

Report on Trip to Mali
August 12 - 19, 2000

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SM-CRSP Project *Decision Aids for Integrated Nutrient Management*

Traveler:

Frank M. Hons - Texas A&M University

Objectives:

The primary objective of this travel was to review progress for the 2000 cropping season for the millet/cowpea core study and the Ca and Mg movement study. Secondary objectives were to obtain any additional available information for the 1998 and 1999 cropping seasons, clarify information received by Frank Smith and Dan Israel, and discuss plans for future collaboration.

Itinerary:

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| August 12 - 14 | Travel to Bamako |
| August 14 | Discussions with Dr. Mamadou Doumbia and Mr. Adama Coulibaly in Bamako |
| August 15 | Sotuba Station; discussions with Mamadou Doumbia, Adama Coulibaly, Lassine Diarra; travel to Segou (Cinzana Station) |
| August 16 | Toured on-farm trials related to NuMaSS, composting, placement, etc near Dougouba and Cinzana Village; met with farmers |
| August 17 | Observed and reviewed core experiment, Ca and Mg movement study, and other studies at Cinzana Research Station |
| August 18 | Sotuba Station; discussions with Mamadou Doumbia, Adama Coulibaly, Abou Berthe, and others |
| August 18 - 19 | Return travel to College Station, TX |

Report:

The first morning in Bamako was spent reviewing the activities of Dr. Mamadou Doumbia and his associates who are conducting the core experiment, the Ca and Mg movement study, and numerous additional on-farm and research station studies in Mali. Dr. Doumbia provided a program overview with four primary objectives in support of SM-CRSP: 1) laboratory analyses, 2) on-station and on-farm experiments, 3) validation of NuMaSS model, and 4) survey of price fluctuations of inputs and outputs. The lab analyses are in support of the core experiment, the Ca and Mg movement study, and NuMaSS predictions. All 1998 soil samples have been analyzed from all studies at all depths and samples from the first sampling depth from 1999 have been completed. Analyses were delayed because of a lack of KCl used for extractable Ca, Mg, and Al and exchangeable acidity. A shipment of KCl was recently received from Lloyd Hossner. A deadline of September 30, 2000 was established for all lab analyses and associated reports.

On-station experiments include the core study, Ca and Mg study, manure and compost placement studies, P rate/residual availability study, and others. On-farm trials include, among others, compost and inorganic fertilizer placement and comparison of NuMaSS predictions with Mali's standard fertilizer recommendation and recommendations using the Dutch quadrant method. Forty-one farmers in the Dougouba and Cinzana areas are participating in these studies, primarily with millet.

Validation of the NuMaSS model is proceeding through the above studies plus additional trials with cowpea, corn, peanut, and cotton. More trials are needed for model validation with cotton and rice since >85% of the fertilizer used in Mali is applied to these two crops. Mamadou is also the co-advisor to a Malian Ph.D. student using the NuMaSS model in his dissertation research in Ghana.

One problem with fertilization of millet and sorghum in Mali is that one kg of fertilizer produces only about three kg of grain. Based on prices of fertilizer and these two grains, this ratio must more closely approximate 12 in order for fertilization to be economical and for the NuMaSS model to have significant impact on millet and sorghum production. A portion of Mamadou's program is now directed to increasing fertilizer efficiency with these crops. He, in conjunction with Frank Smith of North Carolina State University, is also conducting a survey of fertilizer, millet, sorghum, cowpea, peanut, and rice prices to better estimate cost efficiency of fertilization.

Mamadou Doumbia and his group also contribute significantly to graduate student training. He and Adama Coulibaly advise nine M.S. students from the University of Katibougou for six-month internships. These students learn both field and laboratory research techniques and contribute to various research projects.

A draft dissertation proposal from Adama Coulibaly was reviewed. Scores from GRE and TOEFL exams were also reviewed and suggestions made.

Several on-farm trials were visited near the villages of Dougouba and Cinzana, including the farms of Lassana Djire and Saouty Toure. A consistent trend across all farms was that cooperating farmers planted the fields first on which the family depended for food and planted the research trials last. Research trials on average were planted at least three to four weeks after their primary fields, and usually on poorer soils. Practices that introduced confounding, such as planting different treatments on different dates, variable cultivation and so on, were also noted. Lassana Djire was classified as a class D farmer at the beginning of the study. He has increased his animals and equipment and is now rated as a class B producer.

Saouty Toure at Cinzana had good populations of millet on the sandiest soils, but much poorer populations on more loamy soils that contained ~20% silt, possibly due to soil surface crusting. This farmer still had residue from the previous growing season in his fields, which is unusual for Mali. He planted his fields over a sixty-day period. It appeared that with taller plants from earlier planting, a second cultivation for weed control may not be necessary.

Plant populations and weed control at the Cinzana Research Station were very good compared to farmers' fields. Plant population and spacing were excellent on both the heavier and sandier soils of the Ca and Mg movement study. Both these studies were planted on August 1st. The N, P, lime core study was planted on July 25th and had a good plant population. Some of the treatments in 1999 in this study were applied to the wrong plots. Correct application was done in

2000, but confounding effects could occur, especially with P. Early planting of millet in a planting date study showed much greater growth compared with later planting. A P rate study on several soils with different textures showed excellent millet growth response to added P. Residual effects will be determined in future years.

Considerable discussion of a potential soil C sequestration proposal occurred with Mamadou Doumbia, Adama Coulibaly, and Abou Berthe, the new head of the Farming Systems Group at the Sotuba Station. Mamadou suggested a joint proposal of IER, FFEM (French environmental organization), SM-CRSP and Inter-CRSP. Integration of all these groups without excess duplication will be important. Soil C sequestration research/outreach is being stressed by several US agencies, including Congress, USDA, USEPA, and USAID, both nationally and internationally.

Mamadou needs 20 compact disks of NuMaSS version 1.5 to distribute to research and extension personnel for critique and assessment. Russell Yost is traveling to Mali at the end of September and possibly could deliver them.

Much of August 18th was spent discussing questions raised by graduate student Sherry Blanton-Knewton (TAMU), Frank Smith (NCSU), and Dan Israel (NCSU) concerning the cropping systems/rotation study, the survey on price fluctuations of fertilizer and crop commodities, and the core study. Blanton-Knewton's questions were answered and e-mailed to her. I also returned with a diskette and hard copy of the response. Frank Smith was unable to open the price survey file that Lloyd Hossner e-mailed to him after his return from Mali in June. This information was e-mailed directly from Mali to Frank Smith and I also returned with a diskette and hard copy as backup. Dan Israel had several questions concerning labels, treatments, and data from the N, P, and lime core experiment. We discussed each question and I will e-mail the responses to Dan.

Contacts in Mali:

IER-Bamako

Dr. Siaka Dembele, Scientific Coordinator/Advisor

Dr. Floris van der Pol, Scientific Advisor

LaboSEP-Sotuba

Dr. Mamadou Doumbia, Soil, Water, and Plant Laboratory

Mr. Adama Coulibaly, Agronomist

Mr. Sibiry Traore, GIS Specialist

Dr. Abou Berthe, Farming Systems Project Coordinator

Dr. Lassine Diarra, Head of Sotuba Station

Segou/Cinzana/Dougouba

Saouty Toure, farmer-Cinzana

Lassana Djire, farmer-Dougouba

Dr. Toure, cowpea breeder-Cinzana