

Final report:

USAID/Rwanda presentation of the Africa Regional Course in Environmental Assessment and Environmentally Sound Design

14–19 September 2003 ■ Ruhengeri, Rwanda

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Attachments:

Key contacts
Final Agenda
Participant list
Final case site descriptions
USAID/AFR Environmental Review Form
Copies of participant evaluations (hardcopy distribution only)

Summary

In September 2003, following an ENCAP-sponsored preplanning exercise¹, USAID/Rwanda contracted with Tellus Institute to organize and conduct a presentation of the *Africa Regional Course in Environmental Assessment and Environmentally Sound Design for Small-Scale Activities*.

The course was held at the Foyer de Charité in Ruhengeri Province from 15–19 September 2003. Course participants were predominantly professional staff of USAID/Rwanda partner organizations drawn from all three SO programs. Additional participants were drawn from Government of Rwanda ministries and USAID/Rwanda.

The principal trainer for the course was Mark Stoughton of Tellus Institute, who also conducted the ENCAP-sponsored course preplanning. Nancy Odeh of Tellus Institute provided primary home office support for course preparation, including materials translation, and served as a facilitator at the course.

Tellus subcontracted with Tarsis Kagwisagye of Peace Health Consult, a Rwandan Consultancy, to provide logistics support to the course. Tellus also subcontracted with one Rwandan and one Burundian expert to provide region-specific socioeconomic and environmental expertise. A final subcontract was executed with Esther Milenge to provide simultaneous French/English translation services.

Evah Andriamboavonjy, a Madagascan EIA expert whose attendance was supported by an ENCAP technical consultancy agreement, also served as a facilitator.

The primary difficulty encountered in executing the course was late execution of the course contract; USAID/Rwanda issued a PO for the course only on 4 September. As a result, all activities requiring coordination between the logistics coordinator and USAID/Rwanda (including issuing invitations & confirming case site venues) could only occur after this date, and Tellus was presented with significant problems in moving funds in-country to pay for local procurement. Tellus' concerns regarding contract procedures and their consequences are detailed in a separate memo.

Despite the difficulties posed by late contract award, participant evaluations gave the course high substantive marks—**X.XX** out of 5 for quality of content; and **X.XX** out of 5 for the degree to which the course improved participant understanding of environmental assessment.

This memorandum serves as the final report of the Tellus Institute consultants on the course and the delivery process. As such, it constitutes the final deliverable specified under Tellus' scope of work. It documents:

- The general nature of the basic course, and the substantive adaptations and additions made for this presentation.
- Key attributes of the course
- Consultant's evaluation of the course

¹ Mark Stoughton of Tellus Institute undertook an ENCAP-funded preplanning visit to Rwanda between 13 and 22 July 2003. The results of the preplanning exercise are summarized in the *Preplanning Report*, previously distributed to all parties receiving this final report.

Attachments to this memorandum provide additional information and documentation, including the list of participants and participants' evaluations.

General Course description & Rwanda-specific adaptations

The course was a presentation of the "Africa Regional Course in Environmental Assessment and Environmentally Sound Design for Small-Scale Activities." This basic course is described immediately below, with the adaptations made in Rwanda described at the end of this section

The basic course is a 5-day (M-F) course for 25–50 participants. Typically targeted at USAID partner organizations engaged in small-scale activities, it provides an introduction to environmentally sound design with application to key sectors, and to compliance with USAID environmental review requirements (Reg 216 and associated directives). It is not intended as advanced technical training in impact assessment.

The course is centered around a set of case studies; day 3 consists of a one-day field trip in which participants conduct observation and assessment of actual or proposed project sites. Participants then write a draft IEE or environmental review based on their site visit experience. Typically more than one project site is identified for each of a few sectors (e.g., use of agrochemical inputs, small scale irrigation, agricultural micro and small enterprises, roads, etc.)

The course has been developed by Tellus Institute and staff of USAID's Africa Bureau. It has been given more than 20 times since its creation in 1995. Course development has been funded by ENCAP, an African environmental capacity-building initiative of USAID's Africa Bureau. As the lead provider of technical assistance under ENCAP, Tellus Institute—a non-profit environmental research and consulting organization—typically conducts preplanning and materials preparation as well as providing principal course trainers. This was the first presentation of the course in Rwanda.

A full description of the course, agenda and course materials, as well as a database of past participants, is available at <http://www.encapfrica.org>

Adaptations.

- **Method of addressing Reg 216 procedures.** For all participants, knowledge of environmental review processes and environmentally sound design for undertaking small-scale development activities was important. For many, however, specific understanding of USAID Regulation 216 procedures was not essential (participants in this category included, for example, Government of Rwanda professional staff). Accordingly, the course focused on teaching the basic procedures of environmental review rather than Reg. 216-based procedures, and the case study exercises resulted in environmental review drafts rather than IEE drafts. USAID procedures were covered in an optional afternoon session, which was nonetheless attended by almost all participants.

The basic environmental review framework used was that provided by the revised Africa Bureau subgrant *Environmental Review Form* (attached). This form was developed by Tellus Institute under ENCAP for and in consultation with Walter Knausenberger.

- **Accommodation of 5 pm close to all sessions.** The Foyer de Charite has only 39 rooms. As a result, a small number of participants and trainers were accommodated in Ruhengeri

Ville, approximately 25 minutes away. Because USAID/Rwanda enforces a vehicle curfew, the basic course agenda was revised to close the final session of each day at 5 pm. (Closing times in past presentations of the course range from 5:45 to 6:30.) Earlier closing times were made possible by dropping an environmental review role-playing exercise from the basic course agenda.

Key attributes of USAID/Rwanda course

Dates	Monday, 15 September—Friday, 19 September 2003. (Arrival Sunday 14 September)
Venue	<p>The Foyer de Charité, a Catholic retreat and formation facility near Ruhengeri Ville, was pre-identified by USAID/Rwanda and Anne Turner of ADAR as the likely venue. Venue choice was determined by (1) proximity to likely case sites; (2) removal from the capital; (3) venue capacity and training room facilities.</p> <p>Because the maximum capacity of the Foyer de Charité is 39 participants in single-occupancy rooms (vs. a course complement of 47–50, including trainers), some participants/trainers were accommodated at the Hotel Muharaba on the outskirts of Ruhengeri Ville.</p>
Language	<p>The course was presented in French and English with simultaneous translation.</p> <p>Tellus subcontracted with Esther Milenge, a free-lance Rwandan translator, to provide simultaneous translation services. Ms. Milenge arranged for rental of translation equipment and hire of technicians from the Ministry of Information.</p> <p>Nancy Odeh of Tellus Institute had responsibility for translation of key course materials into French; her primary translations were then copyedited by a professional francophone technical editor. The following course materials were translated:</p> <ul style="list-style-type: none"> ▪ Course presentations ▪ Case site briefings, ▪ Case site visit instructions ▪ Instructions for group exercises. <p>Neither budget nor time permitted complete translation of the Participant Sourcebook into French.</p> <p>History. Initially, the course was to be presented in English only. However, during the preplanning, USAID/Rwanda decided that the course should be presented in both English and French to permit the invitation of non-anglophone participants. At the preplanning close-out meeting, USAID/Rwanda staff indicated that simultaneous (vs. alternating/summary) translation would be the preferred translation approach.</p>
Participants: Invitees and trainers/facilitators	<p>Invitees. Excluding facilitators, trainers and USAID/Rwanda professional staff, USAID/Rwanda established a target of 40 participants, of which the majority were expected to be partner organization staff and the remainder Government of Rwanda professionals. Each SO was nominally allotted 13 invitees.</p> <p>The final course roster conformed to these targets. Course attendees included approximately 12 ministry/government professional staff and a few private sector representatives. The balance consisted of professional staff from USAID partner organizations. (Final participant list is attached.)</p> <p>Trainers/facilitators. The final facilitator/trainer complement was as follows:</p> <ul style="list-style-type: none"> Rwandan/regional experts 2 (G. Bikwemu, A. Kayigema) EIA expert 1 (E. Andriamboavonjy) REDSO/ESA 0* Tellus Institute 2 (M. Stoughton (Principal trainer) & N. Odeh) Logistics Coordinator 1 (T. Kagwisagye)

	<p>Translators..... 2 (E. Milenge; TOTAL FACILITATORS/TRAINERS: 6 + 2 translators</p> <p>*Walter Knausenberger planned to attend the course but was forced to cancel due to schedule constraints.</p>
Participant support	<p>Via the Tellus Institute contract, USAID/Rwanda provided room and board to all participants. Transport was provided either by USAID or partner vehicles, or by direct reimbursement of travel costs by public conveyance. Additional per-diem for incidentals was not provided.</p>
Funding and support, including partner contributions	<p>Preplanning support. Mark Stoughton's labor, travel and per-diem for the preplanning exercise were covered by ENCAP via the Tellus Institute subcontract with IRG, the ENCAP prime contractor.</p> <p>USAID/Rwanda provided vehicle, driver, and staff to accompany Mark Stoughton on 2 separate case study reconnaissance outings. The following USAID Partner organizations and funded projects also made a staff member available for these reconnaissance exercises: the ADAR Project; IRC; World Vision, ISAR; Rwanda Women's Network; ACDI-VOCA.</p> <p>Anne Turner, Horticultural Specialist with the ADAR Project, provided significant preplanning support in advance of and during Mark Stoughton's visit, including making preliminary arrangements with the training venue and assisting in case site reconnaissance.</p> <p>Course delivery support. Each of the three USAID/Rwanda SOs contributed towards course delivery costs. ENCAP funded the participation of Evah Andriamboavonjy with a technical consultancy contract.</p> <p>USAID Partner organizations made vehicles and drivers available for transport of participants to and from the venue, and for the case site visits. Partner staff assisted with some site visits. A limited number of partner vehicles were dedicated to the course throughout the week.</p>
Contract mechanisms	<p>USAID/Rwanda issued a single firm fixed price PO to Tellus Institute, who served as a "prime contractor" for the course. Tellus engaged the logistics coordinator, Rwandan/regional experts, and translators via fixed-price subcontract.</p>
Principal trainer	<p>Mark Stoughton of Tellus Institute served as principal course trainer. The principal trainer has responsibility for coordinating the course agenda, assigning presenters, and personally presenting about half of the course sessions.</p>
Logistics Coordinator	<p>Tellus subcontracted with Tarsis Kagwisagye of Peace Health Consult, a Rwandan consultancy, to serve as logistics coordinator. Dr. Kagwisagye was formerly Rwanda country director for The Heifer Project International.</p>
Rwandan/Regional expertise	<ul style="list-style-type: none"> • Gaspard Bikwemu a Burundi national with significant experience in environment-related technical consultancy to USAID/Rwanda and other donor organizations in the region, served as environmental expert. • Anicet Kayigema & Alexis Gakuba together divided the duties of socio-cultural expert • Evah Andriamboavonjy, a Madagascan EIA expert served as a facilitator
Case study sites and descriptions	<p>The course featured four sets of case sites/four case site groups:</p> <ul style="list-style-type: none"> • Health and sanitation. Sites visited: Gisenyi Hospital, Nkamira transit camp (between Ruhengeri & Gisenyi villes); & ACAPE municipal sanitation project (Gisenyi Ville), including landfill site. • Small-scale infrastructure. Existing and new markets in Gisenyi Ville. School construction (World Vision; Gisenyi Prov); ACAPE municipal sanitation project, including landfill site. • Farm-level agricultural productivity: terracing sites (World Vision; close to Foyer de Charite); Abajinama Farmer's Association (Gasiza District, Gisenyi Prov.); visit to an

unplanned new settlement (“Arusha;” UNICEF/GOR activities).

- **Commercial scale agricultural processing** (Sopyrwa pyrethrum extraction and processing plant; Masaka coffee washing station; biowaste/biofuel plant, Kigali).

Case sites were identified during the preplanning exercise.

Consultants’ comments and evaluation

The substantive evaluations the course received were consistent with those obtained by past courses in the series—**X.XX** out of 5 for quality of content; and **X.XX** out of 5 for the degree to which the course improved participant understanding of environmental assessment. (Average evaluation scores for courses in this series are 4.3 and 4.2, respectively.)

More qualitatively, participants exhibited a high level of interest in course content, and the USAID mission exhibited an unusually high degree of commitment to the course. This interest and commitment undeniably facilitated the work of all trainers and facilitators, and was also encouraging, given the difficult environmental problems Rwanda must address if it is to maintain even current levels of food security and public health. Translation was of sufficiently high quality for participant questions and working groups sessions to clearly reflect a nuanced understanding of course content.

It should be noted, however, that the positive substantive experience of the course came as a frank relief to the consultants rather than as an expected outcome. The lateness of the contract award compressed in-country course preparations significantly and presented substantial obstacles to maintaining the quality of course content. For example, late award:

- Prevented confirmation of case site itineraries with host organizations
- Prevented the principal trainer from reviewing or providing advance feedback on the presentations and materials provided by local/regional experts
- Forced the principal & associate trainer to spend significant time in dealing with funds transfer and related issues during the course.

In light of these difficulties, the substantive success indicated by the evaluation scores owes a great deal to two individuals:

- Tarsis Kagwisagye. Dr. Kagwisagye’s efforts as logistics coordinator went far beyond the duties and level of effort specified by his contract. His initiative, experience, and network of personal and professional contacts literally made the course possible.
- Andy Karas of USAID/Rwanda. Mr. Karas was the primary mover behind the course. Upon returning from home leave on 2 September, Mr. Karas was able to mobilize the Mission—and devote a great deal of personal time and energy—to finalizing invitations and arranging logistics on the mission side.

The favorable substantive evaluations also reflect the willingness of the participants to distinguish between substantive content and logistical polish. The participant’s written comments address a number of logistical points. Among these are the fact that the nature of the training venue—a formation center with few of the amenities typically expected in a hotel setting and numerous behavioural restrictions—should have been communicated more clearly in advance.

This said, the physical space Foyer de Charite served training needs admirably, and the Foyer staff/community was extremely professional and punctual in the serving of meals, preparation of rooms, etc. However, if USAID/Rwanda has occasion to use the Foyer de Charite in future, the Consultants strongly recommend that a briefing on the Foyer's "Rules and Regulations" accompany the invitation materials. The consultants also recommend that USAID staff, not just participants, stay at the Foyer.²

² In addition, the use of the Foyer de Charite requires either that all photocopy/business center functions be completed in advance of the course, or that a photocopiers be rented and brought on-site. The Foyer's removal from photocopy and other facilities in Ruhengeri Ville posed significant difficulties, as the late contract award necessitated a great deal of last-minute photocopying and local procurement.

Attachment 1: Key contacts

Organization	Name & Position	Contact Info
USAID/Rwanda	Andy Karas Team Leader; Food Security and Economic Growth (SO3) (key contact, SO3)	USAID BP 2848 Kigali, Rwanda tel (250) 570-940 fax (250) 574-735 akaras@usaid.gov ; mobile 08302128
	Tim Muzira SO3 Team (alternate SO3 contact during Andy's leave)	USAID office info as above timuzira@usaid.gov ; mobile 08303233
	Barbara Sow Technical Advisor in Aids and Child Survival (key contact. SO2)	USAID Office info as above bsow@usaid.gov ; mobile 08302133
	Ruben Sahabo SO2 team (contact for SO2 during Barbara's leave)	USAID office info as above rsahabo@usaid.gov ; mobile 08306230
	Kimberly Pease Democracy and Governance Advisor (key contact: SO1)	USAID Office info as above kpease@usaid.gov ; mobile 08301620
	Pierre Munyura Governance Specialist (second contact: SO1)	USAID office info as above pmunyura@usaid.gov ;mobile 0831762
	Donna Gray Deputy Program Officer (key contact; procurement)	USAID office info as above dgray@usaid.gov

Organization	Name & Position	Contact Info
Chemonics/ADAR	Anne Turner Horticultural Specialist (advance pre-planning support)	Tel: +250.570433/34 Fax: +250.517467 mobile: 250.08305177 Rue du Lac Mpanga BP 3582 Kigali, RWANDA
USAID/REDSO/ESA	Ephantus Wahome Regional Environmental Procedures and Policy Specialist	USAID/ICIPE Complex Kasarani Rd, off Thika Rd PO Box 30261 Nairobi, KENYA ewahome@usaid.gov tel: +254.2.862.400/2 fax: +254.2.860.562/949
	David Kinyua	dkinyua@usaid.gov other information as above
	Walter Knausenberger Senior Regional Environmental Officer	wknausenberger@usaid.gov wijk@aol.com other info as above
USAID/AFR	Carl Gallegos, Bureau Environmental Officer	cgallegos@usaid.gov
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	Nancy Odeh Research Associate (course preparation support, including translation, associate trainer)	nodeh@tellus.org Other information as above

Organization	Name & Position	Contact Info
	Mark Stoughton Associate Scientist (preplanning coordinator; likely trainer)	mstough@tellus.org Tellus Office info as above Visiting researcher Institute for Global Environmental Strategies—Kansai Research Center Tel +81.78.262.6634 fax +81.78.262.6635 IHD Centre Building 5f, Wakinohama Kaigan Dori, Chuo-ku, Kobe, HYOGO 651-0073 JAPAN
	Gaspart Bikwemu Ecological/ environmental assessment specialist	bikwemu@hotmail.com
	Anicet Kayigema Socio-cultural specialist	Email via swamasirabo@usaid.gov B.P 1888 Kigali Tél/home : (+250) 8 56 74 Mobile (+250) 0830 14 06
PEACE-Health CONSULT	Tarsis Kagwisagye Logistics coordinator	Email: peacepartsrw@yahoo.com Alternate email: kagwisagye2001@yahoo.com tel: (+250) 514366; Mobile: (+250) 0859 2583 Fax: (+250) 516298

Attachment 2: Final Agenda

Day/Time	Session
Sun 14 Sept	
Arrival, Registration,	
15:00-18:00	Registration and Logistical Arrangements
TBD	Facilitators' Meeting
Mon 15 Sept	
Basic Tools and Concepts	
9:00-10:00	Official opening Henderson Patrick, USAID/Rwanda Mission Director Prefect, Ruhengeri Province Hon. Laurent Nkusi, Minister for Lands, Resettlement and Environment
10:00-10:30	1. Presentation of Course Agenda, Participant Introductions, Expectations
10:30-11:00	2. Why Assess Environmental Impacts?
11:00-11:15	<i>Break</i>
11:15-12:00	2 <i>continued</i> Introduction to Environmentally Sound Design (with opportunity for discussion of participant experiences)
12:00-12:45	3. Basic Concepts for Assessing Environmental Impacts
12:45-13:30	Lunch
13:30-14:45	4 EIA Procedures for Small-Scale Activities (the USAID example; includes practice in Screening Activities)
14:45-15:15	5 Information Requirements and Tools for EIA
15:15-15:35	<i>Break</i>
15:35-16:05	5 (continued)
16:05-17:00	6. Introduction to Mitigation and Monitoring
TBD	Facilitator's meeting
18:30—	Dinner

Tues 16 Sept <i>The Rwandan Context; Writing the Environmental Review; Field Trip Preparation</i>	
8:30-8:50	Review
8:50-9:50	7a. The Rwandan Environmental Context: Overview, Policy, and Information Resources for EIA.
9:50-10:50	7b. The Rwandan Social Context: Overview, Policy, and Information Resources for EIA
10:50-11:05	<i>Break</i>
11:05-11:35	8a. Writing the Environmental Review
11:35-12:20	8b. Assessing sample environmental reviews
12:20-12:30	9a. Field Trip Introduction
12:20-13:20	<i>Lunch—Sign up for field trips</i>
13:20-14:20	9b. Field Trip Briefings: Key issues for each sector
14:20-15:20	9c. Working groups: Planning for field observation and data-gathering
15:20-15:40	<i>Break</i>
15:40-17:05	10. USAID Environmental Procedures (optional session)
TBD	Facilitators' Meeting
19:00—	<i>Dinner</i>
Wed 17 Sept <i>Case Study Field Trip</i>	
	9d. Field trip to case study sites. (Teams of 10–12 participants travel to separate sites; conduct initial assessments in the field. Teams depart per time posted. Box lunch. Return by dusk.)
TBD	Facilitators' Meeting
19:00-20:00	<i>Dinner</i>
Thurs 18 Sept <i>Developing Environmental Documentation from the Field Trips</i>	
8:30-8:50	Brief Reactions from the Field Trip Groups
8:50-9:00	11a. Instructions to Environmental Review Teams
9:00-11:00	11b. Team Working Groups: Drafting Environmental Reviews for Case Studies (includes break)
11:00-12:30	11c. Plenary: Presentation/Discussion of Draft Environmental Assessment or Environmental Review Outlines

12:30-13:45	Lunch
13:45-14:00	11d. Instructions on Developing Mitigation and Monitoring Plans
14:00–16:00	11d (cont'd) Team Working Groups: Developing Mitigation and Monitoring Plans from Case Studies
16:00-16:15	<i>Break</i>
16:15-17:00	11e. Plenary: Presentation/Discussion of Draft Mitigation and Monitoring Plans
TBD	Facilitators' Meeting
19:00—	Dinner
Friday 19 Sept	Mitigation and Monitoring Plans, Special Topics, and Synthesis
8:30–9:15	11e. (continued)
9:15–10:00	12. Beyond Preliminary Assessment: The Full <i>Environmental Assessment Study & Programmatic Environmental Assessments</i>
10:00–10:45	13. Special topics: Pesticides and USAID Pesticide Procedures
10:45–11:00	<i>Break</i>
11:00–11:30	Special topics cont'd
11:30–12:00	14. Synthesis, Recommendations for Follow-up Activities and Course Evaluation
12:00–13:00	15. Official Closing and Award of Certificates Representative of the Prefect, Ruhengeri Province Henderson Patrice, USAID/Rwanda Mission Director
13:00--14:00	Buffet Lunch

Attachment 3: Participant list

<to be added>

Attachment 4: Case site descriptions

Notes and cautions:

1. These case study notes are based on information that is sometimes conflicting or incomplete. Please bring corrections to the attention of the course facilitators and your group as soon as possible.
2. **During the discussions with stakeholders, please avoid raising any expectations (or fears) that additional funding or development activities will be forthcoming in the project area.**
3. These notes are NOT exhaustive. They are intended to be a starting point for field data collection and subsequent analysis by participants.
4. Participants will NOT be writing an environmental review of the case sites themselves. They will be using the information they gather to write a review of a PROPOSED PROJECT in a similar sector and in a similar physical and social environment.
5. Case studies are NOT audits. They are practice in observation and information-gathering for environmental review. Do not give critical judgments to beneficiaries, site operators, or host organizations.

Sources and acknowledgements.

- Field notes, case site survey visits. July 2003
- “Small-scale coffee processing” (ITDG Technical Information Bulletin). Intermediate Technology Development Group. United Kingdom.
- Chromium and Hexane ToxFAQs bulletins. Agency for Toxic Substances and Disease Registry (US Department of Health and Human Services).
- Pollution Prevention Assessment for a Goatskin Tannery (TANNING AND DRESSING OF LEATHER case study # 7). International Cleaner Production Information Clearing House. 1993.

General Background Information

The case studies sites are located in Ruhengeri, Gisenyi, Kigali-ville and Kigali-rural Provinces. They therefore are dispersed over a wide geographic portion of Rwanda and include both rural and urban settings.

For these reasons, it is not possible to provide a description of the physical and social environment at each of the case study sites. Gathering basic environmental and demographic information is an important task for each of the case study groups.

In addition to direct observation and information-gathering at the sites, participants should refer to the following sources of general information on the Rwandan physical and social environment:

- Their own experience and those of their peers
- Information provided in the participant sourcebook and the presentations of the environmental expert and the socio-cultural expert
- The knowledge and experience of the environmental expert and the socio-cultural expert

GROUP 1:

Commercial processing of agricultural products

Group 1 will visit three agricultural processing sites. The sites represent a wide variety of agricultural processing activities, and thus a wide variety of potential impacts.

Background: commercial processing

Rwanda's national policy is to intensify and commercialize agriculture for improved food security and enhanced economic development.

Commercial-scale agricultural processing is a necessary requirement for successfully intensifying and commercializing agriculture. Processing promotes food security by reducing perishability and increasing transportability of food stuffs. High-quality processing is also necessary to successfully export agricultural products at premium prices.

General environmental issues

Sources of direct adverse impacts. Commercial-scale agricultural processing is a type of manufacturing. These operations are often the largest users of chemicals, water and energy in rural areas; they are also large producers of waste water, waste chemicals and other manufacturing waste products. These wastes can have adverse impacts on community health; workers in the plants may be exposed to hazardous chemicals and working conditions.

Sources of indirect adverse impacts. Commercial-scale agricultural processing creates increased demand for a particular type of crop. This may cause changes in cultivation patterns and land use in the areas supplying the factory. Issues of potential concern include increased monocropping, soil depletion, inappropriate use of agricultural inputs, potential for increased erosion, increased dependency on a single crop; etc.

Beneficial impacts. Commercial agricultural processing should have beneficial impacts. Economically, it can create a more reliable and larger-volume market for farm products. Processors may invest in rural infrastructure improvements, such as roads. Processors may introduce improved agricultural technologies as a way to increase quality of their feedstock. These technologies may increase the productivity and sustainability of local agricultural practices.

Assignment:

Participants will visit each of the three sites. Participants should:

- Obtain basic environmental and social information regarding (1) the immediate physical and social environment of each of the factories; and (2) the physical and social environment of the area that *supplies* each of the factories.
- Understand the basic steps of the production process and particularly (1) the major inputs required by the production process; (2) the disposition of wastes; (3) the exposure of workers to wastes, inputs and processes.

Site 1: SOPYRWA pyrethrum factory and outgrowers

Background: Pyrethrum. Pyrethrum (*chrysanthemum cineraraolium*) is a member of the chrysanthemum family. The flower naturally contains a set of 6 insecticidal chemical compounds (pyrethrins) with desirable properties. Specifically, pyrethrins:

- Are rapidly biodegradable (and therefore unlikely to build-up in the food chain or soil), and :
- Possess low toxicity to mammals and birds

Dried flowers contain about 1.4% pyrethrins. Obtaining saleable pyrethrum extract from flowers requires a series of steps. These include drying the flowers, grinding the flowers, obtaining crude pyrethrum extract (~30%+ pyrethrins), and further concentrating this extract via a refining process (~60% pyrethrins). The extraction and refining process use the solvents aqueous methanol and hexane.³

Both crude extract and refined extract are sold, but refined extract commands a higher price. Major worldwide pyrethrum suppliers are Kenya, Australia, Tanzania, and Rwanda. Pyrethrum is a cyclical global commodity and natural pyrethrum also competes with synthetic pyrethrum compounds. In Rwanda, pyrethrins are grown by 15,000 (est.) outgrowers, primarily in the Ruhengeri and Gisenyi prefectures.

SOPYRWA. SOPYRWA (Societe de Pyrethre au Rwanda) operates a factory located close to Ruhengeri Ville. The factory includes both an extraction plant and a refining plant. The refining plant was built in 1980, but never operated successfully beyond its trial periods. Both plants sustained some damage during fighting in 1994. Sopyrwa re-started the extract plant in 1999 and the refinery in 2003.

Sopyrwa purchases dry pyrethrum flowers from an extended network of outgrowers. Drying of the flowers was originally accomplished centrally via wood-fired brick ovens. In Sept. 2002, however, SOYRWA switched to a decentralized system of solar dryers. (Large farmers own their own dryers, smaller growers use communal dryers belonging to farm cooperatives.).

³ Hexane is an extremely volatile solvent. Its vapors are explosive. Breathing large amounts of hexane vapor results in nerve damage, including paralysis of legs and arms.

Saban tannery and abattoir⁴

Background: Tanneries and abattoirs. Abattoirs (slaughterhouses) have two very important linkages to public health:

- Well-run abattoirs assure that meat consumed is hygienic and free of disease. This vastly improves public health. Improper abattoir operations result in diseased or contaminated meat that can have severe, adverse effects on public health.
- Abattoirs produce a set of wastes that, if improperly managed, can have severe adverse impacts on public health. These are the byproducts of animal slaughter: blood, internal organs, faeces, fetuses, and condemned carcasses. All can carry diseases. These diseases may be transmitted via insect vectors (as when flies feed on entrails) or via consumption of surface water contaminated with these wastes.

Water contamination is particularly likely as abattoirs produce large amounts of liquid waste and wastewater. The contamination is of particular concern as abattoirs are typically located in urban areas adjacent to market activity or in lower-income residential areas.

In addition to disease concerns, the high organic content of abattoir effluent increases biological oxygen demand (BOD) if it is discharged into surface waters. This results in eutrophication and can destroy the ecological productivity of downstream waters.

Tanneries generally have less potential than abattoirs to spread disease. However, tanneries employ a number of toxic chemicals to remove flesh from hides and to “tan” the hides themselves. These operations typically require extensive use of rinse water.

The basic steps in tanning a hide are:

Hide fresh from slaughter → salting (1 month) → soaking and washing* → de-hairing with lime and sulfides** → washing and enzyme treatment to remove lime and soften skins*** → tanning with chromium sulfate salt and acid.****

* The wastewater from this step is nearly neutral, and contains salt and some suspended solids.

** The wastewater is very alkaline, contains toxic sulfides, and is the main cause of the high BOD and suspended solids in the total waste stream.

*** wastewater contains ammonium sulfate, enzymes, and some protein.

**** About 75 percent of the chromium combines with the hide; the remainder is dissolved in the waste water.

Because chromium is the most expensive input to the process, tanneries typically recycle the tanning solution. This removes about 90% of the chromium in the waste stream. Chromium also

⁴ NOTE: The Saban facility was unavailable for a case site visit at the last moment. A biowaste/biofuel facility in Kigali was visited instead. No briefing is available for this site.

presents the most serious public health concern. Ingesting large amounts of chromium can cause stomach upsets and ulcers, convulsions, kidney and liver damage, and even death. Skin contact with certain chromium compounds can cause skin ulcers.

SABAN tannery and abattoir. The SABAN tannery and abattoir is located in Kigali Ville adjacent to a low-income settlement area. Formerly a state-owned enterprise, both operations have been privatized. The tannery exports mostly “wet blue” hides—these are hides which are pre-treated, but not tanned. This is in part because they do not have chrome recycling capabilities, which increases the costs of the tanning process. The tannery does neutralize acid in its wastewater discharge, however.

The tannery is supplied by hides from abattoir. The abattoir slaughters animals on a fee-for-service basis. Currently, about 200 cattle/day are slaughtered and up to 50 smaller animals (goats and sheep). This is significantly less than the abattoir’s capacity.

Both tannery and abattoir discharge waste water to a surface stream.

Masaka coffee-washing station.

Background: Coffee is a global commodity subject to downwards price pressure. Specialty or high-quality coffees, however command significantly higher (and potentially more stable) prices. “Upgrading” Rwandan coffee thus offers significant benefits both to rural growers and to the national economy.

Producing a high-quality unroasted coffee bean is a function of (1) the innate quality of the bean, and (2) the processing of the bean. Processing is composed of two basic steps: washing and drying.

“Washing” involves:

- removal of the skin (the “cherries,” or fruits pass over and between abrasive metal discs rotating in a water bath)
- grading (sorting) of the fruits on the basis of density
- dry fermentation (necessary to break down the mucous surrounding the bean)
- wet soaking and rinsing

Timing of the fermentation, soaking and rinsing steps are critical to prevent undesirable flavors from developing.

Total drying time for the beans is a 2-week process. Drying is conducted on drying racks.

The coffee-washing process requires significant amounts of water and produces two principal waste products: water with high dissolved carbohydrate content, and waste skins and pulp. The waste water has very high BOD and can cause significant harm to surface waters if discharged directly. The waste skins and pulp can be composted.

Masaka Coffee-Washing Station. The station was originally constructed by OCIR, but until its recent renovation and rehabilitation, processing activity was largely non-mechanical and the

resulting coffee not of high quality. Renovation was undertaken with USAID funding and the past coffee season was the station's first for upgraded production.

Total production for the past season was about 25% of the station's capacity. Its operators expect utilization to increase as farmers devote greater attention to coffee cultivation. Note that due to the timing of the coffee harvest season, Masaka will not be processing coffee at the time of the site visit

The station utilizes a system for recycling of wash water and separation of pulp; pulp is composted for use as a soil conditioner. Settling lagoons are used for waste water. Neighbors have complained regarding odors from these ponds.

Group 2:

Farm or cooperative-level agricultural interventions

Group 2 will visit three sites illustrating both baseline agricultural conditions in Rwanda and interventions attempting to improve this baseline.

Background: Agricultural conditions

Nationally, average yields/Ha of basic food crops in Rwanda have been stagnant or declining over the period 1961/65–1996/2001. (Examples of crops with declining yields include bananas, maize, taro and cassava. Crops with stagnant yields include beans, sweet potatoes, and cereals.) A few high-value cash crops have exhibited substantial increases in yield. These crops include potatoes, tea and sugar cane.

Declining yields seem attributable to loss of soil fertility and pests. Increases in yield for high-value crops likely reflect increases in agricultural inputs rather than introduction of improved varieties. (Overall, Rwanda uses low levels of agricultural inputs.)

Due to the steeply sloping terrain, erosion is the greatest threat to the loss of soil fertility in much of Rwanda. Slopes in excess of 30% are commonly farmed without terraces or other erosion control measures. While significant terracing schemes have been implemented in the past, the terrace system as a whole is anarchic.

Given minimal growth in subsistence crop yields/Ha and substantial population growth, the implicit food security strategy has been expansion of cultivated area. That strategy has effectively reached its limits, as close to 80% of all arable land is currently under cultivation, whereas population doubling time is on the order of 20 years. For these reason, conservation and rehabilitation of existing agricultural land is essential.

Site 1: Terrace sites (Remera-Ruhondo)

The reality of Rwanda is that agriculture must be practiced on steep slopes. Maintaining long-term soil fertility in these conditions requires improved erosion control. Participants will visit sites featuring radical terracing interventions and the use of hedgerows and other vegetation as terrace stabilization and erosion control measures.

Issues of particular interest include:

- Efficacy of the terracing as an erosion control measure and how erosion control is verified.
- Productivity of the terraced land, including the time after terracing for productivity to be regained.
- Provisions for maintenance of terraces and other erosion control measures, and for monitoring of productivity.
- The feasibility of pursuing this model on a large scale.

Site 2: Abajinama Farmers' Association

Participants will visit this farmers' association (est. 1999) near Ruhengeri Ville. The Association has received assistance in construction of a potato store and in multiplication of improved varieties. The Association also operates a cooperative store, maintains a communal field, and operates a chicken house with ~200 hens. .

The visit serves the following objectives:

- The visit will permit participants to gain a better understanding of "baseline" agricultural conditions and practices via interactions with members of the association.
- The visit will provide some insights into the efficacy and impacts of measures to enhance productivity and soil fertility. (The fertilization utilizes organic manure and has been experimenting with the effects of NPK fertilizer in trial plots). Such measures are a necessary complement to erosion control to maintain long-term fertility of fields.
- The visit will provide some insights into logistical and health/safety issues presented by stocking and distributing agricultural inputs.

Site 3: New Settlement

Resettlement of refugees in Rwanda has involved opening of new agricultural land. This development of new land development has been both planned and unplanned. This visit to a 4 year-old settlement in the Gisenyi area will provide participants with an opportunity to view the impacts of typical agricultural practices on newly developed lands, and the efficacy of interventions to promote long-term soil conservation and enhanced fertility.

Note: an alternate case site may be substituted.

Group 3: Health and Sanitation

Group 3 will visit three case sites focusing on the relationships between (1) public health and (2) public sanitation and hygiene. The disposition of waste streams from health facilities is one aspect of public hygiene.

Background and general environmental issues

Health and the environment are closely interrelated. The following points illustrate only several linkages between health and environment:

- Public health is affected very significantly by levels of public sanitation and hygiene. Poor sanitation leads to a high incidence of diseases transmitted by the “fecal-oral route,” creates breeding grounds for mosquitoes, and supports populations of scavengers and vermin that themselves harbor and transmit disease.

For this reason, sanitation and hygiene are essential preventive elements of public health policy. Hospitals and clinics are *not* a substitute for public sanitation and hygiene.

- Vulnerable populations—including the young, the elderly, and those with weakened immune systems (such as individuals who are HIV-positive) are particularly affected by poor public sanitation and hygiene. The urban poor are also a vulnerable population, as they (1) frequently live in areas without adequate toilet facilities or access to safe drinking water and (2) more frequently live in proximity to areas that pose particular public health hazards, such as abattoirs, markets, etc.
- Health care sites and institutions themselves generate waste streams that pose a public health hazard when disposed of improperly. These waste streams include syringes, gauze and bandages contaminated with blood & body fluids, and also the faeces of patients who may have infectious diseases. Improper handling of waste streams in the vicinity of health care facilities increases the risk of infections and disease in both patients themselves and the surrounding community.
- Public health and sanitation are especially closely related in emergency relief and refugee camps. Refugee populations—already suffering from poor nutrition and physical stress—are particularly vulnerable to epidemic diseases.

Site 1: ACAPE Sanitation Project (Gisenyi; with Group 4)

ACAPE is an indigenous NGO based in Gisenyi and established in 2000. ACAPE operates a municipal sanitation project in Gisenyi, now being expanded to outlying communities. The project maintains 55 collection points in Gisenyi Ville and, using rented trucks, removes the garbage to a landfill site (a borrow pit) ~1.5km from town.

ACAPE was formed in response to poor sanitation conditions in Gisenyi. The organization has conducted extensive sensitization campaigns with

ACAPE's sanitation operations are financed by association dues. ACAPE estimates that 40% of the community pay monthly dues of 200 RFr to maintain the collection system. However, all waste at the collection points is collected, regardless of origin. (Waste bags, which are reusable, cost 200 RFr. each) ACAPE has received donor support for the purchase of equipment such as wheelbarrows, shovels, etc.

Of particular interest to the case site visit are (1) the management of the landfill site; (2) the differences observed by ACAPE or local government in community health and the incidence of disease; (3) comparison of sanitary conditions in Gisenyi market and Gisenyi Ville vs. conditions in other urban centers in Rwanda. (Participants must rely on their own direct experience to make this comparison.)

Site 2: Gisyenyi Hospital (Gisenyi)

Gisyenyi Hospital is an approximately 50 year-old, 300-bed public institution serving a population of approx. 500,000.

Of particular interest to the case site visit are (1) information regarding key community health issues that can be learned from hospital staff; and (2) identification of the types of waste generated by the hospital, their disposition, and potential impacts on the community or patients. Waste streams of interest include (but are not limited to):

- Food wastes
- “Red bag” medical wastes such as syringes, gauze and bandages potentially contaminated with blood or other bodily fluids
- Body parts
- Plastics
- Bodily wastes

The hospital possesses an incinerator that is intended to safely burn and sterilize medical wastes contaminated with blood or other bodily fluids. However, at the time of the site visit survey, the incinerator was disused and waste was burned on the ground in the vicinity of the incinerator. According to hospital staff, food wastes are collected and composted. Latrines are of the open pit type.

Site 3: Nkamira Transit Camp

The Nkamira Transit Camp lies between Gisenyi Ville and Ruhengeri Ville. It was established on the site of a state-owned dairy in 1998 with UNHCR/WFP assistance as an interim (short-term residence) camp. Its purpose was to serve as a transfer point for resettlement of refugees returning from the DR Congo (former Zaire). Currently, the camp functions at a fraction of its former capacity of 8000—no more than 200 individuals were in residence during the site survey, and residence time is no more than a few days.

The site has also been assigned a permanent function as a refugee camp in the event of natural disasters. It served in this capacity during the last volcanic eruptions. During the eruptions, the average residence period in camp was 3 months. The IRC constructed stoves, additional latrines,

and made water supply improvements to deal with the refugee influx resulting from these eruptions.

The camp includes a clinic, cooking facilities, showers, latrines, and covered accommodations. The water supply for the camp is an underground source ~2km distant. Cooking wood is locally purchased; basic staple foods are supplied by the WFP.

Of particular interest during the site visit is the following:

- Identification of camp waste streams and their disposition. Waste streams of interest include (but are not limited to) bodily wastes, food wastes, medical wastes.
- Likely impacts of increasing the scale of current practices given current camp infrastructure. (This would occur, for example, in the event of a natural disaster such as another volcanic eruption.)
- Identification of current impacts from past refugees. Issues might include, for example, the method of decommissioning old latrines.

Group 4:

Small Scale Infrastructure

Group 4 will visit a set of case sites that illustrate the environmental issues attendant to the construction and management of small-scale infrastructure projects.

Background and general environmental issues

The construction and operation of small-scale infrastructure is perhaps the most common type of development activity in Africa. Examples of small-scale infrastructure include construction of: market access roads and associated drainage structures buildings such as schools and health posts, and small-scale irrigation and diversion structures

Small-scale infrastructure provides vitally needed economic and social benefits. However, its construction and operation can have adverse environmental impacts that offset—sometimes completely—these benefits. Examples include:

- Improper management of health-care wastes from a clinic contaminate community water supply and spread disease.
- Improper construction of drainage structures for an access road destroys downstream agricultural fields and drastically shortens the life of the road.
- Insufficient provision of sanitary facilities for a school adversely affect the health of students.
- Failure to remediate a borrow pit creates stagnant water and increases the incidence of malaria in the community

A major objective of environmentally sound design is to secure the benefits of small-scale infrastructure without incurring the adverse impacts that threaten these benefits.

Site 1: ACAPE Sanitation Project (Gisenyi; with Group 3)

Public health is affected very significantly by levels of public sanitation and hygiene. Poor sanitation leads to a high incidence of diseases transmitted by the “fecal-oral route,” creates breeding grounds for mosquitoes, and supports populations of scavengers and vermin that themselves harbor and transmit disease.

For this reason, sanitation and hygiene are essential preventive elements of public health policy. Hospitals and clinics are *not* a substitute for public sanitation and hygiene. An effective public sanitation program requires both equipment and installed infrastructure, including a disposal facility.

ACAPE is an indigenous NGO based in Gisenyi and established in 2000. ACAPE operates a municipal sanitation project in Gisenyi, now being expanded to outlying communities. The project maintains 55 collection points in Gisenyi Ville and, using rented trucks, removes the garbage to a landfill site (a borrow pit) ~1.5km from town.

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Of particular interest to the case site visit are (1) the construction and management of the landfill site; (2) the differences observed by ACAPE or local government in community health and the incidence of disease; (3) comparison of sanitary conditions in Gisenyi market and Ville vs. conditions in other urban centers in Rwanda. (Participants must rely on their own direct experience to make this comparison.)

Site 2: New Gisenyi Market

Background. The operation of markets presents significant environmental concerns. Markets generate a large amount of organic waste. This waste can form a breeding ground and habitat for flies, rodents and other vermin. Flies can contaminate foodstuffs for sale at the market, spreading disease via the “fecal-oral” route. Other vermin also harbor and transmit disease. (The disease potential of waste is generally highest for meat and other animal products.)

Markets also generate significant amounts of inorganic waste (plastic and metal), arising from the original packaging of market goods. Improper disposition of this waste stream can likewise produce a breeding ground for vermin and interfere with proper drainage of the site.

Finally, markets create large concentrations of people, who in turn produce produce bodily wastes. If improved latrines or other appropriate facilities are not created for this waste, contamination of market food-stuffs is again likely via the “fecal-oral route.” The health of the surrounding community may also be adversely affected.

The development of a new market cannot be an isolated project. Pedestrian and vehicle accessibility to the market must also be developed, as well as provision for disposal of wastes. Note that the construction of physical facilities for waste disposal (e.g. latrines and a water supply) is not sufficient. Ongoing management is critical—including cleaning of latrines, sweeping and washing of the market, etc. In addition, the economic and social success of the market depends upon appropriate management structures.

New Gisenyi Market. Gisenyi, like other urban centers in Rwanda, is experiencing significant growth. This creates the need for new basic infrastructure such as markets. Participants will visit the new Gisenyi Market in a newly developing area of western Gisenyi Ville. The market is being developed to supplement the old central market. Town authorities envision that it will serve as a wholesale market for Congo.

Of particular interest during the site visit are:

- The physical construction of the market and market access, including the source of construction materials.
- Physical structures for (1) waste handling and disposal & (2) the management of waste streams and waste handling facilities.
- The social and environmental impacts of the current level of marketing activity, and the changes in these impacts that would result from increasing the scale of these activities.

Site 3: New school construction

Background. School construction presents the same environmental concerns as other types of construction. These concerns include (but are not limited to): the safety of construction in view of expected environmental conditions (including earthquakes, severe weather, etc.), provision of drainage, provision of facilities (e.g., latrines, incinerators) for the disposition of waste generated by the facilities, and remediation of borrow pits.

However, schools present a particular concern. This is both because students represent a vulnerable population, and because schools educate implicitly as well as explicitly. For example, insufficient latrine facilities at a school or poor management of these facilities sets a standard that students are likely to replicate in their homes and communities.

New School Sites. Participants will visit one or more new school sites in Gisenyi province. Of particular interest during these visits are the issues mentioned in “background,” above.

Note: Alternate small-scale infrastructure sites may be substituted for the school site(s).