



**Institutional Partnerships Program
Semi-Annual Progress Report¹
Due October 31, 2006**



INTRODUCTION

USAID uses this material to report its development results to Congress. Your information is critical to Congress's understanding of development and the future funding of such programs. This information provides the basis for HED's dissemination of partnership results to USAID and other donor organizations and is disseminated throughout the higher education community.

Partnership Title: Linking Biotechnology / Bioengineering with Mali-based Agribusiness: Quality control for Health, Safety, and Exports

Development Field/Sector: Accelerated Economic Growth

Lead U.S. Institution: Montana State University

Host Country: Mali

Lead Host Country Partner Institution: l'Institut d'Economie Rurale

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Partnership Web Sites: <http://www.montana.edu/mali> , <http://courseweb.stthomas.edu/cmgeorge/>
(UST)

Period Covered by this Report: October 1, 2005 – September 30, 2006 (12 months).

Mail or e-mail the completed report to your primary contact at:

Higher Education for Development
1331 H St., NW, Suite 200

¹ Revised September 22, 2006

Washington, DC 20005

INSTRUCTIONS

- Please involve both the U.S. and overseas partners in the writing of this report, where possible. It is the lead U.S. institution's responsibility to submit this report by the due date to HED.
- Please include as much information as necessary to fully answer the questions. The boxes below expand.
- Mail or e-mail the completed report to your primary contact at HED by October 31, 2006.
- Share a copy of this report with the appropriate person(s) at the host country USAID Mission.

PARTNERSHIP PROFILE

In approximately one page, please provide an executive summary of your higher education partnership, describing:

- the key development issue(s) being addressed
- overall partnership objectives
- primary activities
- development outcomes

The information you provide will be disseminated to USAID and the higher education community through print and on-line publications.

The Montana State and IER partnership focuses on **four key development challenges** in the Malian agriculture sector:

- (a) the disconnect in teaching, research, and extension among l'Institut d'Economie Rurale (IER) scientists (who do not teach in the classroom), University of Bamako, Institute of Agriculture (IPR/IFRA) faculty (who seldom conduct on-farm research), and small-scale, subsistence farmers (who have relatively few forms of regular communication with IER and IPR/IFRA);
- (b) lack of strong collaboration between IER and IPR/IFRA due to physical separation between institutions;
- (c) urgent need for farmer-identified problems to be solved, if appropriate, by research conducted, for example, in a soil microbiology laboratory or a disease-free tissue culture facility closely linked to a field production area of disease-free seed potatoes, in varietal resistance studies, and postharvest quality protection studies.
- (d) lack of rapid, widespread dissemination of farmer-generated information.

OVERALL PARTNERSHIP OBJECTIVES: Our overall objective is to facilitate integration of modern agricultural knowledge/methods, without altering Malian traditional cultural practices. Our approach is based on developing new levels of collaboration among our HED partners and the Malian educators, scientists and farmers in order to merge culturally appropriate methods with more effective agricultural and natural resource management techniques. Underlying this overall objective, we will consistently prioritize methods and activities that will significantly help Malian food production and marketing systems. We anticipate that this approach will lead to successful incubation of entrepreneurial activity in the agricultural sector. The collaborative endeavors will provide mutual benefit to rural Montanans / other US partners as **we all** learn to create better balance between technological advances and traditional values.

PRIMARY ACTIVITIES. Our primary activities occur in a “sandwich” arrangement. Year One focused on selecting Malian participants and developing a customized training program for each applicant. Year Two is resulting in training Malian participants at US partner universities. Year Three will result in the transfer of training knowledge from the participants to their home institutions through the development of expanded laboratory projects and the creation of new extension programs/Agricultural Innovation centers and a process for identifying potentially successful entrepreneurs and encouraging them to develop clusters of small enterprises, particularly focused on: 1) quality management of shea butter production and storage for export and development of a high quality US/Canadian market; 2) initiation of a certified seed potato cluster of enterprises for regional export; 3) Food Security focused on two issues: 3a) improving protein availability in subsistence farming communities, primarily through reduction of postharvest cowpea losses due to insect damage; and 3b) improved lysine in their traditional low-lysine diet of millet, sorghum, rice; and 4) improving water quality and quantity for individual households.

DEVELOPMENT OUTCOMES include seven participants trained in:

1. Soil Micro / Molecular Biology and Risk Assessment (Abdoulaye Camara)
2. Potato Disease Management and transfer of technology to Tomato Disease Management (two participants are being trained in this area, one in the total potato disease management system with seed selection and production businesses the goal [Adama Berthe], one being trained in techniques that she will transfer to the development of a tomato disease management system with the same type of seed production businesses as the goal [Aissata Thera]. Mme. Thera will focus on managing bacterial wilt, a disease introduced to Mali from Europe that will make impossible a seed potato industry, if not aggressively managed.)
3. Business Communications (Belco Tamboura)
4. Business Management / Environmental Engineering, mainly Water Storage / Water Quality (Sidy Ba)
5. Seed Physiology, capitalizing on important traits of local land races of cowpeas (Keriba Coulibaly)
6. Agriculture and Extension Education / Innovative Techniques (Assa Kante)

These seven training programs were agreed upon through consensus by IER, IPR/IFRA and US partners / collaborators. These areas continue to be refined weekly in phone conferences and by e-mails and reevaluated by IER and US partners. The weekly US faculty discussions and Malian e-mail interactions are fruitful and seem to be resulting in a good balance of participant talents, interests and Mali agricultural sector needs.

Two women scientists have completed one calendar year of the US portion of their training along with 5 male trainees. Each of the 7 trainees are currently in their 4th semester on a US campus. For full support of the

entire M.S. degree program of each of the seven, additional funding is required. Additional funding has been received by all seven participants and more is being sought for each of the participants (specific details appear later in the report). In addition to these specific academic training outcomes, we are providing informal laboratory and field training in the US and in Mali. This year lab facilities were provided by the Montana Certified Seed Potato Laboratory, Dr. Dunkel's postharvest laboratory, Dr. Jacobsen's plant pathology laboratory, Dr. George's mechanical engineering laboratory, Dr. Weeden's genetics laboratory, Dr. Camper's microbiology laboratory for biofilm research, Dr. Jones' environmental engineering laboratory for water quality research, and the University of Bamako, Medical School for conducting ELISA testing for bacterial wilt strains. In the third year, we will provide training in collaboration with the Environmental Toxicology Laboratory at the Malian Central Veterinary Laboratory [LCV]) in Good Laboratory Practices (GLP). Additional training with DNA analysis and other molecular tools will be accomplished at University of Bamako, Faculty of Science and Technology (FAST). In addition to the academic courses, we are currently providing training for the participants at MSU in statistical analysis, peer-refereed journal article preparation, critical path management, holistic management, participatory process, and grant writing.

Outcomes of these activities will be a cadre of newly trained Malians ready to develop: a) a molecular/microbial laboratory system (personnel and equipment) able to perform soil microflora analysis, setting up disease-free tomato / potato tissue cultures, and organizing field distribution of disease-free plants; b) an incubator center for identifying potentially successful new Malian entrepreneurs and assisting them in developing / implementing business plans to commercialize portions research, particularly from these newly developed laboratories under the direction of these HED participants from IER and IPR/IFRA; and c) a dissemination program integrating farmer-to-farmer technologies with IER research and IPR/IFRA teaching using multimedia approaches in Malian Community Learning and Information Centers (CLICs)(the first such initiative will be aimed at improvement of Malian shea butter quality and a US market with high rate of return to Malian women producers). The Malians and their mentors have developed a total of 5 initiatives that are each poised now to launch within the next 2 years.

QUALITATIVE INFORMATION

1.	<p>In <u>one or two sentences</u>, state the overall objective of your higher education partnership and its intended development results. The objective of our partnership is to build a sustainable, and therefore continually adapting, up-to-date, integrated agricultural research, education, and extension program in Mali. Our plan is based on providing graduate-level training in the US and in Mali and the promise of employment in a stimulating work environment</p>
2.	<p>What activities have the partner institutions undertaken during <u>this reporting period</u> (October 1, 2005 – September 30, 2006) to achieve the stated partnership objectives and development outcomes?</p> <p>During the first half of this reporting period, workshops (2 to 6 hours each, not concurrent) have been provided for participants, their US mentors, Malian supervisors, technicians, and colleagues in:</p> <ol style="list-style-type: none"> 1) holistic thought and management: Part 1 2) participatory process Part 1 3) grant writing 4) the process of developing and writing / publishing peer-refereed journal articles 5) preparing curriculum vitae 6) preparing and using organizational charts for our collaborating institutions 7) critical path management 8) identification of bacterial wilt strains present in Mali 9) holistic thought and management Part 2 10) grant writing and management 11) development of a 5-year, time-based plan of work with measurable outputs and outcomes (both long-term and short-term) 12) participatory process Part 2, particularly techniques of participatory assessment, taught in a role play setting <p>During this reporting period, we held weekly meetings with all Malian participants and their faculty mentors at Montana State and University of St. Thomas (via speaker phone). The purpose of these meetings was to reinforce the concepts introduced and/or strengthened in the above workshops (numbers 1 through 7). For example, some sessions were devoted to developing the details of the critical path that would result in the launching of 3 or 4 small agro-enterprises. In many sessions, particularly first semester, portions of sessions were devoted to the participants explaining their courses' content and how they will be useful in their ultimate role in the Agribusiness Center.</p> <p>The purpose of the weekly project meetings was to reinforce the concepts introduced and/or strengthened in the workshops during the first half of this year (numbers 1 through 7 listed above) and those conducted in the second half of the year (numbers 9 through 11 listed above). For example, some sessions were devoted to developing the details involved in launching the first five initiatives of the Agribusiness Incubator Center. Each initiative team developed a 5 year plan in this reporting period. This plan would result in each initiative launching 3 or 4 small agro-enterprises and in developing a fee-for-services that would within 5 years result in sustainability of that initiative. (Our underlying philosophy is that assistance requested and paid for is more likely to be adopted.) In many sessions, particularly first semester, portions of sessions were devoted to the participants explaining their courses' content and how they will be useful in their ultimate role in the Agribusiness Center.</p> <p>Because University of California (UC)-Davis, Dr. Robert Gilbertson, is the main plant pathologist involved with Integrated Pest Management (IPM) Collaborative Research Support Program (CRSP)-Mali we also included Dr. Gilbertson in our phone meetings on a monthly basis. Dr. Gilbertson is a</p>

collaborator on the HED project and joined this year as a partner on the USDA undergrad project for which HED participants serve as mentors. During our period of extreme budget constraints before we were given tuition waivers by 3 institutions, Montana State, University of St. Thomas (UST), and the ACE Language Institute, we also held several 3 way phone conferences with UST, Montana State, and Malian director, Dr. Kadiatou Gamby (IER).

From January through the end of April 2006, participants also participated with their undergraduate mentorees/assistants in a weekly two hour seminar (ENTO 500-01) entitled Plant, Insect, Human Interactions: Mali. In these sessions we reviewed the participatory process (through role play exercises); reviewed organizational charts; planned research protocols; and learned specific processes in writing / publishing peer-refereed journal articles and writing grants. It was from this series of seminars that the idea of clusters of small enterprises within a broad initiative of the Agribusiness Incubator Center was conceived.

We have specifically accomplished the following:

October, 2005, Keriba Coulibaly, Adama Berthe, and Abdoulaye Camara, all members of the Plant Biotech section of the Mali Agribusiness Entrepreneurial Incubator Center, met at Montana State with faculty and students from Chief Dull Knife College (Northern Cheyenne reservation) studying Malian adult education processes. Later in month, these Malian scientists traveled to the Northern Cheyenne reservation with Dr. Florence Dunkel and Heather McCartney, assistant to project. On the reservation at Chief Dull Knife College, Malians were feted with a mini-powwow (ceremonial dances, drumming, singing, and cultural interpretation) followed by brief presentations by the Malians and Dr. Dunkel. A traditional Northern Cheyenne meal with students and community families was shared and a traditional “give-away” followed. The evening ended with a video presentation by Dunkel of the goals of the HED project and introduction to all of the participants and their projects. The following day, the HED delegation met with the Vice President of the College, students, and tribal leaders. Many amazing cultural exchanges occurred during this time. A 42-minute documentary was produced for sharing more broadly with the other Malians. This is included in the appendix as a DVD entitled “East Meets West: Northern Cheyenne of Eastern Montana and Malians of West Africa.”

October 18, 2005, Belco Tamboura, designated director of the Mali Agribusiness Entrepreneurial Incubator Center met in a master class at the University of St. Thomas (UST) School of Business with Bill Gates, founder and CEO of Microsoft. In November, Belco made a presentation about the Mali Agribusiness Center for an NGO, Compatible Technologies, Inc., St. Paul, MN which has ties to Dr. Camille George, particularly her work with the shea butter manufacturing process.

October 2005, Sidy Ba and Keriba Coulibaly give presentation on Mali at the Bozeman Senior Center.

October 2005, Aissata Thera, Abdoulaye Camara, Adama Berthe give presentation on Mali for 3rd graders at the Anderson School (rural Bozeman area public school).

October 2005, Assa Kante gives training session for Chief Dull Knife students and instructor working on the Cowpea Initiative, on traditional and new Malian dishes using cowpeas.

October 31, 2005, HED Mali team submitted a proposal to USDA-CSREES International Programs for additional funding.

November 9 to 19, 2005, Dunkel worked at UST and in Mali. At UST Dunkel met with Dr. Camille George and Belco Tamboura. In Mali, Dunkel met with Malian project directors, Kadiatou Gamby for IER and Mamoudou Traore for IPR/IFRA regarding HED participants’ progress and to determine needs for additional funding.

November 2005, In Mali, Dunkel met with the director of ISFRA, the unit within the University of Bamako system that grants graduate degrees. It was determined that each of the participants with the exception of Assa Kante, designated leader of the innovative outreach portion of the Center, would be able to obtain M.S. and Ph.D.s at ISFRA. The only criterion was that an appropriate in-Mali advisor was available. Since the specialty in which Assa Kante is to receive additional training, adult education, does not exist yet in Mali, she could not receive a graduate degree through ISFRA.

November 24, 2005, Keriba Coulibaly began his research on postharvest bruchid resistance of IITA-developed cowpea varieties and Malian farmer developed varieties. From these studies the insect bioassay portion of his thesis research will be developed.

December 1, 2005, Assa Kante submitted an AAUW scholarship application for continuation of her

graduate program.

December 12, 2005, All junior mentors and mentorees of the HED participants participate in a national Video/Teleconference, Montana State University (Bozeman), Chief Dull Knife College (LameDeer Montana), University of St. Thomas (St. Paul Minnesota), Virginia Tech (Blacksburg, Virginia). Undergrad students present their research projects in which they are collaborating with HED participants and with IER.

December 14, 2005, Assa Kante and Aissata Thera attend holiday dinner with Bozeman Chapter BF of P.E.O. to greet members and discuss their graduate programs.

December 16, 2005, Assa Kante completed her first semester as a graduate student at Montana State University. She earns a GPA of 4.0 which is all A grades.

December 16, 2005, Sidy Ba, designated leader of the Engineering section of the Center, and Aissata Thera, designated leader of the Plant Biotech section of the Center, completed their English courses at Montana State. Keriba Coulibaly, Adama Berthe, and Abdoulaye completed their first semester of English courses and planning for their research program at Montana State.

December 19, 2005, Belco Tamboura, Dr. Kevin Sauter, Robert Diggs (College of Business, Montana State), and Dunkel met with Dr. Nona Mason, Department Head of Business Communications. This team, minus Drs. Sauter and Mason, then met with the UST 2005-6 Mali externs and hear presentation by them and have a demonstration of the models created this year and last year in the mechanical engineering lab for testing in Mali.

December 21, 2005, Belco Tamboura completed his first semester at University of St. Thomas in Business Communications.

December 25, 2005 to 8 January 2006, Belco Tamboura flew to Montana State and had many team meetings to create brochure and job descriptions for the 7 participants in the Ag-Business Entrepreneurial Incubator Center. During this period, assistant Heather McCartney assists each participant in preparing a c.v. in English. On 9 January 2006, Dunkel and Diggs met with Mr. Tamboura to receive oral and written reports of his work.

January 11, 2006, Aissata Thera began her first semester of graduate courses in Plant Pathology. Assa Kante begins her second semester of graduate courses in Agricultural Education and Extension.

January 21, 2006 Sidy Ba flew to St. Paul to begin his first semester of graduate courses in Engineering at the University of St. Thomas.

January 23, 2006 Aissata Thera passed the required 550 mark on her TOEFL exam. And on 30 January 2006, both she and Assa Kante submitted applications to P.E.O. (an international philanthropic organization for encouragement of higher education for women) for International Peace Scholarships.

January 30, 2006 Belco Tamboura begins his second semester in Business Communications at University of St. Thomas.

February 20, 2006 Aissata Thera and Assa Kante participate in predeparture orientation and planning for their undergraduate and secondary school teacher mentorees and for US mentors and going to Mali March 2006.

February 24, 2006 Assa Kante and Keriba Coulibaly present /facilitate discussion of use of food insects in Mali with undergraduate students in BIOL 106 Insects and Human Societies (University-wide Core Course) during their annual food insects luncheon.

February 25, 2006 All Montana State HED participants prepare Malian meal for an estimated 1,000 Bozeman community members and prepare a cultural booth. Exhibit in its entirety wins second place at the International Food Festival in which students from 37 countries participated..

March 6, 2006, Assa Kante, Aissata Thera, Dunkel, Dr. Dean Drenk, Montana State College of Business advisor, and their 3 undergraduate mentorees and a secondary school science teacher mentoree. Mentorees and assistant Heather McCartney were all on parallel funding from USDA-CSREES Challenge Grant program. These seven team members met University of St. Thomas (UST) (in St. Paul MN)-based team members on the UST campus. UST-based team members were Belco Tamboura, Sidy Ba, Dr. Kevin Sauter, Dr. Camille George, Dr. Ashley Shams and most of their administrators and UST undergrad mentorees who had just returned from Mali. All mentorees (Mali externs) and HED participants presented their research projects to each other.

March 13, 2006, a formal PowerPoint presentation was made by participants Ba, Thera, and Kante with Dunkel and Dr. Dean Drenk for USAID Mission Director, Dr. Dennis McCarthy, Dr. Ram Shetty, Gaussou Traore, Jean Harmon. Faculty, Montana State Mali externs and secondary school science teacher

being advised by these participants, and 3 of their faculty mentors (Dunkel, Dr. Barry Jacobsen, and Drenk) were present.

March 9-20, 2006, Assa Kante completed preliminary interviews with shea butter producers in three villages, Dio, Doila, and Zantiebouyou. She also organizes a sensory evaluation of the use of neem kernel powder for postharvest preservation of cowpeas against the bruchid beetle.

March 11 to 18, 2006 Dr. Barry Jacobsen gave a mini-course in Mali on identifying strains of bacterial wilt, *Rhizoctonia solanarum*.

March 14 to 24, 2006 Sidy Ba began village-level, participatory assessment on water needs and collects preliminary data collection on the water storage project that he advises. He also provided engineering assistance and advice for the evaporative cooling design of UST externs that is being tested at the Kangaba Community Learning and Information Center (CLIC).

March 15, 2006 Belco Tamboura participates in the senior design mid-term for the water pasteurizer with Dr. Camille George.

March 20, 2006, Sidy Ba, Aissata Thera, Assa Kante, Drenk and Dunkel have planning meeting with Dr. Kadiatou Gamby, in-Mali coordinator of HED project.

March 28, 2006 Undergraduate mentorees of Sidy Ba and Assa Kante made oral and display presentations of their research in the annual campus-wide Montana State Undergraduate Scholars Conference. Sidy's advisee, Stacey Hellekson was chosen of the 1200 scholars to be featured on the Montana State website. This story is available on our project website and in hardcopy in the appendix to this report.

March 31, 2006, Keriba Coulibaly, completed a thorough literature review for his proposed thesis research and preliminary experimental process regarding cowpea varietal resistance. Both Adama Berthe and Aissata Thera successfully learn meristem culture processes for verifying disease-free status of seed potatoes.

April 8, 2006, Montana Mali Night, 117 guests were served a home-made Malian dinner, HED participants and each of their undergraduate mentorees, secondary school teachers and community tribal college mentorees described with PowerPoint their research in Mali in 2006. The director, Dr. Dunkel, presented with the HED participants gifts and certificates to each of the host families and Dr. Jeff Jacobsen, Dean of the College of Agriculture presented gifts from Montana State University to each HED participant. Ambience was created by an extensive textile exhibit and Malian drumming by a local student. The evening ended with a 16 minute video summarizing the Montana State team work in Mali March 2006.

April 8, 2006, Minnesota Mali Night, 12 guests met to share Mali stories, and listen to the Tuareg band, Tinariwen. The group met with a Minnesota-based African radio disc jockey who was able to take the participants back stage to visit the Malian band.

May 1, 2006. HED participants, Assa Kante and Aissata Thera receive announcements from P.E.O. that they have been awarded International Peace Scholarships for 2006-2007. \$8000 for each participant.

May 5, 2006, Sidy Ba and Belco Tamboura participate in the senior design final presentation and poster session for the water pasteurizer with Dr. Camille George.

May 8, 2006. Holistic workshop of 6 hours with all 7 Malians and the Mali faculty from both UST (by video conference) and Montana State.

May 8, 2006. Aissata Thera gives presentation on her potato work at PEO chapter meeting in Amsterdam MT, community of seed potato growers.

May 19, 2006. Sidy Ba completes semester of: 1) broad-based preparation for leader of the Engineering Section of the Agribusiness Incubator with classes in manufacturing, project management and computer aided design; and 2) research collaboration with his mentor Dr. Camille George, undergraduate students (externs in the USDA project) and other faculty in the Department of Mechanical Engineering at University of St. Thomas (St. Paul, MN).

May 19, 2006: Sidy Ba, Belco Tamboura, Dr. Kevin Sauter and Dr. Camille George met with Dr. Thomas Rochon, the Chief Academic Officer at UST. During this meeting Dr. Rochon announced the gift of two laptop computers for Ba and Tamboura.

June 1, 2006. Dr. Dunkel meets with project officer at HED new offices in Washington, D.C.

June 2, 2006. HED participant Sidy Ba begins work on his M.S. research proposal in Environmental Engineering with Dr. Warren Jones, Department of Civil Engineering, Center for Biofilm Engineering.

June 3-4, 2006. Dunkel meets with Belco Tamboura at UST to plan summer activities in developing the Agribusiness Incubator Center.

June 22 to 31 July, 2006 Assa Kante conducts thesis research in villages in Mali.

June 20, 2006 Sidy Ba and Keriba Coulibaly apply for Malian Fulbright Scholarships.

August 3, 2006, HED participant Aissata Thera completes the summer session in the Plant Pathology graduate program and departs for Mali to monitor field portion of her research.

August 9-11, 2006. Dr. Fafre Samake, Director General of l'Institut Polytechnique Rurale (IPR/IFRA) (equivalent to President of the national agricultural university of Mali) and Dr. Florence Dunkel, project director attend HED annual meeting and make presentation. Dunkel received prize for submitted photograph in Picturing Change Competition.

August 10, 2006. Dr. George and Sidy Ba announce that Jim Zink of Symmetry Solutions arranged for a donation of 41 sets of Solid Works, a computer aided design software. 20 copies, a class pack, of this computer-assisted design software was sent to IPR/IFRA, and 20 copies, a class pack, of this software to ENI the National Institute of Engineering, and one copy of this software will go to the Agribusiness Incubator for Sidy Ba. The software package is valued at \$6,000 (total of \$246,000 US).

August 11-14, 2006. Samake and Dunkel travel to University of St. Thomas (St. Paul MN) to meet informally with HED Participant Belco Tamboura and Dr. Kevin Sauter, work on the 5-year plan for the Incubator Center for which IPR/IFRA is responsible, and to visit the campus facilities, particularly the College of Engineering.

August 14-18, 2006. Samake and Dunkel travel to Montana State University (Bozeman, MT) to meet with HED Participant Belco Tamboura and Dr. Kevin Sauter, work on the 5-year plan for the Incubator Center for which IPR/IFRA is responsible, and to visit the campus facilities, particularly the Montana Seed Potato Growers Laboratory, the Department of Plant Sciences and Plant Pathology, and the College of Engineering, where his faculty members, are developing a graduate research program.

August 20, 2006. Current draft of 5-year plan for Incubator Center is completed.

August 2006. Belco Tamboura completes his certificate in the Masters in Business Communication in the College of Business at the University of St. Thomas.

September 5 and 7, 2006, Montana State HED participants assist in recruiting their Agribusiness Incubator Center initiative assistants, undergraduates in the USDA extern program.

September 2006, Montana State and UST faculty and HED participants, and Montana State undergraduate mentorees begin a semester reading project which includes: *Dancing Skeletons* by Katherine Dettlyer (1994), *The Trouble with Africa: Why Foreign Aid is not Working* by Robert Calderisi (2006), and *Farmer Farmer first: Farmer Innovation and Agricultural Research* Robert Chambers, Arnold Pacey, Lori Ann Thrupp, eds. (1989). Most weekly Agribusiness team meetings include some discussion of these books.

September 25, 2006. Project Director Dunkel and faculty mentor Robert Diggs meet with Christian M.X. Loupeda, Senior Technical Advisor in Microfinance, at Freedom From Hunger, Davis California to learn organization goals, extent of current program in Mali, and how the Mali Agribusiness Incubator might interact with this organization.

September 26, 2006. Project Director Dunkel and faculty mentor Robert Diggs meet at University of California-Davis with Agribusiness Incubator Center mentor, Dr. Robert Gilbertson, just returned from IER-Sotuba, Sikasso, Mopti. Gilbertson reports on virus situation with tomatoes and recent results in his lab and in the field in Mali.

September 29, 2006. Belco Tamboura meets with the evaporative cooler senior design team.

	<p>September 29, 2006, Dr. Camille George presented the solar water pasteurization system at the Fourth Annual Engineers for a Sustainable World (ESW) conference at the University of Iowa.</p>
3.	<p>How have these activities strengthened the capacity of the lead host country* higher education institution(s)?</p> <ol style="list-style-type: none"> 1. <u><i>Sustainable Program Management without dependence on Foreign Aid.</i></u> As a team with US mentor support, HED participants (faculty, adjunct faculty, potential adjunct faculty of IPR/IFRA) have shown that they can together identify initiatives that are of national importance and can develop a 5 year plan of action to launch these initiatives in Mali. The participants with mentor assistance have shown they can develop a detailed, time-based plan of activities in which each initiative is guided to the moment of self-sustainability within the Agribusiness Incubator Center that the team is creating in Mali. The capacity of the team was also strengthened in developing quantitative measures to evaluate output of each activity and outcomes of each activity, both short-term and long-term. 2. <u><i>Holistic thinking and planning</i></u> is now a pattern that the Institute of Agriculture (IPR/IFRA) faculty and adjunct faculty (from IER) could implement in their own agricultural research, teaching, outreach, and entrepreneurial strengthening activities. 3. Although <u><i>participatory process</i></u> was practiced by some IER-Sotuba scientists (adjunct IPR/IFRA faculty) prior to this HED project, participatory assessment, research, and evaluation is becoming, now, a more widely understood and accepted technique by IPR/IFRA faculty and adjunct faculty, that is, by our 7 HED participants. 4. <u><i>Preparation of Competitive Grant Proposals for Research and Development.</i></u> Every HED participant has been involved in preparing at least three grant proposals for research and agricultural development during this reporting period. These grants included both US national organizations and private organizations. They are: 1 AAUW fellowship; 2 P.E.O. International Peace Scholarships; 1 USDA-CSREES International Science and Education grant; 1 Borlaug fellowship for West African Women Scientists; 1 HED new IDEAS grant; and one Bill and Melinda Gates Foundation Concept proposal. On May 1, 2006 we received word that the 2 P.E.O. scholarships were awarded to the 2 Malian women. In this reporting period, Sidy Ba, Keriba Coulibaly, and Belco Tamboura began preparing their applications for the Fulbright scholarship and Assa Kante for the LEAP scholarship linked to the international research center for forestry (ICRAF) in Mali. These experiences will strengthen the participants to lead their institutions and the Incubator Center in seeking funding in support of research and training. 5. <u><i>Preparation of Original Research for Peer-refereed First Tier Journals.</i></u> Assa Kante has drafted a manuscript from her in-Mali research during year 1 (2005) of this grant. This is available in the appendix of this report and is titled “Communicating Agricultural and Health-Related Information in Low Literacy Communities: Case Study of Villages Served by the Bougoula Community Learning and Information Center (CLIC) in Mali.” Aissata Thera with her graduate advisor, Dr. Jacobsen obtained publishable data on bacterial wilt in Mali. This article will be submitted to <i>Plant Disease</i> as a First Report and titled “Survey of <i>Ralstonia solanacearum</i> races in Mali.” Keriba Coulibaly has completed the first set of experiments with cowpea varieties and Malian bruchid beetles. Each of the 7 participants now understands that although their respective institutions do not require publications in internationally recognized, peer-refereed journals for promotion or tenure, in order to be competitive for grants and scholarships outside of Mali, they will need to publish in these journals. 6. <u><i>Preparation of Curriculum Vitae.</i></u> All HED participants prepared their curriculum vitae in English, a necessary process for their institutions to succeed in garnering extramural funding. 7. <u><i>Understanding of US Organizational Structure Including the Land Grant System.</i></u> These 7 faculty greatly improving their understanding of the US organizational structure which includes major funding sources. By this process, they have greatly improved their capacity, and therefore,

	<p>that of their home institutions in responding to US requests for proposals.</p> <p>8. <u>Critical Path Management</u>. All 7 faculty / HED participants learned by example how to use critical path management and Sidy Ba is becoming self-sufficient in using the software to run the program.</p> <p>9. <u>Certification of Disease-Free Seed Potatoes</u>. IPR/IFRA faculty (HED participant Adama Berthe) and IER scientist (HED participant Aissata Thera) are now positioned to do their own certification of the disease-free status of seed potatoes. Mme. Thera with her technicians have been trained by doing identification of bacterial wilt strains in Mali.</p> <p>10. <u>Capability to Use and Teach Computer Assisted 3-Dimensional Design</u>. HED Participant Sidy Ba has learned Solid Works software and has scheduled training sessions in collaboration with the University of St. Thomas faculty and staff (St. Paul MN) for the national engineering university of Mali (ENI) and for IPR/IRFA faculties in Mali. These training sessions are planned for the first week of January 2007.</p> <p><i>* The overseas country, not the United States</i></p>
4.	<p>How have these activities benefited the local host country community*?</p> <p>* Two villages in the Mopti region now recognize the interest of the Center in their water storage and water quality needs.</p> <p>* Three shea butter production units, the village of Dio, the Cooperative at Zantiebouougou, and the Association of 15 villages based at Dioila now understand the interest of the Center in helping them improve the quality of their products and improve the marketing of their products in the US. The Cooperative at Zantiebouougou understands how their product will be accepted in the local Montana market. The national organization to promote shea butter organizations Projet d'Appui aux Groupements Feminins dans l'Exploitation du Karite, Mme Konte Binta Bocoum, Coordinatrice, understands the goals of the Incubator to support improved economic return to producers (village women) of shea butter in Mali.</p> <p>* The town of Kangaba, particularly the Community Learning and Information Center (CLIC) there, is pleased with the assistance the Engineering Section of the HED Agribusiness Center has provided in testing the evaporative cooling system that was installed there in March 2005, revised in January 2006 and monitored with the assistance of Sidy Ba in March 2006 and with the local Peace Corps Volunteer continuously since January 2006. We are looking forward to the visit of HED participant Sidy Ba and his UST mentors in January 2007 to develop an improved design for the evaporative system.</p> <p>* HED participants are forming an amazing link between Montana secondary schools and those of their own children or their own former high school and their own HED/Center projects. Part of this is occurring with visits and presentations of Malians in the classroom and partly with teachers and US HED team members visiting classrooms in Mali. This exchange has been now formalized with visits of 2 teachers (one from Belgrade MT, one from the Northern Cheyenne reservation) to Mali and the exchange of 4 "discovery trunks," two from Mali and two from the US. This has resulted in a vertical integration of the themes of the Agribusiness Incubator Center in the communities it will serve. Schools that are already collaborating with the Incubator are the American International School of Bamako and the private school in Oeulesabougou. Schools that are in a planning stage with HED participants to collaborate with Incubator projects are: Ecole Populaire (Kati), Lycee Mama Thiam (and primary school) (Bamako), Lycee de Progres (Bamako), Lycee Luc Sangare (Bamako), Lycee Fily Dabo Sissako (Bamako), Lycee Hammadoun Dicko (Sevare). HED participants and mentors have met with AFIMA (Malian professional women's organization to promote science, engineering, and architectural choices in young Malian women students.)</p> <p>* Most of the Center team traveling to Mali in March 2006, participated in National Women's</p>

	<p>Recognition Day.</p> <p>* Through community outreach in Montana with ROC Wheels, Inc., HED participants have developed a program for initially donating and eventually producing wheelchairs for handicapped persons in Mali.</p> <p><i>*The local community beyond the campus of the host country higher education institution</i></p>
5.	<p>How have these activities benefited the U.S. higher education institution(s)?</p> <ul style="list-style-type: none"> • It is difficult to put into words the tremendous impact there has been in our undergraduate and graduate programs at Montana State and University of St. Thomas and in undergraduate programs at the community college on the Northern Cheyenne Reservation, Chief Dull Knife College, as a result of having the HED participants from Mali on campus and in our classrooms. This impact is seen in the neighborhoods where 4 of the participants now live on or near campus; the English classes where 5 of the participants refreshed their English; in broadened understanding of students and faculty in courses taken by these 7 participants in Montana and Minnesota (at UST). • Specifically, the participants made presentations in the following courses at Montana State: Insects and Human Societies; Holistic Thought and Management; French Language, all 4 levels; several courses in Adult Education and Agricultural Education and Extension; Environmental Engineering; Crop Genetics; and in the Plant-Insect-Human Interactions seminar. These interactions have led to an enthusiasm of US undergraduates to assist the participants in launching the 5 initiatives of the Incubator Center in Mali. • At University of St. Thomas, participants made presentations for the Senior Design program in the College of Engineering and participated in the mid-term exam and the final exam for undergraduate students.
6.	<p>How have these activities benefited the local U.S. community*?</p> <p>* There continues to be an incredible effect on the Bozeman, Livingston, Belgrade, Manhattan, Choteau, and Lame Deer, Montana communities as the participants are invited to interact with schools, other community groups, and families in these city, farming, and Native American reservation communities. This effect includes new understanding of the Malian culture and environmental concerns. Examples of organizations benefiting in this manner are: the local Montessori preschool where one of the participant's son attends school; the Belgrade 7th grade science classes, Manhattan 7th grade classes, 3rd grade of a rural Bozeman area public school; neighborhoods of the 4 participants in homestays; and other groups such as a Montana P.E.O. chapters in Bozeman, Amsterdam, and Hamilton.</p> <p>* HED participants facilitated development of a strong, on-going relationship between rural, city, and reservation schools in Montana and rural and city schools in Mali. This relationship is both for cross cultural understanding and to share original research results on local issues. HED participants and their mentors serve as collaborators in both countries. These pairs are Northern Cheyenne Reservation schools in Lame Deer and St. LaBrei are working with the private school in Oeulessabougou on the cowpea initiative. Belgrade public schools and the Ecole Populaire in Kati are paired to address issues of the water initiative. The American International School of Bamako is paired with the rural Manhattan MT schools to address issues of both the cowpea initiative and the seed potato initiative of the Incubator Center.</p> <p>* The Montana Certified Seed Potato laboratory and a family of seed potato growers in Manhattan MT are coming to understand the particular opportunities and constraints that the Malian HED Agribusiness Incubator Center is facing as they prepare to launch their Certified</p>

	<p>Disease-Free Seed Potato Initiative.</p> <p>* During this reporting period, the participants and their mentors presented the 4th annual Mali Night. People came from communities throughout Montana and families from outside Montana. There was much community interest in the event. 117 guests attended and were served a Malian dinner by participants, their mentors, and mentorees. This was followed by a 2- hour program.</p> <p>* Philanthropies based in Montana were provided with a connection to Mali. These included 3 chapters of PEO (international philanthropic organization of higher education of women) in Hamilton, Bozeman, and Amsterdam, Montana. These included ROC Wheels, an organization that provides wheelchairs to handicapped children in developing countries and expertise to develop manufacturing units in developing countries and similar organization, The World is Our Neighbor which supplies entire medical/dental examining/surgical suites. The latter two organizations were provided with a connection in Mali through HED participants.</p> <p>*Leadership efforts of Belco Tamboura resulted in the organization of the Malian expatriate community throughout Minnesota.</p> <p><i>*The local community beyond the campus(es) of the U.S. higher education institution(s)</i></p>
7.	<p>List other collaborating U.S. institutions (e.g., NGOs, community-based organizations, government agencies, small businesses, other higher education institutions, etc.) and briefly describe their involvement in partnership activities during this reporting period (October 1, 2005 – September 30, 2006):</p> <ul style="list-style-type: none"> • <u>USDA-Cooperative States Research, Education, and Extension Service (CSREES) Challenge Grant Program</u>, two grants for Higher Education and one grant for Secondary Education. All three are related to initiatives of the HED Mali Agribusiness Center. • <u>USDA-Agricultural Research Service (ARS) in Sidney, Montana</u>. Dr. Stefan Jaronski, insect pathologist working with soil entomopathogenic fungi has offered to advise HED participant Abdoulaye Camara. • <u>University of California-Davis</u> (Dr. Robert Gilbertson, Plant Pathology) has provided for our project debriefing regarding his work with gemini tomato viruses in Mali, biotech developments at IER-Sotuba, and in Mali generally, as well as specific advice regarding the Mali Agribusiness Incubator Center’s biotech initiatives to alleviate plant diseases. • <u>Chief Dull Knife College, Lame Deer, Montana</u>, is providing cultural introduction to Native American (Northern Cheyenne) culture and provides insight into the preserving of traditional wisdom and practice which a change process is underway in an indigenous culture. They also provide advice in using adult education tools with non-literate learners • <u>Brigham Young University, Department of Sociology</u>, is providing an evaluation process for portions of the HED project. • <u>Compatible Technologies Inc. (CTI)</u>, provided professional advising for Belco Tamboura. One of the members, Steve Clarke, at his own expense, met Dr. George, UST Mechanical Engineering mentor, traveled to Mali in January 2006 to view the mixer design, part of the shea butter initiative of the Agribusiness Center. Improvement of grinders for shea nuts were also investigated. . • <u>Shea Yeleen</u>, president and board member met in Washington D.C. with Dr. Dunkel in person and by speaker phone with Assa Kante to confirm the goals of their shea butter organization and the meaning of fair distribution of profit. • <u>Agbanga Karite</u>, a company based in Olympia, Washington forms the US and Canadian marketing arm of shea butter producing cooperatives in Togo. Assa Kante and her undergraduate assistant and mentoree visited their factory, participated in their production and discussed developing a similar relationship with Malian cooperatives. • <u>Bozeman, Montana Farmer’s Market</u>, provided Assa Kante with an opportunity to test marketability of shea butter produced by the women’s cooperative in Zantiebougu, Mali,

	<p>one of the items on the critical path for launching the high quality shea butter initiative of the Mali Agribusiness Incubator Center.</p> <ul style="list-style-type: none"> • <u>Montana Seed Potato Growers' Association</u>, plant pathologist, Dr. Mike Sun, and technicians provided Aissata Thera and Adama Berthe with practical experience in how to provide tissue culture lab support for a seed potato industry, self-contained in Mali. Members of the Association also provided field tours for HED participants, faculty mentors, and for Dr. Fafre Samake, Director General of IPR/IFRA (national agricultural university of Mali). • <u>ACE Language Institute</u> • <u>Chief Dull Knife College</u>, a community college on the Northern Cheyenne Reservation, Lame Deer, Montana
8.	<p>List other collaborating host country institutions (e.g., NGOs, community-based organizations, government agencies, small businesses, other higher education institutions, etc.) and briefly describe their involvement in partnership activities during this reporting period (October 1, 2005 – September 30, 2006):</p> <ul style="list-style-type: none"> * With <u>Peace Corps-Mali</u> we are testing uptake by Peace Corps Volunteers of Integrated Pest Management (IPM) materials from the IPM CRSP. The information is in a format to use for transfer to non-reading, Bambara-speaking farmers. If successful, this format will be one mode used by the Innovative Outreach section of the Center for training and information dissemination * <u>CLICs</u>, particularly the one at Kangaba the Mali Agribusiness Center Engineering Section is testing in collaboration with the local Peace Corps Volunteer, the environmental changes created by an evaporative cooler installed by the UST team in the Kangaba CLIC. * <u>Cooperative at Zantiebouougou (Zantiebouougou Union)</u> – provided our team (HED Agribusiness Center) with: a tour of their shea butter factory; a discussion of opportunities and constraints; and an agreement to participate in the training sessions in 2006-2007. Assa Kante worked with this Association this year to assess what barriers exist to adopting new technologies. The Agribusiness Incubator Center will use this information to assist the Association in improving the quality of their shea butter and in finding direct US export markets. * <u>Shea Butter Association of 15 villages at Doila</u> - provided our team (HED Agribusiness Center) with: a tour of their shea butter factory; a discussion of opportunities and constraints; and an agreement to participate in the training sessions in 2006-2007. Assa Kante worked with this Association this year to assess what barriers exist to adopting new technologies. The Agribusiness Incubator Center will use this information to assist the Association in improving the quality of their shea butter and in finding direct US export markets. * <u>ICRAF</u>, the International Research Center for Forestry (Mali branch), the international forestry research center based just outside of Bamako, provided our team with an opportunity to present a proposal to fund production of shea quality determination kits for distribution in Mali and regionally. The kit, appropriate for village use, was developed by the Shea Initiative within the HED Agribusiness Center (HED participant mentoree, Chris Sedlak). * <u>INAGEF</u> - the Malian unit that directs the CLICs received 14 sets of videos produced (3 in Bambara; 1 in English). The purpose of the videos was to encourage village women who are producing shea butter to organize into cooperatives to improve quantity, quality, and marketability of the shea butter they produce. * <u>Bamako Institute of Engineering</u>. This is the regional school of engineering. They have developed an agreement with our HED project that will link them with UST and Montana State and Montana State (March 2006) met with the Dean, Dr. Moussa Kante and faculty to confirm the linkage. The partnership includes Dr. Camille George, UST Mechanical Engineering professor and mentor for the mechanical engineering portion of the HED Mali Agribusiness Center. * <u>American International School of Bamako (AISB)</u>, This is the school where US diplomats'

	<p>children attend as well as other students, Malian and other nationalities. In 2005-06 school year the 6th through 11th graders in collaboration with Dr. Dunkel, IER-Sotuba, conducted with their teachers in biology, chemistry, and social studies, an original, publishable scale study to determine what level of neem kernel powder (grown beside the school) will prevent bruchid beetle infestations of cowpeas. Simultaneously, IER-Sotuba, food scientists directed by Assa Kante determined what level of neem kernel powder was acceptable to the consumer eating the cowpeas treated during storage. AISB students prepared a report of their results in publication format and shared this with the Agribusiness Incubator Center leader of the Cowpea Initiative, Keriba Coulibaly. AISB students also shared their results with another collaborator on the Cowpea Initiative, Bourema Samake, high school biology teacher at the Alliance School in Oeoulessabougou.</p> <p>* <u>Alliance School of Oeoulessabougou, Mali</u>. High school and middle school students conducted field experiments in school year 2005-06 to test the ability of solarization processes with locally purchased plastic sheets to disinfest cowpeas. This was conducted in collaboration with the Peace Corps-Mali, AISB, IER-Sotuba, Chief Dull Knife and Montana State.</p> <p>* <u>Shea Butter Production Association at Dio</u>. Assa Kante worked with this Association this year to assess what barriers exist to adopting new technologies. The Agribusiness Incubator Center will use this information to assist the Association in improving the quality of their shea butter and in finding direct US export markets.</p> <p>* <u>Villages of Dera and Sendegue</u>. Sidy Ba with his undergraduate mentoree, Stacey Hellekson and faculty mentor, Dr. Dean Drenk, worked with these villages in assessing water storage possibilities. It is to these villages that Sidy Ba will return to test the wetlands water purification system that he is designing as part of his M.S. degree at Montana State.</p> <p>* Village of Sanambele. HED participants from IER have a long history working with this village, particularly in IPM preharvest projects. For HED participant mentors, e.g., Dr. Montagne and others, and HED mentorees Dr. Dunkel and the elder men and women of the village have demonstrated the use of participatory assessment techniques. The 7th grade English class of Sanambele is working on a cowpea and other crop pest project and will join the Agribusiness initiatives in Food Security, probably both in the Cowpea projects and the high Lysine project.</p> <p>* <u>Projet d'Appui aux Groupements Feminins dans l'Exploitation du Karite</u>, Mme Konte Binta Bocoum, Coordinatrice, tel: 223 222 12 25, fax: 223 223 84 45, email: defsam@cefib.com / projetkarite@mpfef.ml</p>
9.	<p>Please briefly describe your partnership's greatest <i>successes</i> – including any <u>unanticipated successes</u> – during this reporting period (October 1, 2005 – September 30, 2006).</p> <p>One of the greatest successes was the receiving of 2 PEO International Peace Scholarships by the 2 women participants on the team.</p> <p>There have been several unanticipated successes this year. One of these is at this early point in the formation of the Agribusiness Entrepreneurial Incubator Center we see among the participants' outstanding cooperation, collegiality, and seriousness in reaching their goals to launch the Incubator Center. We Americans are quite in awe of what we observe in mutual respect and working cooperatively. Adaptation to this far northern climate, separation from family, and academic demands was successfully accomplished, due in large part to two factors. One factor is the amazing support the Malians give each other and the other factor is the support of the community of Bozeman and University of St. Thomas campus. In the midst of very tight budget constraints, we see a firm commitment to making the Incubator a success.</p> <p>The second unanticipated success has been the offer of a full tuition waiver for one year by</p>

	<p>University of St. Thomas for Belco Tamboura should he choose to continue in the Master of Business Communications program. Likewise, Montana State University has provided a full tuition waiver for each of the 3 participants (Assa Kante, Aissata Thera, Sidy Ba) in degree programs for fall semester.</p> <p>The third unanticipated success has been the providing of full tuition waivers from June through December 2006 for all students in the English program (Keriba Coulibaly, Adama Berthe, Abdoulaye Camara) at the ACE Language Institute.</p> <p>The fourth unanticipated success was the donation of 41 copies (valued at \$6000 US each) of Solid Works, 3-dimensional computer assisted design for engineering faculty and students at ENI, the national university for engineering in Mali and at IPR/IFRA, the national university for agricultural sciences.</p> <p>We were delighted with the straight-A records of both Sidy Ba and Assa Kante.</p> <p>Another unanticipated success Concept of clusters of small enterprises within each initiative***</p> <p>***Completion of 5-year plan to sustainability (without continuing foreign aid) of 5 initiatives of the Incubator Center. This 5-plan contains measurable outputs and outcomes (both long-term and short-term) for each activity***</p>
10.	<p>Please briefly describe any programmatic <i>challenges</i> your partnership encountered during this reporting period (October 1, 2005 – September 30, 2006).</p> <p>By far, the greatest challenge to the project in this reporting period has been to provide adequate English study instruction, given the specific learning styles and backgrounds of those scientists that came with the lowest level of English preparation, Keriba Coulibaly, Adama Berthe, and Abdoulaye Camara. Both HED participants and instructors have worked tirelessly and with great determination to accomplish the goals of an acceptable TOEFL level for graduate studies.</p> <p>The next greatest challenge has been to manage the budget to be sure sufficient funding always remains to complete the graduate degrees that were started and to protect funding for the transportation back to Mali.</p>
11.	<p>Has your partnership conducted collaborative <i>research</i> during this reporting period (October 1, 2005 – September 30, 2006) to address a development challenge in the host country? YES. If YES, please briefly describe:</p> <ul style="list-style-type: none"> *A project report on the research in water purification and water storage can be found at: http://courseweb.stthomas.edu/cmgeorge/ *A project report on the Evaporative cooling of CLIC building at Kangaba can be found at http://courseweb.stthomas.edu/cmgeorge/ * a survey was conducted by Sidy Ba in collaboration with undergraduate scholar Stacey Hellekson on water needs and opportunities for water storage in villages in the Mopti area. This report will be available on the CD in the appendix to this report. * Assa Kante completed her M.S. thesis research, its analysis, and the first draft of her thesis. Her research involved barriers to accepting new technologies in Women’s Cooperatives and Associations organized for shea butter production. * Assa Kante completed data summaries and drafting an article with the mentorship of Dr. Dunkel. The article is intended for the peer refereed journal, Journal of International Agriculture

	<p>and Extension Education. It is titled: Communicating Agricultural and Health-Related Information in Low Literacy Communities: Case Study of villagers Served by the Bougoula Community Learning and Information Center (CLIC) in Mali.</p> <p>* Assa Kante developed a training program to improve quality in shea butter production in Mali for use in the Community Learning and Information Centers (CLICs)</p> <p>* Aissata Thera is in the midst of her thesis research and has drafted her research proposal titled: <i>Ralstonia solanacearum</i> management in Mali for Efficient Production of Seed-Potatoes Free From Disease.</p> <p>* Four components of research in the integrated management of cowpeas postharvest initiative was initiated this reporting period. These are: 1) the postharvest resistance to 11 varieties of cowpeas being introduced into Mali by IITA (International Research Center) (Montana State) with HED participant Keriba Coulibaly; 2) sensory evaluation of cowpeas treated during storage with neem kernel powder (IER-Sotuba); 3) Lowest effective dosage (LD95) of neem kernel powder to arrest population development of bruchid beetles in cowpeas (AISB), and 4) the effect of solarization on bruchid beetle infestations of cowpeas (school in Ouelessabougou).</p> <p>* Sidy Ba has drafted his research proposal titled: "Use of Constructed Wetlands and Slow Sand Filtration for Production of Drinking Water in sub-Saharan Africa."</p>
12.	<p>Has your partnership adapted <i>curricula</i> or introduced methods of instruction relevant to host-country development needs during this reporting period (October 1, 2005 – September 30, 2006)?</p> <p>YES.</p> <p>If YES, please briefly describe:</p> <p>Since we are training Malian tenured professors and adjunct or potentially adjunct professors, we are continually, informally instituting change. The most major of these changes are:</p> <ol style="list-style-type: none"> a. It is now understood by Assa Kante and the entire HED Mali Agribusiness Center team that it is important to add an entire curriculum in Adult Education and Agricultural Education and Extension to the offerings of the Institute of Agriculture (IPR/IFRA) and to the Normal School for Education in Bamako. b. It is now understood by our team, particularly the College of Business professors and Entrepreneurship professor (Belco Tamboura), that the form of entrepreneurship that will flourish in Mali is not the form that we call capitalism. Entrepreneurship in Mali should make use of the amazing strength of their cooperative spirit, their ability to form and function in cooperatives. Each HED participant, particularly Belco Tamboura, is now aware that they need to define entrepreneurship, Mali-style. Soon, the Incubator Center will be working with recent graduates. Belco Tamboura is beginning to assemble a matrix of characteristic, typical of Malian entrepreneurs. c. Assa Kante has now gained the skills to use holistic management in her teaching and training. She, with the aid of Dr. Cliff Montagne and Dr. Dunkel has facilitated the diffusion of this understanding throughout the Incubator team and its mentors). This is a continuing process. d. Sidy Ba with the aid of his mentor Dr. Camille George, University of St. Thomas, has begun the process of introducing the use of 3-D computer-assisted design into the curriculum at the National School of Engineering in Bamako (ENI) and the Mali Agricultural University in Katibougou (IPR/IFRA). In September 2006, they announced that the software, SolidWorks, each copy valued at \$6,000, will be given to these 2 universities and to the Mali Agribusiness Incubator Center. A total of 42 copies, 20 to ENI, 20 to IPR/IFRA, 1 to the Incubator Center. In addition, plans have been made to install the software in Mali January 2007. A team of 4 engineers (including Sidy Ba) will

	<p>install the software and provide training for faculty at the 2 universities January 2007.</p> <p>e. Dunkel has begun to introduce principles of the participatory process to HED participants with reading the book, <i>Farmer First</i> by Robert Chambers et al., and to introduce techniques of participatory assessment by participating in role plays with HED participants.</p> <p>f. This year <u>all 7 HED participants</u> have participated in connecting their Agribusiness Incubator Center and their own initiative's research program with the secondary schools of Mali.</p> <p>Since the source of Malian University students and professors is the secondary schools of Mali, we have instituted several changes this reporting period in Malian schools in part with parallel funding from USDA-CSREES Secondary Education Challenge Grant Program funding. We will report on the funding that is that from the Mali HED Agribusiness Center. Our goals were and continue to be to vertically integrate the activities of the Malian Agribusiness Center and so to pay attention to the next generation of agri-business entrepreneurs and agricultural scientists. Our specific goals with the schools is to: 1) encourage Malian young women and men in choosing agricultural-based science as a career; 2) encourage biology teachers to teach by guiding students in doing science in the classroom, that is testing real hypotheses about local problems; and 3) to facilitate including local scientists (such as the HED participants and their colleagues) in this collaborative research so that the students and teachers can learn to know and work side-by-side with real scientists. We began with a 3 part curriculum change: 1) starting to bring agricultural scientists and engineers into the classroom; 2) by initiating experiments (students choose those related to maintaining postharvest cowpea quality long term and water quality); and 3) 1 June 2006, we held a global science fair. Research results were shared by Malian students in a formal science symposium format. Two schools (American International School of Bamako and the Alliance school at Ouelessabougou) presented research they completed for the Food Security (Cowpea) Initiative of the Agribusiness Incubator. The 3rd school (Popular School at Kati) presented research related to the Water Purity Initiative of the Incubator Center. The initial plan (successfully tested with the teachers from the 3 schools in March 06) was that Mali and Montana students would present to each other and HED participants via video conference (1 June 06). Nationally recognized agricultural scientists, including Dr. Dunkel, posed questions to students via video from the USDA in Washington DC. Unfortunately, due to visiting dignitaries USAID-Mali's video connection room was unavailable. Instead, simultaneously, Malian students/ teachers from 3 schools met in Bamako video taped their symposium, sent tape to MT schools. AISB prepared a written report in peer refereed journal format and gave it to HED participants.</p>
13.	<p>Has your partnership undertaken activities during this reporting period (October 1, 2005 – September 30, 2006) to prepare individuals for participation in the host country's <i>workforce</i>? YES.</p> <p>If YES, are some of these efforts targeted to underserved or disadvantaged groups? Please briefly describe:</p> <p>Each of the 7 participants gained additional laboratory and / or field and academic skills to assist them in their own tenured positions and to develop entrepreneurial initiatives to create jobs and train Malians for those jobs. For example, all 7 learned how to develop 5 year plans for their agribusiness initiative to achieve sustainability without foreign aid. In this plan they learned to detail it with time-based measurable activities, as well as measurable outputs and measurable short-term and long-term outcomes.</p> <p>Specifically, our partnership has trained:</p>

	<p>2 technicians of HED participant Aissata Thera in the IER-Sotuba microbiology laboratory in using ELISA testing materials and interpreting the results.</p> <p>HED participants Abdoulaye Camara and Keriba Coulibaly in DNA extraction, PCR (Polymerase Chain Reaction) techniques, and gel electrophoresis. Keriba worked with cowpea and other legume DNA in the genetics laboratory of Dr. Norm Weeden, one of his Montana State faculty mentors in the Department of Plant Sciences and Plant Pathology. Abdoulaye worked with microorganism DNA and also learned DGGE analysis for microbial communities in the laboratory of Dr. Mark Burr, Montana State Center for Biofilm Engineering. Dr. Burr is an assistant research professor in the Department of Land Resources and Environmental Sciences.</p> <p>English skills of all 7 participants have greatly improved. All are continuing to take the TOEFL. By the end of this reporting period, all but 3 had attained the 550 level permitting them to take graduate level courses.</p>
14.	<p>Has your partnership been involved in <i>community outreach</i> activities (e.g., agricultural extension, service learning, etc.) in the host country during this reporting period (October 1, 2005 – September 30, 2006)?</p> <p>YES.</p> <p>If YES, please briefly describe:</p> <p>The Shea Butter Initiative Team led by Assa Kante met extensively with the women of Dio, the shea butter production association at Doila, and the cooperative (Zantieboungou Union) in Zantieboungou. All are production units for shea butter. Assa conducted in-depth interviews in March and again in June and July 2006 regarding: opportunities and constraints to shea butter production and marketing; interest in technological innovations; and barriers to adoption of new technologies.</p> <p>The Water Quality Initiative Team led by Sidy Ba visited 2 villages in the Mopti region to conduct a participatory assessment of water needs, both quantity and quality. Structures were measured for designing/adapting water storage containers and materials were obtained to test at the Montana State College of Engineering.</p> <p>HED Participants Assa Kante, Aissata Thera, and Sidy Ba and also visited local schools in Bamako and Mopti of their children or their alma mater to begin a joint program to: encourage the use of inquiry and scientific process in their biology courses; to provide opportunities for students in secondary schools to get to know local scientists; and to engage in collaborative research on local topics.</p> <p>During this reporting period we had one 2 meetings with the AFIMA president. AFIMA is a Malian organization to encourage young women to enter studies in the sciences and engineering. The first meeting (November 05) was with Dr. Dunkel alone. The second meeting was with Montana State undergraduates in engineering, media arts, and chemistry, Assa Kante, and a secondary school science teacher from a small town in Montana. We summarized the progress of our program involving initiatives of the Mali Agribusiness Center and the secondary schools in Mali. We decided that AFIMA should be the more frequent connection of these classrooms to ensure that they are having frequent visits by their collaborating scientist or engineer.</p> <p>Three secondary schools (from Oeulesabougou, Bamako, and Kati) linked in their research to the Agribusiness Incubator Center met to present their classroom research to each other. Their</p>

	<p>research is related to the Cowpea Initiative and the Water Quality Initiative. They were scheduled to present their data simultaneously to scientists at the USDA in Washington DC and to their collaborators at Montana State, but due to visiting dignitaries in USAID-Mali, the video conferencing room although previously scheduled was not available. The teachers videotaped the presentation and this was made available to HED participants.</p>
15.	<p>Has your partnership donated any books, computers, software, library supplies, etc. to the host country higher education institution(s) during this reporting period (October 1, 2005 – September 30, 2006)?</p> <p>YES.</p> <p>If YES, please list:</p> <ul style="list-style-type: none"> • Symmetry Solutions arranged (thanks to the initiative of Dr. Camille George and Sidy Ba) for a donation of 41 sets of Solid Works, a computer aided design software package. 20 copies, a class pack, of this computer-assisted design software was sent to IPR/IFRA, and 20 copies, a class pack, of this software to ENI the National Institute of Engineering, and one copy of this software will go to the Agribusiness Incubator for Sidy Ba, leader of the Engineering Section. Each software package is valued at \$6,000. • Two laptop computers donated by the University of St. Thomas to Belco Tamboura and Sidy Ba, valued at \$3500. • 1 laptop computer was donated by a host family to the professor of plant pathology at IPR/IFRA (Adama Berthe). • Professional books and reprints have been donated to host country institutions by Montana State and UST faculty. Titles are available upon request. • 30 years of Science journals were offered by Dunkel for the libraries at IPR and/or IER (Mode of transportation is being determined at this time.).
16.	<p>Has your partnership donated any books, computers, software, library supplies, etc. to any other host country institutions (e.g., NGOs, cooperatives, women’s groups, clinics, etc.) during this reporting period (October 1, 2005 – September 30, 2006)?</p> <p>YES</p> <p>If YES, please list:</p> <ul style="list-style-type: none"> • 1 laptop computer was donated by a host family to the IER scientist in plant pathology (Abdoulaye Camara). • 2 laptop computers were provided on long-term loan by the USDA-Forest Service via a host family to the IER scientist in Extension Education (Assa Kante) and the IER scientist in crop breeding (Keriba Coulibaly). • Professional books and reprints have been donated to host country institutions, particularly l’Institut d’Economie Rurale (IER) and Peace Corps-Mali by Montana State, UST, and Chief Dull Knife College faculty. Titles are available upon request. • 30 years of <i>Science</i> journals were offered by Dunkel for the libraries at IPR and/or IER (Mode of transportation is being determined at this time.). • 20 copies (\$6000 each in value) of SolidWorks 3-D computer assisted design software were donated via by Dr. Camille George and Sidy Ba for the National School of Engineering (ENI).
17.	<p>How has information about your partnership been disseminated during this reporting period (October 1, 2005 – September 30, 2006)? As appropriate, please provide HED with samples of</p>

the following as attachments to this report:

- **Articles published in the campus, local, national, or international media**

November 2005 Article in Bozeman Chronicle on HED participants

April 2006 article in US-based newspaper, *The African News Journal*, volume II, Edition 4, cover story. Pages 1 and 10. "A different "3M": Minnesota, Montana and Mali. By Bashe Said.

Spring 2006 article in *Techknowledge*, the School of Engineering newsletter, on the Mali Project.

Spring 2006 article in *CAS Spotlight*, the newsletter of the College of Arts and Sciences at UST, article highlighted the efforts of St. Thomas faculty in Mali and other parts of Africa.

June 2006 two articles by F.V. Dunkel on cover page of *Plant Science Says*, the newsletter of the Department of Plant Sciences and Plant Pathology, Montana State University, "Mali Night 2006" and "P.E.O. International Peace Scholarships Awarded to Mali Graduate Students."

- **Features in any other media (radio, television, Internet, etc.)**

Dunkel, F.V. 2006. Building Partnerships in Higher Education and Hatching Agribusiness Incubator in Mali. Invited paper for USAID-Mali website. 2pg

Montana State University Website, www.Montana.edu March 28, 2006. Engineering student Stacey Hellekson assists in Malian Water Issues.

We have updated and continue to upgrade the HED-Mali website www.montana.edu/mali

UST maintains Mali research reports and information on website, <http://courseweb.stthomas.edu/cmgeorge/> (UST)

Our prize-winning video continues to be available on the HED website under <http://www.aascu.org/alo/working/films05.htm> "Junior Mentors Synergize Partnerships". F.

Dunkel and A. Grue.++

12 minutes.

- **Research papers published or presented**

Abraham, J., and George, C. Full-building radiation shielding for climate control in desert regions. *International Journal of Sustainable Energy*, submitted Jan 2006. (Abraham is UST mentor in Mechanical Engineering)

Biglefthand, R., K. Coulibaly, and F. V. Dunkel. 2006. Postharvest resistance to *Callosobruchus maculatus* in Malian cowpea varieties. Poster presented at the annual American Indian Research Opportunities Symposium July 20, 2006. (Raphael Biglefthand was a mentoree of Coulibaly and Dunkel)

Lehman, A.D., Dunkel, F.V., Klein, R.A., Ouattara, S., Diallo, D., Gamby, K.T., and N'Diaye, M. 2006. Insect management products from Malian traditional medicine: Establishing systematic criteria for their identification. *Journal of Ethnopharmacology*. Accepted September 2006. In press.

(available as preprint on website of J. Ethnopharm.)

Shams, A., and George, C. (2006). Global competency: An international approach. *Academic Exchange Quarterly*. 10 (4). In press.

Shams, A., George, C., and Dunkel, F.V. (2006). The new '3-M': Minnesota, Montana and Mali: The synergy of collaborative international service-learning. *Professional Forum Paper presented at Sixth International Service-Learning Research Conference, Portland State University Portland, OR.*

- **Video or DVD productions**

Dunkel, F.V. 2005. East Meets West: Northern Cheyenne of Eastern Montana and Malians of West Africa, 42 minutes. DVD or VHS. Highlights Keriba Coulibaly, Abdoulaye Camara, and Adama Berthe being honored by a Northern Cheyenne powwow and dinner at Chief Dull Knife College, Lame Deer Montana.

Dunkel, F.V. 2006. Mali 2006: Summary Presentation for Mali Night, 16 minutes. DVD or video. Features Assa Kante, Aissata Thera, Sidy Ba during their initial return to Mali March 2006 after beginning graduate program at MSU/UST.

- **Photographs that may be used in future HED publications (enclose prints or a CD-ROM with high resolution images).** We sent a series of 6 for the Annual Meetings competition and hope you have access to these. We will include additional photos on a CD.

In addition to the project photos, Assa Kante's mentoree, Anna Volkersz, also produced a series of production and quality deterioration photos for the Shea Butter Initiative. They are available from Ms. Volkersz on request.

18. Please outline your partnership's *planned activities* for the next six months, paying particular attention to achieving stated objectives.

- Improve frequency of features in public media (radio, television, Internet, etc.)
- We will continue to update the HED-Mali website www.montana.edu/mali
- Submit at least 2 research papers for peer-review by scholarly journals co-authored or senior authored by HED participants.
- Assa Kante with the aid of her major professor, Dr. Martin Frick, and faculty committee, Drs. Carl Igo, and F. Dunkel will complete the field study to: 1) Identify social, situational, institutional, and dispositional barriers to adoption of new technologies in shea butter processing; and 2) Identify differences in adopter characteristics as related to preferences for receiving information on new or innovative practices associated with producing and marketing shea butter from harvest to retail markets.
- Aissata Thera and Adama Berthe will participate in all activities of the Montana Certified Seed Potato laboratory and field inspection program.
- Sidy Ba will complete his M.S. research proposal, submit to his committee, and meet with his committee.
- Aissata Thera will complete her thesis research proposal, submit it to her graduate committee, and meet with her research committee.
- Keriba Coulibaly, Adama Berthe, and Abdoulaye Camara will complete all requirements for full admission to the graduate program in Plant Sciences and Plant Pathology at Montana State.
- Belco Tamboura will return to Mali in February 2007 after successful completion of the

comprehensive synthesis process that is presently underway. In Mali, he will continue coordination of the entire Center and particularly focus on the identification of potentially successful entrepreneur groups in Mali.

- The Agribusiness Center team and mentor network, US and Malian, will continue to refine the detailed 5-year workplans created for the 5 present initiatives that will launch the center. These are: the Seed Potato Initiative, the Shea Butter Quality Improvement for Export Initiative; The Cowpea Initiative; the High Lysine Yeast Replacement Initiative and the Household Water Quality Improvement Initiative.
- The Agribusiness Center team and mentor network, US and Malian, will continue to integrate their activities horizontally (particularly with the Mali School of Engineering), vertically (particularly with city, town and village school systems), and holistically within Malian communities.
- All participants with their mentors will continue to seek sources of funding and apply for appropriate programs to continue their academic work and the launching of the Agribusiness Center.
- All participants with their mentors will continue to seek sources of funding and apply for appropriate programs to continue their academic work and the launching of the Agribusiness Center.
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- All participants with their mentors will continue to seek sources of funding and apply for appropriate programs to continue their academic work and the launching of the Agribusiness Center.
- All participants with their mentors remain committed to attaining the goal of self-sustainability of the Mali Agribusiness Entrepreneurial Incubator Center within 5 years. That is to stop reliance on and foreign assistance while continuing to provide assistance to new entrepreneurial initiatives of Mali related to the agricultural sector.

QUANTITATIVE INFORMATION

1. Approximately how many – by gender and age – host country nationals have been trained through partnership activities (e.g., degree programs, certificate programs, seminars, workshops, extension days, etc.)?					
This period (October 1, 2005 – September 30, 2006)			Since the beginning of ALO/HED funding (including this period)		
	Less than 25 yrs old	25 yrs or older		Less than 25 yrs old	25 yrs and older
Females	1	2	Females	1	2
Males	1	5	Males	1	5
Total	2	7	Total	2	7
<p>Purpose and length of the training: Please briefly describe the purpose and length of the training: 2 weeks training in Mali was provided for the IER plant pathology technicians (less than 25 year old category) by HED participant Aissata Thera and Montana State University Dr. Barry Jacobsen. These 2 IER-Sotuba technicians learned how to use and interpret ELISAs to determine the race of bacterial wilt-causing organism present and how to field inoculate to verify the presence of the race (bioVAR) of the disease.</p> <p>For the category 25 years of older, the anticipated length of training is 2 years, but this will depend on the receiving of parallel funding. These training programs are degree and certificate programs. Specifically, they are: <u>Assa Kante</u> who obtained training at Montana State in this reporting period in Agricultural Extension Education, Holistic Thought and Management, research methods and publication, statistical analysis, and grant writing. She will be defending her M.S. thesis in <u>Belco Tamboura</u> received training in business communications (from UST) and critical path management (from Montana State). From UST, he received a graduate certificate in Business Communications, August 2006. In September 2006 he began a comprehensive synthesis process that should lead him to development of a business plan for the Incubator Center. <u>Sidy Ba</u> received training in light manufacturing and mechanical engineering. He has completed the first draft of his M.S. research proposal in Environmental Engineering at Montana State. <u>Aissata Thera</u> received training in formal courses concerning greenhouse construction, bacterial wilt, medicinal plants, and general concepts of plant pathology. She has completed the first draft of her M.S. in plant pathology. <u>Keriba Coulibaly</u>, received training in English (under parallel funding), crop genetics, and research methods, specifically insect bioassays, mass culturing of insects, and legume DNA extraction and PCR/gel electrophoresis analysis. <u>Abdoulaye Camara</u> received training in English (under parallel funding), critical path management, and research methods as well as microbial DNA extraction, PCR/gel electrophoresis analysis, and DGGE for microbial community analysis. <u>Adama Berthe</u> received training in English (under parallel funding), critical path management, meristem culture development, research methods, and seed potato production management.</p>					

		This period (October 1, 2005 - September 30, 2006)	Since the beginning of ALO/HED funding (including this period)
2.	How many exchanges* has the partnership supported for host country participants? (These figures should be a subset of the total in question #1 above.) <i>* Partnership-related trips to the United States.</i>	Faculty: Undergraduate Students: Graduate Students: 5 Administrators: 1 <u>Others:</u> Total: 6	Faculty: Undergraduate Students: Grad Students: 12 Administrators: 3 <u>Others:</u> Total: 15
<p>Purpose and length of the exchange(s): All those 7 participants who were selected to come to the U.S. arrived in the previous reporting period. Their work in this reporting period is recorded in quantitative item #1. In addition, Aissata Thera who returned to Mali in March on HED funding for 2 weeks to begin her thesis research. Assa Kante and Sidy Ba returned to Mali in March for 2 weeks also for the same purpose. Assa Kante returned for 5 weeks in June and July 2006 to conduct her M.S. thesis research. Aissata Thera returned for 3 weeks August 2006 to continue her in Mali thesis research. These HED participant travel expenses were on parallel funding or personal funding and not HED funds. Their stipends during this time, however, were from HED. Therefore, because of the partial support, these partnership trips are counted as exchanges.</p> <p>In this reporting period, Dr. Fafre Samake attended HED annual meetings, and on-site visits to UST and Montana State, August 2006.</p>			
3.	How many exchanges* has the partnership supported for U.S. participants? <i>* Partnership-related trips to the host country</i>	Faculty: 3 Undergraduate Students: Graduate Students: Administrators: 1# <u>Others: 0</u> Total: 4	Faculty: 5 Undergraduate Students: Graduate Students: Administrators: 2 <u>Others: 1</u> Total: 8
<p>Purpose and length of the exchange(s): This reporting period only two faculty members (Dr. Florence Dunkel [Nov 05, Mar 06] and Dr. Barry Jacobsen [Mar 06]) traveled on HED funding and #one of these (FD) was also an administrator (project director). Other trips were made by Dunkel, Dr. Camille George, Dr. Dean Drenk, and Dr. Robert Gilbertson, but these were on parallel funding.</p>			
4.	How many times has your partnership consulted/collaborated with a host country <u>government</u> entity/organization? We work closely with IER and IPR/IFRA. All but one of the 7 HED participants are tenured scientists/engineer with one of these government organizations.	Many times, weekly (approximately 48)	Many times, weekly (approximately 168)
5.	How many times has your partnership engaged in <i>policy</i> initiatives in the host country during this reporting period (e.g., taken part in government-sponsored panels, written public policy position papers, consulted with Ministry of Education officials)?	none	none
6.	How many new degree programs has your partnership established?	none	none
Please indicate the type of degree program(s) (e.g., AAs, BAs, MAs, MSs, PhDs) and field(s):			

		This period (October 1, 2005 - September 30, 2006)	Since the beginning of ALO/HED funding (including this period)
7.	Has your partnership leveraged additional resources, beyond the originally proposed cost-share, to deepen and expand collaborative efforts?	Estimated total dollar amount: \$305,600	Estimated total dollar amount: \$753,600

	This period (October 1, 2005 - September 30, 2006)	Since the beginning of ALO/HED funding (including this period)
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Listed separately with estimated dollar amounts:

Tuition waivers from Montana State University for Assa Kante, Sidy Ba, and Aissata Thera, Fall Semester est. \$20,100

Tuition waivers from ACE Language Institute. Est. \$12,600. 3 HED participants for Fall Semester 2006 plus summer session 2006 Est. \$8,400.

41 copies of 3-dimensional, computer-assisted design software (SolidWorks) from Symmetry Solutions for collaborators at the national engineering university (ENI) and the national agricultural university (IPR/IFRA). Est. value \$6,000 per package, \$246,000 US total.

6 laptop computers plus software est. value. \$7,500.

1 trip to Mali and per diem for mentor from Montana State College of Business, Dr. Dean Drenk, est. \$3000.

Plant Pathology supplies, including media, ELISA kits estimated \$1200 from Dr. Barry Jacobsen for use in plant pathology laboratory in Mali. Similar supplies for use in laboratory at Montana State. Est. \$1200. Total, Est. \$2,400.

Molecular biology supplies for DNA extraction, PCR/gel electrophoresis analysis related to microbial work of Sidy Ba and Abdoulaye Camara and legume work of Keriba Coulibaly in laboratories of Dr. Warren Jones, Dr. Mark Burr, and Dr. Norm Weeden, respectively. est. \$3,600.

EPScor funding \$2000.

A portion of the funding used for faculty travel international and on the ground in Mali (Dr. George, Dr. Gilbertson, and Dunkel visit March 2006) and for travel of undergraduates assisting participants Assa Kante and Sidy Ba came from parallel funding, not HED funding. This was included in the parallel grants from USDA Higher Education Challenge grant and the USDA Secondary Education Challenge grant listed in previous HED annual reports

If you have any additional information or comments about your partnership that you would like to share, please do so here or as an attachment:

Spring semester 2006, HED participants, Sidy Ba (left) and Belco Tamboura (right) contemplating development of the Engineering Section of the Mali Agribusiness Entrepreneurial Incubator Center with Mechanical Engineering Professor Dr. Camille George during the HED participants training at University of St. Thomas University, St. Paul MN. At this particular moment, they are participating in the weekly meetings (phone conference) of the UST and Montana State teams. Meeting is in Communications Professor Dr. Kevin Sauter's office (Dr. Sauter is taking the photo).



April 8, 2006. Minnesota HED participants, Sidy Ba and Belco Tamboura and Agribusiness team meet with Mali Tuareg band during the Minnesota Mali Night celebration.



May 19, 2006. Sidy Ba completes semester of: 1) broad-based preparation for leader of the Engineering Section of the Agribusiness Incubator with classes in manufacturing, project management and computer aided design; and 2) research collaboration with his mentor Dr. Camille George, undergraduate students (externs in the USDA project) and other faculty in the Department of Mechanical Engineering at University of St. Thomas (St. Paul, MN). Sidy Ba, Belco Tamboura, Dr. Kevin Sauter and Dr. Camille George met with Dr. Thomas Rochon, the Chief Academic Officer at UST. During this meeting Dr. Rochon announced the gift of two laptop computers for Ba and Tamboura.



**Please be sure to share your progress reports with your primary contact(s) at the host country
USAID Mission.**