The outputs of this phase of the training programme include: Feasibility study; topographic and perimeter survey maps; design drawings; bills of quantities; costed bills of quantities; and site factory layout. These documents have been submitted to the client as the *UCAR Design Report*.

2.3 Production of Drawings

Drawings detailing the following structures of the Coffee factory design have been completed as per the agreement with the client:

- Cherry Hopper
- Selecting shed
- Skin tower
- Chemical Store
- Recirculation tank
- Pulpers house
- Chemical Bag Store
- Fermentation tanks
- Wet parchment tables layout
- Soak tank and final washing channel
- Emergency drying shed
- Kitchen
- Incinerator
- Workshop
- Recirculation pump house
- VIP Latrine

The drawings are available in *AutoCAD release 14 and 2000* versions.

Table 2.1: List of Participants

No.	Name	Company	Position	Telephone and Physical Address	E-mail
1.	André Munyakazi (Civil Engineer)	Atlantis Consult	Administrateur Directeur	84080 (4) 08301339 P.O. Box 3383 Kigali	atlantis_consult@hotmail.com
2.	Jean Runuya (Architect)	Architectural Design Consultants (A.D.C)	Administrateur Directeur Manager	250 08301552	runuya@yahoo.fr
3.	Kaningu Christian (Civil Engineer)	Rwanda General Building (R.G.B)	Directeur	(250) 08500326	chris1116@caramail.com
4.	Kalisa Aimable (Civil Engineer)	HYGEBAT	Technicien	250) 0851146	kalai 61@postmaster.co.uk
5.	Rwasibo Jean Bosco (Civil Engineer)	SOGIS	Technicien	(250) 08513142	rwajebos@yahoo.fr
6.	Mugambira Jules (Civil Engineer)	BEP & Ingenieurs Conseils	Superviseur des Travaux	(250) 08519310	jmugambira@yahoo.fr
7.	Gasana Innocent (Rural Engineer)	TRADE CO. S.A.R.L	Chargé des travaux	(+250) 08408078 (+250) 511502	gasana25@hotmail.com
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Table 2.2: Training in Week 1

TIME	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
8.30- 10.30 am	Introduction	Coffee Processing	Coffee Processing	Engineering Graphics	Computer Aided Design	Site Investigation
10.30–11.00 am	TEA/COFFEE BREAK					
11.30 - 1.00 pm	Field Visit	Coffee Processing	Coffee Processing	Computer Aided Design	Computer Aided Design	Site Investigation
1.00-2.00 pm	LUNCH BREAK					
2.00-3.30 pm	Field Visit	Field Visit	Feasibility Study	Computer Aided Design	Computer Aided Design	Site Investigation
3.30-4.00 pm	TEA/COFFEE BREAK					
4.00-5.30 pm	Field Visit	Field Visit	Feasibility Study	Computer Aided Design	Computer Aided Design	Site Investigation

Table 2.3: Training in Week 2

TIME	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
8.30 10.30 am	Topographic Survey	Machinery & Equipment	Water Supply	Electrical Installation	Bills of Quantities	Maintenance
10.30-11.00 am	TEA/COFFEE BREAK					
11.30 - 1.00 pm	Topographic Survey	Machinery & Equipment	Water Supply	Electrical Installation	Bills of Quantities	Maintenance
1.00-2.00 pm	LUNCH BREAK					
2.00-3.30 pm	Topographic Survey	Machinery & Equipment	Waste Management	Bills of Quantities	Construction Management	Discussions
3.30-4.00 pm	TEA/COFFEE BREAK					
4.00-5.30 pm	Topographic Survey	Networks	Waste Management	Bills of Quantities	Construction Management	Discussions

APPENDICES

APPENDIX 1: MODEL COFFEE FACTORY DRAWINGS

APPENDIX 2: TRAINING NOTES

ANNEXE: MODEL BILL OF QUANTITIES