

**TECHNICAL REPORT**

Reporting Period: October through December 1994

USAID Project No.: PCE-5053-G-00-3058-00

Title: Agronomic and Economic Evaluation of Crop Residues as Feed for Small Ruminants in Niger

Institution: Department of Food Science and Animal Industries and Office of International Programs. Alabama A&M University, Normal, AL 35762

Principal Investigator: Dr. Arthur Felix

**Research Objectives:**

## To determine:

- 1) the profitability of feeding chopped crop residue, simulating the effects of wider application of crop residue on livestock markets, input markets and other related activities;
- 2) the effect of changing the traditional soil amendment uses of residue to small ruminant feed on its market value;
- 3) the degree to which the availability of labor and capital might limit the adoption of the residue as feed; and
- 4) the acceptability of the technique to small-scale farmers.

This is the fourth quarterly report for the above project covering the period of October 1 through December 31, 1994. Although this project completed its first funding year in fall, 1993, the first phase of the research activities did not begin until the month of September, 1994. This delay was due, in part, to political changes in Niger as well as some administrative changes at INRAN, as explained in our previous technical report. This will require that the feeding trials continue through the month of May, 1995.

During the Fall quarter, some major progress was made. Phase one of the project was initiated with the first survey (village survey) being completed, followed by the selection of

ten (10) farmers from each of the two research sites. Survey data were collected and being computerized. The second survey (market survey) is in progress and will continue throughout the end of the feeding trials. Our Nigerien counterparts have had several meetings with the farmers explaining the purposes of the project and various components of the research procedures. The number of farmers who expressed interest in participating in the project exceeded our expectations.

Two survey technicians were hired, trained and placed one per research site. In addition to conducting the surveys, these technicians will work closely with the farmers, assisting them in the preparation of the silages, in feeding the animals and in collecting research data.

The principal investigator, Dr. Arthur Felix, travelled to Niger from December 2 through December 19, 1994 to initiate feeding trial activities and to evaluate progress of ongoing surveys. Upon arrival, he found that most of the equipment and supplies (choppers, drums, feeders, waterers, crop residues, feed supplement) required to start the on-farm research activities had already been purchased and transported to the research sites. Enough crop residues needed to initiate the ensiling process had been chopped by most of the participants.

The principal investigator travelled to the sites in company of his research counterpart in charge of the on-farm trials. Working together with the technicians and the farmers (participants), they made silage for 80 percent of the participating farmers who showed great interest in the process. A copy of the trip report is attached as part of this quarterly technical report.

The principal investigator was particularly pleased with the development of the project, as well as the spirit of unity that was demonstrated among the farmers. The local extension

service expressed special interest in the project indicating that this is the beginning of the widespread use of crop residues throughout the region for livestock feeding. Two of these extension agents offered their cooperation in disseminating the results of the study. The USAID mission in Niamey, also, offered its support by promising to visit the research sites at appropriate times when the feeding trials begin. The new Director General of INRAN, who is an animal scientist from the University of Niamey, expressed special interest in the project and promised his full cooperation.

The next phase, which is the on-farm feeding trials, is expected to begin in January, 1995 upon the purchasing of the animals. Funds will be transferred to that effect.

There is great expectation that the outcome of the project will be more promising than ever before because the Nigerien research team works diligently to ensure the success of the project operations.

## **Niger Small Ruminant Research Project**

### **Trip Report**

**Country Visited:** Niger, West Africa  
**Travel Dates:** December 2-19, 1994  
**Traveller:** Dr. Arthur Felix  
**Purpose of Travel:** To continue research activities on the on-going small ruminant (sheep and goats) on-farm research and to initiate ensiling of crop residues for small ruminant feeding in collaboration with the National Institute of Agronomic Research (INRAN) of Niger.

### **Executive Summary**

Dr. Arthur Felix travelled to Niger from December 8 through December 19, 1994 to continue research activities in connection with the on-farm testing of crop residues as feed for small ruminants. The project is being conducted in collaboration with the National Institute of Agronomic Research of Niger (INRAN). The traveller had his first meeting with Mrs. Ibro Germaine (Project Coordinator) and Dr. Moctar Karimou (Animal Scientist); then the three met with the new INRAN Director General (DG), Dr. Abdoulaye Gouro. The three gave the DG a briefing on the project activities and purpose. Then the three made plans for the trips to Kouka and Konni (the two project sites) for Dr. Felix and Dr. Moctar. The traveller attempted to meet with USAID mission officials but they were all on missions within the country. Drs. Felix and Moctar travelled to the village of Kouka from December 6 to December 9. They initiated the ensiling process with seven participating farmers filling two drums each with the assistance of a surveyor recruited for the project.

Upon returning to Niamey on Friday, December 9, Drs. Felix and Moctar and Mrs. Ibro went to the ILCA laboratories at ICRISAT where they met with the animal scientist Dr. Fernandez who had agreed to do the chemical analyses of the samples collected during the feeding trials.

Drs. Felix and Moctar travelled to the second project site at Konni from December 11 to December 15 where they made silage for nine (9) participating farmers.

Drs. Felix and Moctar and Mrs. Ibro had a briefing meeting on Thursday, December 15 and prepared a formal request for a training trip to the U.S. for Mrs. Ibro and Dr. Moctar. On Friday the 16th, the three co-workers had a debriefing meeting with the DG who had agreed to approve the training trip to the U.S. The DG also signed the MOU Supplement II in connection with the collaborative project execution by the two parties.

Dr. Felix later met with the AID mission officials, Mr. James Anderson and Mr. Curtis Nissly. During the meeting they discussed training trips and support by AID for Mrs. Ibro and

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Dr. Moctar as well as for other Nigerien participants under their education and training program. Dr. Felix was also introduced to Dr. Sidikou, head of the above training program.

The traveller had an exit meeting with Mrs. Ibro and Dr. Moctar on Friday evening during which a final revision of the project budget was performed and the last details on project protocol were discussed.

### **Detailed Trip Report**

#### December 2-5, 1994

The traveller left Huntsville at 4:30 p.m. on Friday, December 2 and arrived in Niamey, Niger, at 9:20 p.m. on December 3, 1994. The traveller was greeted at the airport by Mrs. Germaine Ibro, coordinator of the project in Niger. The traveller was then taken to Sofitel Hotel (Gaweye) by 10:00 p.m. where Mrs. Ibro shared with him the tentative agenda for the visit. The traveller had the opportunity to rest on Sunday, December 4 since the first meeting was scheduled for Monday morning.

The first meeting, which included the traveller, Mrs. Ibro and Dr. Karimou Moctar, animal scientist, was scheduled at 8:30 a.m. at Mrs. Ibro's office. The traveller was picked up at 8:00 a.m. by an INRAN driver assigned to his service. First, Mrs. Ibro revised the agenda of activities with the traveller and Dr. Moctar. Then Mrs. Ibro and Dr. Moctar gave him a briefing of progress made since the last visit by Drs. Jones and Reddy in July 1994. The two sites for the feeding trials were chosen and ten participating farmers were selected at random since there were far more volunteers than expected. All ingredients needed to initiate research activities (ensiling process) were in place including choppers (one at each site), millet stalks, cowpea vines, drums, feeders, waterers and feed supplements, etc. The chopping process of the residues also was initiated in both sites (Kouka and Konni) with enough materials to make at least two drums of silage for each participant.

According to the agenda, the ensiling activities were begun at Kouka, which is about 2-1/2 hours from Niamey, and then continued at Konni. A plan was made to leave for Kouka on Tuesday, December 6 and return on Friday, December 9. The work at Konni was scheduled Monday, December 12 through Thursday, December 15. It was understood that INRAN would provide only the vehicle for the trips with a driver; fuel costs and per diem for drivers would be covered by the traveller. The country is in the worse economical difficulty with employees' salaries not having been paid for over four months.

The next meeting was to have been at 9:00 a.m. with the new Director General of INRAN, Dr. Abdoulaye Gouro, who happens to be an animal scientist from the University of Niamey. But, apparently Mrs. Ibro did not schedule in advance the meeting with the DG's office. They were told upon arrival that the DG had a prior meeting arranged with the Minister of Agriculture. The meeting was tentatively rescheduled for the afternoon.

In the meantime the team visited with Mrs. Djermakoye Bibata and the Research Director for INRAN, Dr. Issaka Maga. The traveller then visited the Director of SERRA, Mr. Mousea Oumarou who is currently the administrative officer in charge of the project funds. He is also responsible for the cereal laboratory where some of the project data analyses will be conducted.

The traveller went to the AID office but did not meet with any executive officers; all of them were out of town on a special mission trip for four days. The traveller, however, met shortly with Mr. Anderson's deputy director, Mr. Gaston Gabarro, who provided him with assistance for cashing some checks at the U.S. Embassy.

At 3:30 p.m. that afternoon, the team met with the DG. Dr. Abdoulaye has a pleasant personality. Since he is in his first days in office, he had not been briefed on the project. However, he was pleased to learn that some progress is being made in the livestock area. He promised his full cooperation in the execution of the project. The team explained to the DG the need for INRAN to sign the agreement on the project execution whose original copies were not received. He then agreed to sign both versions, English and French, before the end of the traveller's visit. The DG also agreed in principle for the trip to the U.S. by Mrs. Ibro and Dr. Moctar at the end of the research activities the coming summer provided that the USAID mission will cover the costs.

The rest of the afternoon was spent making arrangements for the trip to Kouka scheduled for Tuesday morning at 8:00.

#### December 6-9, 1994

On Tuesday morning the traveller, Dr. Moctar and a driver left Niamey for Kouka, not at 8:00 as scheduled, but at 9:15 a.m. due to some delay in getting the key for the vehicle to be used on the trip. The team arrived at Kouka at 12:15 p.m. The team met with the surveyor in charge of the project activities in the village. They found the chopper had suffered some mechanical breakdown which Dr. Moctar tried to fix, at least temporarily, to provide enough chopped residues to take care of the ensiling process. The chopping process continued the rest of the afternoon. The team then left at about 4:00 p.m. for the village of Fillingué where some lodging arrangement was made by Mrs. Ibro with a guest house established by a German agency working in the area. A minimal fee was charged per night for the up-keep of the unit.

During the next two days the team, assisted by the surveyor, worked with seven farmers who had their residues ready for ensiling. A total of 14 drums of silage were made. The cooperation received from these farmers truly exceeded the traveller's expectation. They worked together helping each other from the beginning to the end. The team left Kouka on Friday, December 9 early enough in the morning to reach Niamey in time to prepare for a meeting at ICRISAT with an animal scientist from ILCA, Dr. Fernandez. The team arrived in Niamey at about 10:00 a.m., and took all silage samples to the cereal lab for dry matter determination. After a short briefing meeting with Mrs. Ibro, the team spent the rest of the

morning making plans for the next trip to Konni scheduled for Sunday. Also, the traveller went to the USAID office trying to meet with either Mr. Anderson or Mr. Curtis Nissly, the agricultural officer, but both were out of town attending a conference.

At 3:30 p.m., the traveller, accompanied by Mrs. Ibro and Dr. Moctar, went to ICRISAT as previously scheduled to meet with Dr. Fernandez. They discussed the possibility of analyzing all forage samples at Dr. Fernandez's lab. He graciously agreed to assist them in all tests that his lab is equipped to conduct except for gross energy and fat, which could be evaluated at the INRAN cereal lab in Niamey. Dr. Fernandez will charge all chemical costs to the project. The team returned to Niamey at 5:30 p.m. and convened to leave for Konni on Sunday, December 11 at 12:30 p.m.

#### December 11-15, 1994

On Sunday, December 11, the traveller was picked up at the hotel by the driver and they then picked up Dr. Moctar at his home at Kolo. From there they proceeded to the village of Dosso on the way to Konni to pick up a belt for the chopper at Konni. From Dosso they continued to Konni where they arrived at 7:30 p.m. Housing accommodation at Konni was less desirable in a small guest house managed by a Dutch agency, but it was free and better than any other hotel accommodations in the little town.

On Monday morning Drs. Felix and Moctar went to the village where they met with the surveyor. As was the case in Kouka, the chopper was damaged. Some worker had introduced a pitch fork in the delivery section and caught the blades that were badly bent as well as the blade holding shaft. They spent the entire morning trying to fix it, which was not done until it was taken to the shop in town. Because of this inconvenience, many of the participants could not chop enough residues to make two drums of silage. Only five participants were ready to ensile. Therefore, priority was given to chopping residues for the other farmers. They finally managed to initiate the ensiling process with one farmer with two drums being completed. It was a very exhausting day. The team finally returned to town by 5 p.m. The ensiling process was very slow, for unlike the Kouka farmers, Konni's do not work together. In addition, many of the participants were busy planting winter wheat. However, there is an abundance of crop residues and farmers there take pride in stocking them. During the next three days, nine out of ten participants had their drums filled with silage. It is amazing to observe that farmers in this region give the first priority to their animals and allocate more space to them than they do to their own living quarters.

On Tuesday, two representatives of the extension service came to talk with Dr. Moctar expressing their interest in the research activities. They offered to collaborate with the project in organizing a demonstration program for the farmers in the community. They believe that the developing of a chopping and ensiling process will be a great benefit to the community where livestock plays such an important role in the livelihood of the population and where crop residues, particularly millet stalks, are so abundant and widely under-utilized. Farmers in both locations expressed high interest in the use of the chopper for their crop residues. Some of them even offered to pay for the fuel if they were allowed to use it for a while. The two

extension representatives spent about two hours watching the ensiling procedures. They were visibly impressed.

The team completed the ensiling work on Wednesday and then went downtown to visit the livestock market where some of the animals will be purchased. Drs. Felix and Moctar left Konni early on Thursday morning and arrived in Niamey by 11:00 a.m. They then had a briefing meeting with the project coordinator, Mrs. Ibro. During the meeting the three discussed accomplishments during the trip to Konni and developed the plan for Mrs. Ibro and Dr. Moctar's visit to the U.S. which would be submitted for the DG's approval during their exit meeting on Friday. Also, at this time Mrs. Ibro gave to the traveller some reports on trips made to the two sites and on other activities conducted since the last visit by Drs. Reddy and Jones. She also gave documentation of all expenses incurred since the last transfer of funds.

The meeting was then adjourned as the team planned to have an exit meeting with the DG on Friday morning, before meeting with the AID Mission Director and the Agricultural Officer at the U.S. Embassy.

On Friday morning, the team met with the DG at 9:00. The team reported to the DG results of research activities at Kouka and Konni. The DG was pleased to learn about progress made and promised his full support to the research efforts. He also expressed the desire to visit the research sites in the future. The DG also agreed to sign Supplement II of the MOU between AAMU and INRAN, which was originally approved by both parties involved, but was lost in the mail. Before adjourning, Mrs. Ibro and Dr. Moctar submitted to the DG for his approval a formal request for their training trip to the U.S. at the end of the research activities. The trip, which will be financed by the AID mission training program, will allow the above Nigerian counterparts to travel to Alabama A&M in June to work with Dr. Felix and Dr. Jones in the statistical evaluation of the research results and in the preparation of the first draft of the research manuscript for publication. The DG promised to approve the request after it is submitted through proper channels, that is, through the Director of the CERRA, Mr. Moussa Oumarou, who is currently in charge of the project's financial administration.

The next meeting was scheduled for 11:00 a.m. with AID mission officials at the U.S. Embassy. The traveller met first with Mr. Curtis R. Nissly, the Agricultural Officer who took time to acquaint himself with the project's purpose. Mr. Nissly started his functions with AID in Niamey in August 1994; therefore, he has limited information about the project. He welcomed the traveller and explained some of the economic constraints the AID mission is experiencing, and even the possibility of closing the program in Niger. Nevertheless, Mr. Nissly promised his support to the project. He also informed the traveller about an opportunity for other project funding through the African Development Foundation (ADF). He then gave the traveller a copy of a project on dairy production that was granted to the Association for the Revitalization of Livestock in Niger (AREN).

Mr. Nissly and the traveller then met with the Mission Director, Mr. James Anderson. The traveller then briefed them on the progress of the research activities both at Kouka and

Konni and the interest expressed by many farmers in the use of the chopper and the millet stalks in small ruminant feeding. Mr. Nissly thinks that a manually operated chopper could be more beneficial economically to the farmers. Mr. Anderson also talked about the development of the Internet System and the possibility of establishing collaboration with their education and training program in Niamey. Mr. Nissly indicated that their corresponding training service in the U.S. expressed concern about not being able to find HBCU institutions to train Nigerien Nationals. The traveller explained that Alabama A&M and other HBCU's such as Tuskegee University have been training African Nationals including Nigeriens for many years and that they have, through the International Programs Office, all human resources and facilities for such programs.

Mr. Anderson then asked Mr. Nissly to introduce the traveller to the head of the Education and Training Office, Dr. Maman Sidikou, who received his Ph.D. degree at Florida State University and M.S. at Texas A&M University. Dr. Sidikou, who is Nigerien, is currently serving as a liaison education and training officer for the AID mission. Dr. Sidikou expressed a great desire to collaborate with 1890 institutions for training Nigerien participants in the U.S. through their corresponding training service counterpart in the U.S.

Before departure the traveller requested the Mission's approval for the training trip for Mrs. Ibro and Dr. Moctar in connection with the current project. Mr. Anderson agreed that this can be accomplished without difficulty because they have plenty of funds for training purposes. He then asked Mr. Nissly to take care of this as soon as the request is submitted by INRAN.

Later in the afternoon, the traveller had an exit meeting with Mrs. Ibro and Dr. Moctar. The most pressing need is for funds to purchase the animals (sheep and goats) to initiate the feeding trial as early as January 1995. Mrs. Ibro submitted a request for additional funds which also included other expenses for the next quarterly activities. They spent most of the time adjusting the budget to the current balance in the project funds. The traveller explained that the previous budget revision as was done during the last trip of Drs. Reddy and Jones (July 1994) had erroneously included funds from indirect costs which cannot be used by the INRAN administration. They finally agreed to reduce some of the expenditures, but they cannot do this unless the chemicals and analyses costs are included in their budget, which the traveller agreed to do, taking into account the increased costs of all local commodities and that the chemical analyses will be conducted in Niger.

The meeting was adjourned at about 7:00 p.m., with the consensus that there may be an additional meeting before the traveller's departure to clarify some of the budget line items or expenses documentation.

Dr. Moctar suggested a final short meeting with the traveller on Sunday afternoon to make sure that they cover every aspect of the research protocol.

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The traveller spent some time Saturday, December 17 reviewing the financial report documentation submitted by Mrs. Ibro.

On Sunday afternoon, December 18, the traveller had a short meeting each with Mrs. Ibro to verify some of the expenses documentation, and with Dr. Moctar on the research protocol.

The traveller left Niamey at 11:50 p.m. and arrived in Huntsville Monday, December 19 at 7:30 p.m.

The traveller is particularly pleased with the development of the project. The Nigerien team, particularly Mrs. Ibro and Dr. Moctar, were very impressive in the way they conduct the project. Both work diligently to keep the research activities on schedule. They show a real sense of professionalism and responsibility. Dr. Moctar was very impressive in the way he worked with the farmers, especially in fixing the equipment to make sure enough material was available to ensile.