TRIP REPORT

August 6-13, 2009

Workplan Finalization: African Food Security Initiative (AFSI)- Quality Food Production, Availability and Marketing Project

Rice Component: Mali

USAID /EGAT/AG- Funded Project for Senegal, Mali and Uganda

Award EDH-A-0-0-08-00015-00

LWA #EPP-A-00-04-00016-0

E. A. 'Short' Heinrichs, Consultant, VA Tech

Ozzie Abaye, Agronomist, VA Tech

Women weeding rice in the 130 ha USAID /IICEM rice project (Plaine Rizicole des Femmes de Niena) at Niena village, Sikasso Region, Mali. Note child at left and baby on back of woman at right.

Executive Summary

The objective of this trip was to obtain information to facilitate the development of a final workplan for the Mali components of the IPM CRSP: African Food Security Initiative (AFSI)-Quality Food Production, Availability and Marketing Project, Award Number EDH-A-00-08-00015-00. A draft workplan had been previously developed which included (1) Objectives, (2) Activities, (3) Participating Institutions and scientists (US, Mali and Senegal) (4) Expected outputs and (5) Year 1 task timelines. This trip provided the opportunity to develop a more detailed workplan which includes experiment al plans and the scientists involved in each component.

The trip included meetings at our hotel in Bamako with scientists of IER (Institut d'Economie Rurale), visits to Niena village women's rice project and M'pegnesso village, both in Sikasso region; IER Sikasso Station in Sikasso; OPIB (Office du Perimetre Irrigué de Baguineda) in Baguineda; IER Station in Sotuba and the USAID AEG team at the USAID Mission in Bamako.

A table provides a list of sites, agencies and persons visited. A photo gallery provides a visual snapshot of agencies and persons visited farmer activities and constraints to production.

The major constraints according to the meetings with IER scientists and farmers were in order of importance as follows: **Niena Women's Project**: Rice Yellow Mottle Virus (RYMV), insects soil fertility and shortage of seeds of high yielding and RYMV resistant varieties. Note that weeds are not considered as constraints as they feel that the problem can be managed by hand weeding. However, weeds appeared to be causing severe yield losses as rice plants in weeded fields were stunted due to weed competition prior to weeding and were damaged in the weeding process (see photos). **M'pegnesso village**: RYMV, a type of disease (unidentified) that stunts and kills young plants (4-5" tall) (a bacterial disease, "kresek like"? …they emphasized the seriousness of this particular "disease"), shortage of seeds of high yielding and RYMV resistant varieties, rice "blast" *Pyricularia oryzae, Helminthosporium oryzae* (brown leaf spot), stemborers and termites. **OPIB Baguineda:** RYMV, AfRGM (African Rice Gall Midge) and shortage of seeds of high yielding and RYMV and AfRGM resistant varieties.

Activities of the AFSI project in Mali based on Objective 1 of the proposal "Increase the agricultural productivity and availability of rice" will involve Activity 1.1: Develop IPM packages for local certified rice seed in Mali and the following tasks:.

Task 1: Risk evaluation for rice yellow mottled virus (RYMV) in certified rice seed.
Task 2: IPM Package proposed for testing
Task 3: Quick test of RYMV for certified seed
Task 4: Seed Production
Task 5: Begin first IPM tests
Task 6: Rice IPM workshop

This report concerns primarily tasks 2, 4 and 5. Tasks 1 and 3 will be handled by Sue Tolin and Bob Gilbertson who will be visiting Mali in September. Larry Vaughan will handle task 6.

Based on the perceived constraints to rice production at the three sites a workplan has been developed in collaboration with the IER and IICEM collaborators to cover tasks 2, 4 and 5. The workplans need further development by IER and IICEM collaborators to fill in the details of each experimental plan but a general outline of activities is included in this report. **OPIB Baguineda**: Abdoulaye Hamadoun has developed a plan to conduct a survey and prepare a map

indicating the spatial distribution and intensity of insect and disease damage throughout the OPIB Baguineda (Elaboration d'un Référentiel Spatial pour le suivi des nuisibles du riz dans le Périmètre Irrigue de Baguineda). **Niena Women's Project**: Demonstration plots using the best management practices available for lowland rice production will be established. Components will include the monitoring of rice pest and disease intensity and rice plant damage and populations and the cultural management of insects, diseases and weeds with emphasis on RYMV. Also, seed production activities will be conducted in Niena with the women's farmer group. The seed production workplan will be developed by and the demonstration and training activities conducted by IICEM. **M'pegnesso village:** Demonstration plots using the best management practices available for lowland rice production will be established. Components will include the monitoring of rice pest and disease intensity and rice plant damage and populations and the cultural management of insects, diseases and weeds with emphasis on RYMV.

Introduction

The objective of the trip was to meet host country collaborators in Mali to determine the pest constraints affecting rice production in the Baguineda and Sikasso Regions so as to finalize the workplan for the USAID/EGAT/AG- funded project, African Food Security Initiative (AFSI) - Quality Food Production, Availability and Marketing Award Number: EDH-A-00-08-00015-00. Our major goal for this trip was to establish a collaborative "project" that would address constraints associated with rice production.

Food security in Africa requires interventions that will: a) improve agricultural productivity and availability of key food staple commodities and b) alleviate trade bottlenecks caused by sanitary/phytosanitary issues. Interventions to improve productivity necessitate development and extension of science-based food production methods to increase yields, reduce crop risks and lay the foundation for long-term productivity growth.

An Associate Award for three years was provided to the IPM CRSP with the following objectives:

- Increase the agricultural productivity and availability of rice
- Increase the agricultural productivity and availability of tomato
- Increase the agricultural productivity and availability of maize/millet
- Develop disease diagnostics for key food commodities
- Alleviate trade bottlenecks in key food commodities and reduce sanitary/phytosanitary risks from a trade standpoint

This report targets primarily the first objective and discusses the constraints to rice production and recommends activities that should be included in the final workplan.

Activities July-7-13

Date	Contact/met with	Activities/Discussions
July 6th and 7th		Left Blacksburg/Nebraska on the 6th for Mali via Paris and Arrived in Bamako on the 7th
July 8th	• Madame Gambye – Sotuba – Entomologist • Abdoulaye Hamadoun – Director IER – Sotuba – Entomologist -	**Rice**: In **Sikasso** – low-land/upland rainfed and river flashed **Bargained –** Irrigated rice **–** Major rice production constraints include **Rice Yellow Mottle Virus (RYMV), insects and fertilization**. Madame Gamby and Abdoulaye mentioned several key players in rice production. Sikasso: Yacouba Doumbia (low-land rice program leader Agronomist; Cisse (Breeder); Moro Traore – Plant pathologist; Abdoulaye Hamadoun – Entomologist; Kaliffa Yettara – weed scientist

3 PM	• **Niamoye Yaro Diarisso** – Scientific coordinator for irrigated crops including rice – IER – Bamako - Entomologist	1. Potential project: Inventory of constraints. Abdoulaye Hamadoun gave us an outline of his proposed project (involving the mapping of OPIB farmers' field for biotic constraints (diseases, insects and weeds) and also a survey their general production practices (weed control, fertilization, variety….). 2. Also discussed the relationships between blister beetle and grasshopper Dr. Diarisso – discussed her millet program and the research program she has been leading to control millet stem borers. Millet is more susceptible to stem-borers compared with sorghum and corn (less infected – millet>sorghum>corn). She also mentioned higher population of stem-borers in northern regions (drier). Her experiment involved using various grasses as a trap, in this case **big bluestem** (*Andropogon* spp.) and **Pennisetum** spp. The big bluestem or **Pennisetum** is planted in three rows around the millet (10-15 rows of millet plants). However, they found big bluestem to be more effective in trapping stem-borers than *Pennisetum* spp.. Due to its perennial nature and deep rooted system, bluestem can provide excellent ground cover (soil conservation) and add organic matter to the soil. Also discussed the push/pull program for crop protection – the concept was developed in Kenya. This technique/program can be used for any field crop depending on location. The main crop can be maize, sorghum or millet. Two grass types are used in the program one to attract the insect (lay eggs on grass – grass not suitable host so the egg will die) – PUSH; second grass – used as insect repellent – PUSH . The main crop is crown in the middle while the push and pull plants are grown in –rows the opposite end of the corn rows. Research had shown higher level of infestation in the control than where the push-pull technique was implemented. Also discussed IER programs. Program related to the major crop in that region: 1. **Sikasso**- Main crops – Cotton and low-land rice. Secondary crops – millet, sorghum, fruit, vegetables. 2 Bamako/Koulikro: Sorghum, livestock ,poultry, fruit and vegetables

		3**. Segue (two centers)** • Niono – Main research center – major crop irrigated rice - shallow standing water and flooded (deeper water level – most plant in under water). Also: livestock, and vegetables. • Signania (second center) main crop millet grown alone and intercropped with cowpea. 4. Samanko (North) – a center for testing and re-modeling agricultural equipments (for seeder, harvester, plowing/disking…). 5. Mopti – Major agricultural enterprises: flooded rice and fish Six IER coordinators for: Irrigated crops and vegetables (Niamoye Yaro Diarisso); Environmental issues; Dryland agriculture Livestock and forages; Farming systems (Lassine Diarra);Technology and Gender (Mohamed Ndiaye)
July 9th	Sunday	E-mail, report preparation and planning for the Sikasso trip.
July 10th	Harouna Yossi (IER – Sikasso Station Research Director) – Ingenieur des Eaux Forets; m Yacouba Doumbia (Agronomist), Fagaye Sissoko (cover crop specialist)	Traveled from Bamako to Sikasso. On the way to Sikasso we visited two farm communities (Niena and M'pegnesso). In the field, we met a group of women (from Women's Cooperative Association for Rice). Approximately 150 women managing 103 ha. We thought the women owned the rice fields, later we learned that at this particular location, the women (through their association) are hired to weed the rice field. The women can earn 10,000 CFA/ha for weeding and or seeding (the contracts between the farmers and the women organization can be written for weeding and/or seeding). **Niena:** The women at Niena identified a few problems associated with rice production. The major problems identified by the women were: RYMV, insects, and soil fertility. The women explained that when fertilizer is used as NPK (at 100 kg/ha – the amount of each element not known), no effect on RYMV. However, when urea is used as nitrogen source, the incidence of RYMV is reduced. Why? We think that the Urea source provides more nitrogen (46% N) where the amount of nitrogen in the NPK blend fertilizer not known. The effect of nitrogen fertilization on RYMV is indirect. That is, nitrogen fertilization can boost plant growth – robust/healthy plant can "fight

		off" potential disease …or as Dr. Mamadou Doumbia (soil scientist - Sotuba) said that the farmers always associate plant disease and resulting yield reduction to soil fertility. They say the problem is " in the soil". Thus – identification of nutrient deficiency symptoms as well symptoms caused by disease and insects are crucial. He agreed that nitrogen application will help the plant tolerate the RYMV infection. **M'pegnesso**: Farmer organization included both men and women. Rice area is 600 hectares - rice yields range from 1-1.5 T/ha. Most of the rice production follows rice after rice with the exception of potatoes following rice at a much lower scale. The lack of moisture is a limiting factor to growing 2 row-crops/ season. The farmers identified a few problems/constraints associated with rice production: **A. Pests and Diseases (in order of economic importance)** 1. RYMV 2. A type of disease (unidentified) that stunt and kill a young plant (4-5" tall). A bacterial disease, "kresek"?: They emphasized the seriousness of this particular "disease". 3. Rice "blast" *Pyricularia oryzae* 4. *Helminthosporium oryzae* (brown leaf spot) 5. Stem-borers – most evident in rainfed rice fields 6. Termites Approximately 10% of the rice planted is of a local variety. Old varieties being grown are Nologani Ovekerman, Bambrini, Dangana Saumani, Kono Niedembo, Kadai Kone and Denkratia (BR 4). New rice varieties being grown include: Sik350 A 150; Sik 353 A 10; Sik 131.KA and Khaodawk Mali 105. Khaodawk Mali 105 – very susceptible to stem-borers. Nerica -4 (upland variety) widely grown in Mali. Nerica L-1 and L-2 for lowland rice not available due to lack of seed. **B. Nitrogen fertilization**: Nitrogen fertilization vs RYMV or other diseases: generally nitrogen fertilization improves plant health thus plant "fight off attach by disease". However, nitrogen fertilization does not improve yield if significant number of plants are already infected i.e. regardless of N fertilization the productivity of the infected plant remain less than that of the healthy plant.
July 11th	• Madame Gambye IER – Sotuba –Entomologist	**AM - Sikasso**: Met with the center's director as well as researchers - Short explained the purpose of our trip and potential small plot

	• Mamourou Diourte – Head of Sorghum Improvement Program – INTSORMIL – coordinator Abdoul Wahab Toure – IER-Sotuba – Sorghum Program Madame Gambye and Abdoulaye Hamadoun – IER - Sotuba	(demonstration type) study comparing BEST practice (including fertilization, variety, pest control methods (disease, insect, weed) with the typical farmer practice. Once again, the shortage of resistant rice varieties, nitrogen fertilization and disease pressure came up as yield limiting factors. PM- **Baguineda** . At the site, we observed RYMV resistant as well as tolerant varieties. We observed several plants affected by **gall midge (*Orseolia oryzivora*)** . It was obvious that tillers attacked by gall midge do not produce panicles. However, would galled plants produce more tillers to compensate for loss of panicles/growing points? In Baguineda, RYMV and gall midge (AfRGM)at the two most severe pest constraints. Met several farmers at the field and looked at very well managed irrigated rice fields. Gall midge was the most noticeable disease in the field. Observed minor caseworm damage. The farmers pointed out several stunted/dead plants (the symptom of those stunted/dead plants closely resembled the symptoms described by the farmers at the **M'pegnesso** location. Dr. Hamadoun was evaluating rice varieties IT 306, DKA 5, DKA 22, DKA 32 AND DKA 34. **Project planned by A. Hamadoun for OPIB, Baguineda:** Survey of constraints (involving mainly survey of farmer fields for diseases, insects and also survey their general production practices (weed control, fertilization, variety….). A map indicting locations of constraints within OPIB will be developed.
July 11th		Visited Sotuba (AM) – Visited the director of the seed testing lab and the lab. We explain to him IPM-CRSP overall objective and the interest in improving seed quality (seed for consumption and seed – planting). We asked the seeds labs role in providing training program for the farmers. He said the training program is provided mainly to selected farmers who produce seeds (for planting). They receive seeds from all the regions and they do seed analysis to remove impurities (red rice, weed seeds) and also grade seeds to a lesser extent (high, low quality).

July 12 – PM	***USAID – Bamako*** • USAID personnel: Gaoussou A. Traore - Program Management Specialist AEG(conducted the meeting) • Yacouba Santara, Program Specialist AEG • Baou Diane, Project Management Specialist, AEG Madame Gambye – IER, Sotuba Jean Francois Guay, Director – IICEM/Abt Associates Yacouba Kadari Traore, Technical Coordinator- IICEM/Abt Associates	Short started the meeting by explained the role of IPM-CRSP in rice and tomato production. He also brought up the issue of new seed variety availability for the farmers and how to increase the production of those disease/insect resistant varieties and how we can collaborate. Gaoussou Traore (USAID) mentioned an ongoing effort (AID-supported) to establish and maintain n seed foundation. He also emphasized that IICEM is doing a lot of work in the areas of seed quality improvement and suggested that we closely link our effort with IICEM (and the new seed foundation). Jean Francois Guay (IICEM) said they will be happy to provide training (farmers) and collaborate with IPM-CRSP in any effort to improve quality of rice for both consumption ad seed.

IPM-CRSP collaborators met

Farmers Associations

- Women and men's association – Sikasso Region- Nieno and M'pgenesso
- Men farmers association (irrigated rice) – Baguineda

IER

- Madame Gambye IER – Sotuba -Entomologist
- Abdul Ahab Toured – IER- So tuba – Sorghum Program – Agronomist
- Abdoulaye Hamadoun – Director IER – Sotuba – Entomologist -
- Niamoye Yaro Diarisso – Scientific Coordinator for Irrigated Crops – IER – Bamako – Entomologist
- Harouna Yossi - IER – Sikasso Director – Ingenieur des Eaux Forets.
- Madame Thera - Baguineda - Plant pathologist
- Dembele – weed scientist
- Yacouba Doumbia - Sikasso -low-land rice program leader - Agronomist

- Mr. Cisse – Sikasso - Breeder

USAID Meeting

USAID personnel

- Gaoussou A. Traore - Program Management Specialist (conducted the meeting)
- Yacouba Santara - Program Management Specialist
- Baou Diane – Project Management Specialist

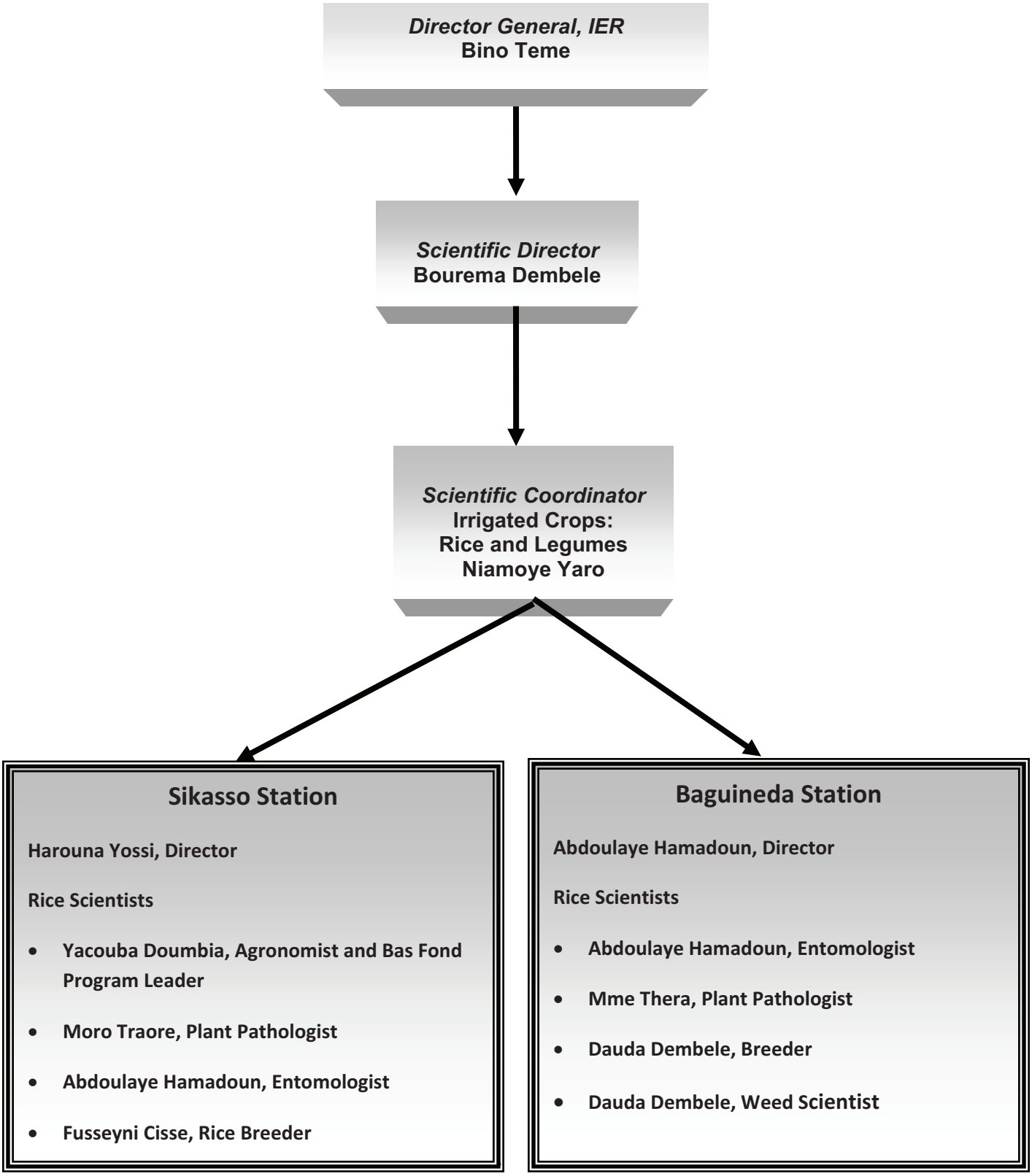
IER Personnel

- Madame Gambye – Entomologist, IER Sotuba
- Mamourou Diourte – Head of Sorghum Improvement Program – INTSORMIL - coordinator

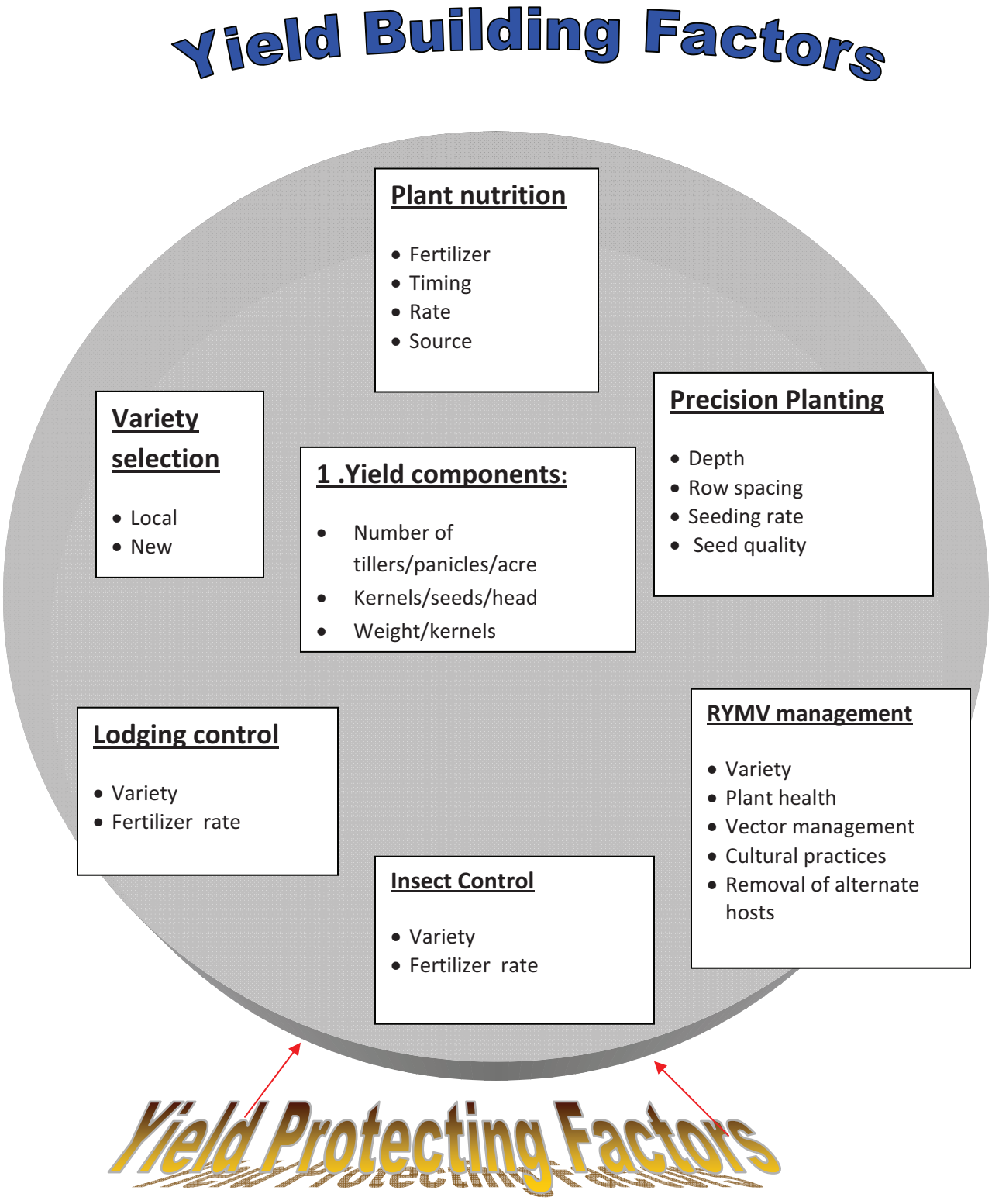
IICEM

- Jean Francois Guay, Director – IICEM/Abt Associates Djiguiba Kouate
- Yacouba Kadari Traore, Technical Coordinator- IICEM/Abt Associates
- Djiguiba Kouyate, Responsible for Rice/tomato production project, ACDI/VOCA

IER Program Coordination



Factors to be considered in the development of demonstration plots at Niena and M'pegnesso



Proposed Workplan

Objective 1: Increase the agricultural productivity and availability of rice.

Activity 1.1: Develop IPM packages for local certified rice seed in Mali.

Participating Institutions and Scientists
IER, Mali; IICEM; VT: Short Heinrichs, Bob Gilbertson and Sue Tolin.

This project will develop and test IPM packages for local certified rice seed production associated with improved varieties promoted by USAID/Mali's ICEM project.

U.S. and host country IPM CRSP scientists will conduct brief participatory appraisals, which will include interactions with farmers, marketing agents USAID missions, and WARDA scientists among others to help prioritize the adaptive research program aimed at IPM rice packages.

Expected Outputs
1. Rice IPM package designed and tested for high-value rice seed (October 2010)2009
2. Capacity building workshop on rice IPM technology development (joint Senegal/Mali).
3. Short term training for IPM rice scientists completed (March 2010)

Year 1 Task Timeline

	Task	PI	Month/Year
Task 1	Risk evaluation for rice yellow mottled virus (RYMV) in certified rice seed.	Sue Tolin Bob Gilbertson	2009
Task 2	IPM Package proposed for testing	Short Heinrichs	2009
Task 3	Quick test of RYMV for certified seed	Sue Tolin	2009-2010
Task 4	Seed Production	IICEM	2010-2011
Task 5	Begin first IPM tests	IER Scientists	2010
Task 6	Rice IPM workshop (same workshop as Task 1 Activity 1.2)	ISRA and IER	2010

Task 1: Risk evaluation for rice yellow mottled virus (RYMV) in certified rice seed.

U.S. PIs: Sue Tolin and Bob Gilbertson

Site: Sikasso (Niena women farmers' group)

Budget

Item	Yr 1, 2009-2010	Yr 2, 20010-2012	Total
Transportation			
Supplies			
Salaries			
Communications/publications			
Total			

Task 2 and 5: IPM Package Proposed and Tested

U.S. PIs: Short Heinrichs and Ozzie Abaye

Baguineda Site

Study 1: Survey of Rice Pests in the Irrigated Perimeter of Baguineda

Elaboration d'un Référentiel Spatial pour le suivi des nuisibles du riz dans le Périmétre Irrigué de Baguineda (PIB)

Major problems: (1) RYMV and (2) AfRGM

Question Principale:

Quelles sont les zones les plus infestées par les dégâts causés par les insects et les maladies du riz dans les PIB?

Questions specifique:

1. Quel dispotif approprie pour assurer le suivi de la distribution spatiale des nuisibles sur l'ensemble des PEB?

2. Quels sont les points de concentration des differents nuisibles?

3. Quel est l'impact des pratiques agricoles sur l'infestation des parcelles par les nuisibles?

Cadre Pratique

1. Etablir un fond de carte numerique des PIB

2. Positioner les parcelles des exploitations connues sur le fond de carte numerique

3. Sur cette base, proposer un enchantillon de parcelles repartees de facon homogene a lechelle du perimetrer

4. Identifier ces parcelles et leurs exploitants sur le terrain

5. En collaboration avec les specialists du riz, collecter des informations sur les insects, les maladies (weeds?) pratiques culturales des exploitants

6. Stocker, traiter et presenter ous-formes cartographjiques et graphiques les informations collectees.

Date of monitoring: August – November

Sites: 0.6 ha fields of 30 farmers will be monitored

Budget

Item	Yr 1, 2009-2010	Yr 2, 20010-2012	Total
Transportation			
Supplies			
Salaries			
Communications/publications			
Total			

Study 2: Demonstration of Best Management Practices for Lowland Rice Production

Sikasso Site

Villages: Women's farmer groups in M'Pegnesso and Niena

Collaboration: With IICEM

Major problems: (1) RYMV and (2) an unidentified agent causing wilting of young seedlings (bacteria, kresek?)

Demonstration Sites: Five .25 ha demonstration plots will be established in each village. Acivities at each site village will be similar. Components 1 and 2 will be conducted in the same plots.

Component 1: Survey of Rice Pests

Insect pests

- Sweep net (and aspirator) collections biweekly for mobile insects including RYMV vectors

- Visual observations for AfRGM and stem borer (deadhearts and whiteheads)

- Note any termite damage and identify termite species to determine their damage potential

Diseases (visual observations to determine % plants attacked)

RYMV
Blast (*Pyricularia oryzae*)
Helminthosporium sp.
Cercospora sp.

Component 2: Cultural Management of insects, diseases and weeds with emphasis on RYMV

- Varietal selection (resistant or tolerant to RYMV). Compare a traditional with a new variety
- Nursery management
- Planting procedures
- Soil fertility
- Destruction of alternate hosts
- Manual weeding as needed

Plant growth and yield components will be recorded

Component 3: Technology Transfer

Field days and demonstrations

Budget

Item	Yr 1, 2009-2010	Yr 2, 20010-2012	Total
Transportation			
Supplies			
Salaries			
Communications/publications			
Total			

Task 3: Development of a rapid immunostrip assay for detection of RYMV in rice plants and seed for certified rice seed production.

U.S. PI: Sue Tolin

IER Scientists at Sikasso

Sikasso Site

Villages: Women's farmer groups in M'Pegnesso and Niena

Task 4: Seed Production

Sikasso Site: Seed production activities will only be conducted in Niena with the women's farmer group.

Responsibility: The workplan will be developed and the demonstration and training activities will be conducted by IICEM.

Budget

Item	Yr 1, 2009-2010	Yr 2, 20010-2012	Total
Transportation			
Supplies			
Salaries			
Communications/publications			
Total			

Task 6: Rice IPM Workshop

Venue: This could be held in conjunction with the African Rice Congress sponsored by WARDA, The African Rice Center and IER to be held in Bamako, March, 2010.

Budget

Item	Yr 1, 2009-2010	Yr 2, 20010-2012	Total
Transportation			
Supplies			
Salaries			
Communications/publications			
Total			

Photo Gallery

Sikasso and Baguineda Regions, Mali, 8-12 August 2009

IER Scientific Coordinator Irrigated Crops (Rice and Legumes), Niamoye Yaro (l) and Virginia Tech Agronomist, Ozzie Abaye at hotel meeting, Bamako, Mali.

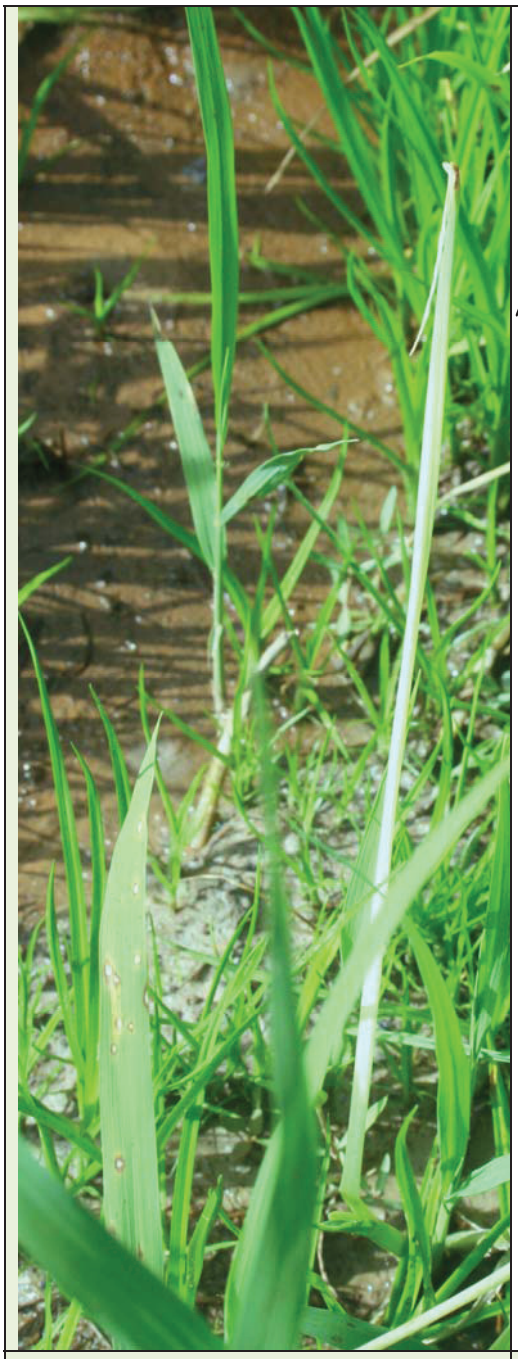
Niena village, site of the 130 ha women's rice project supported by USAID/IICEM.

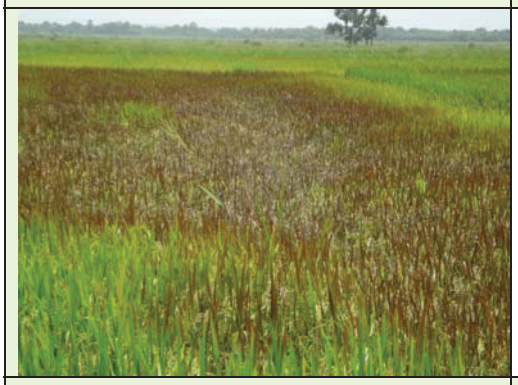
Leader of the Niena village women's rice project supported by USAID/IICEM.

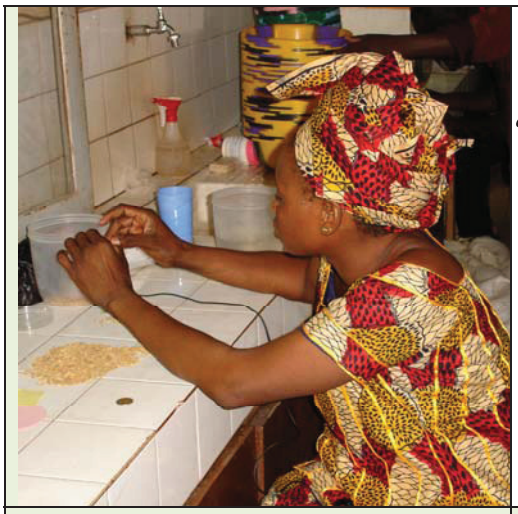
	"Weeds, the scourge of rainfed lowland rice production" Weeding at the Niena village women's rice project. Woman at left has a baby on her back.
	M'pegnesso village women rice farmers.
	M'pegnesso villagers explaining their constraints to rice production with IER scientists.
	"Panichure jaune" or Rice Yellow Mottle Virus (RYMV) infected plant at M'pegnesso village. Note yellow, rusty color.

	Harvesting rice with a sickle in M'pegnesso village.
	Meeting the IER Sikasso Station Research Director Harouna Kossi (right). Djiguiba Kouyate, IICEM/ACDI VOCA (left) provided our transportation to Sikasso.
	Moro Traore, IER Sikasso plant pathologist in front of a diagram depicting the transversal profile of a bas fond (lowland rice production area) showing the hydromorphic area.
	Mme Gambye, IER Sotuba Entomologist and Abdoulaye Hamadoun, IER Sotuba Station Director and Rice Entomologist discussing rice pest problems (RYMV and AfRGM) occurring at the OPIB (Office des Périmètres Irrigués de Bagwineda) (Bagwineda Irrigation Scheme Intensification Project)

	Nursery to produce seedlings for varietal resistance screening to the African Rice Gall Midge (AfRGM) Orseolia oryzivora at the OPIB, Baguineda. Dr. Abdoulaye Hamadoun is the project leader.
	OPIB Baguineda rice farmer explaining his pest constraints to rice production.
	Panichure jaune (Rice Yellow Mottle Virus) infected plant at OPIB, Baguineda. Note the yellow leaves.

	"Silver shoot" or "onion shoot" (gall) caused by the African Rice Gall Midge (AfRGM) Orseolia oryzivora at the OPIB, Bagwineda. The adult fly emerged through a hole produced by the larva before pupation near the tip and the tip above the emergence hole is broken and hanging down.

	Feeding damage (removal of the chlorophyll layer) caused by the caseworm larva Nymphula sp. At OPIB, Baguineda.
	Unidentified damage (disease?) to rice in the OPIB, Baguineda.
	Cleaning rice seed in the IER Laboratoire des Semences Sotuba.

	Removing impurities (red rice seed etc) and grading rice seed for certification in the IER Laboratoire des Semences Sotuba.
	The "benefactors" of rice technology transfer. Children of M'pegnesso village attending the meeting with parents where the farmers discussed their constraints to rice production and explained their needs regarding rice production technology.
	"Malian sunset"