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SEMI-ANNUAL REPORT
PURDUE/AID CONTRACTS AID/AFR C-1257 and 1258
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This semi-annual report covers activities under AID/AFR C-1257 and 1258 since the previous report submitted in April 1978. The report will be concise since a two day workshop is planned for February 1 and 2, 1979. Detailed reports of all activities will be prepared for the February workshop. AID has been invited to participate in the workshop and complete proceedings of the workshop will be provided to AID as the second annual report for these two contracts.

Activities are reported by country and within countries by location and/or the cooperating indigenous organization or program. Following the country activity reports, the general activities on the Purdue campus will be described briefly.

Senegal

A. OMVS

Cooperative studies have been conducted between Purdue University and the OMVS which is funded by UNDP and AID to provide detailed micro data for irrigated agriculture on small and medium sized perimeters in the Senegal River Basin. The Nianga perimeter has been utilized as an example of medium sized irrigation perimeter while small perimeters near Matam have been utilized for the study of small perimeter irrigated agriculture.

The farmer survey in the Nianga perimeter was initiated by Mr. Ed Weiler, a Master's student, during the 1977 crop year. Mr. Weiler returned to campus in December 1977 and was followed in January of 1978 by Mr. John Sundman, a second Master's student. Mr. Sundman continued data collection

until August of 1978, thus completing a full crop cycle. Data collected by Weiler and Sundman are being used by both students as a basis for their theses. Mr. Weiler has developed a computerized cost benefit model for medium size perimeters as a basis for his analysis of cost benefits of the Nianga perimeter. It is expected that Mr. Weiler's thesis will be completed in December 1978, and a report of results will be included in the February workshop.

Mr. Sundman, utilizing detailed farm production data from the Nianga perimeter, is developing an optimization model which will be employed to evaluate the most profitable utilization of the Nianga perimeter as it currently exists. As a part of this analysis, Mr. Sundman will evaluate the economic viability of alternative levels of mechanization of irrigated agriculture on the perimeter.

The study of small perimeter irrigated agriculture near Matan has been under the direction of Michele Fieloux. Ms. Fieloux has completed one full year of data collection and is currently analyzing these data to prepare a preliminary report of small perimeter irrigated agricultural production. The data will be subjected to further analysis after data coding has been completed. While Ms. Fieloux is analyzing the first year's data, additional data is being obtained on flood recession farming activities by those farmers who utilize the small perimeter. Also, data is being obtained on other types of traditional farming activities outside the perimeter and on family budgets. Ms.Fieloux's final report is expected in 1979.

B. CNRA, Bambey

Two Master's students were stationed with CNRA at Bambey. Mr. Doug Barnett was on site from June through December 1977. Ms. Edna Loose was on site from June 1977 until July 1978. Mr. Barnett has developed a computer model on the peanut basin farm. This model focuses on production activities and decision making of the head of household. The model is constructed in such a way that it can be used to determine optimal farm organization when the single goal is assumed to be revenue maximization or the model can be optimized for a multiple goal objective function. This model provides a basis for investigating the degree to which revenue maximization as a single objective function is a satisfactory means of modeling farmer behavior. Preliminary results indicate that multiple goal objective function modeling is a more realistic formulation of farmer decision making in this region. Mr. Barnett's thesis will be completed in December 1978.

Ms. Edna Loose has collected detailed data concerning the activities of women in farmer households in the peanut basin area. Three villages were sampled for this study. In one of these villages, post-harvest mechanization (threshing and grinding of grain) has just been made available. The two other villages sampled do not have mechanized threshing and grinding services available; one of the villages was Wolof and the other Serere. Processing of this data is under way and will serve as a basis for Ms. Loose's thesis. Her thesis will analyze the activities of women to provide an indication of their role in agricultural production and the impact of the introduction of mechanization of threshing and grinding of grain on the role of women. In addition, she has collected and will analyze detailed data on household monetary transactions. There is evidence that lack of money restricts the use of the mill for grinding grain.

Ms. Loose will report on her findings at the University of Illinois workshop on the role of women in Africa in April 1979.

C. SODEVA

Two villages in Thies and Bambey prefectures are being studied by Bozena Stomal. Mr. Malcolm Versel is studying three villages west and south of Kaolak. These studies are being conducted in collaboration with the SODEVA office of studies and planning. Data is being obtained on farm work, other economic activities and family budgets. Households included in the sample represent different levels of technology and different sizes of agricultural operation in terms of area harvested per worker and different ethnic groups. These studies are being conducted in the area of the Senegal Cereals Project and, therefore, will provide useful micro data for economic evaluation of farmer reaction to interventions proposed in this project and data for planning activities in the second phase of the project.

D. SOMEVAC/PIDAC

Yasmine Marzouk is studying agricultural production in two villages in the lower Casamance, both in the PIDAC extension area, and one in the area of the AID-sponsored Casamance Development Project. One of the villages specializes in irrigated rice with the area cultivated being limited by the degree to which available rainfall overcomes salinity in the river and by the supply of water for irrigation. The second village produces rice, sorghum and peanuts, as well as other crops, utilizing animal traction. These two villages exhibit interesting differences in the traditional roles of different members of the household in rice production, especially the rôle of women. The villages also differ in that in the first, rice is sold as a cash crop, while in the second rice is not sold but peanuts is the cash crop.

E. Senegal Ag Sector Model

Ms. Cathy Jabara, a Purdue Ph.D. student, is developing a computer model of the Senegal Agricultural Sector. This model will be utilized to provide shadow prices for the value of crops produced under irrigation (to be incorporated in the benefit/cost studies of irrigation) and to study the impact of Senegalese trade policy with respect to food grain imports, agricultural exports and internal food grain price policy on agricultural production. Ms. Jabara is utilizing farm level production data from other activities under these projects in Senegal as well as existing farm level and sector level secondary data. She spent the months of June and July in Senegal collecting secondary data and discussing trade and agricultural policy with Senegalese officials. Her thesis advisor, Dr. Robert L. Thompson, joined Ms. Jabara for two weeks in Senegal to assist with data collection and interviews of officials. Ms. Jabara was involved in a serious automobile accident while in Senegal, but fortunately was not seriously injured and was able to complete her work.

Mali

A. OACV, Kita

The farmer survey at Kita, which was initiated by Delores Koenig during the period 1977 crop year, has been continued by Mr. Al Fleming with assistance from Mr. Coulibaly, a Malian. This data collection activity will be completed in January or February of 1979. The data obtained by Ms. Koenig, including a demographic census of villages and preliminary agricultural production data, has been tabulated and coding and punching of data is underway at Purdue. The detailed farm production data is being

coded in Mali by the utilization of the Radio Shack TRS 80 minicomputer. Mr. Fleming will return to the U.S. in early 1979 to conduct his analysis of field data for his M.S. thesis.

B. OMM, Mopti

Detailed production data is being obtained through a survey of farmers in four villages in the Mopti region. These include one village on the Mopti plane, one on the Dogon plateu, one at the foot of the falaise, and one on the Seno plane. This extensive survey was initiated by Mr. Andreas Massing and is being continued by Mr. Stan Cohen. The distance between villages is rather great and the amount of travel required is excessive considering the condition of roads. Mr. Cohen has had some health problems, possibly resulting from the amount of travel required over rough roads by landrover. In spite of the difficulties, this survey activity will yield a data base sufficient to characterize and model agricultural and irrigated vegetable production in these four micro climates of the Mopti region. In addition to the standard agricultural production data which is being collected in all areas, a survey of women in the region has been conducted to provide information on the role of women in household and agricultural production. Agricultural production data is being coded onto magnetic tape using the TRS 80 minicomputer. This data, on magnetic tape, will be returned to Purdue and utilized by Mr. Cohen as a basis for his thesis research.

C. Operation Riz, Sikasso

A survey of farming activities on the improved "bas fonds" in the Sikasso region has been initiated by Mr. Tom Whitney. Unfortunately, due to the delay in signing an agreement between AID and the Government of Mali, this activity did not get started until late July 1978. Therefore, it will be necessary to continue this data collection activity well into 1979. This

activity is considered essential to our study of irrigated agriculture in the Sahel region in that it represents the utilization of rainfall through the management of runoff water on "bas fonds", at low cost. Mr. Whitney will return to campus in December 1978 for consultation and will return to Sikasso to complete his survey work during 1979.

Upper Volta

A. AVV Statistics

The Purdue effort to collaborate with the Volta Valley Authority in the collection of detail farmer production activity by settlers in the AVV area, has been under the direction of Dr. Josette Murphy. The original objectives of this activity were: (1) to obtain data on the costs/returns of sorghum and millet produced in a settlement project; (2) to assist the AVV in improving the quality of agricultural production data collected from settlers; and (3) to increase the capacity of the AVV to analyze data. The data acquisition activity has proceeded exceeding well. A report of the 1977 agricultural season has been produced in French and translated into English and supplied to AID and other donors. The 1978 agricultural campaign has again seen an exceptionally good effort in acquiring detailed data from participating farmers and in setting up a system of supervision of the survey workers by Voltaies. A report of the 1978 campaign is in progress and will be reported at the workshop in February. We will continue our cooperative activity with the AVV in 1979, but at a reduced level, to permit Dr. Murphy to work on the synthesis of the data and her observations.

Progress toward increasing the internal capacity of the AVV for data analysis has been less successful. There have been a number of problems,

the most serious of which involves internal staffing problems of the AVV. A number of suggestions have been made by project personnel to the AVV management to resolve this problem. However, to date, action has not been forthcoming.

A minicomputer has been located in Upper Volta and is being utilized for the coding of data in country; the AVV raised serious difficulties before permitting the sending of survey forms to Purdue. Data collected for 1977 and 1978 agricultural years has been made available to other services in the AVV and to donor agencies. These agencies have utilized these data in their planning activities.

B. Kaya

The farming and nonfarm activities in three villages near Kaya are being studied by Ms. Della McMillan. The villages differ in their access to "bas fonds" and in the incidence of out migration. Kaya has been chosen as a site for detailed demographic and agricultural production data because it is in a region of heavy demographic pressure and out migration. This part of the Mossi plateau has been an important source of settlers in the Volta Valley area. Therefore, data collected in the Kaya area will provide a basis for making a comparative study of agricultural production and farmer income levels in traditional farming regions with conditions in the resettlement project area and so, for a better understanding of the migration process. A substantial report on the 1978 season is expected by March 1979.

C. Kaibo

Farming in a large village in the AVV region, which is not a part of the AVV resettlement project, is being studied by Mahir Saul. He is collecting the standard detailed demographic and agricultural production data

and is also collecting data on the interaction between farmers in the region adjacent to the AVV project and settlers in the AVV area. Mr. Saul was rather late in getting started with his survey, but will continue the study for approximately 12 months. He is obtaining interesting results on the assistance given by nonproject villagers to the official settlers and to the unofficial settlers in the AVV area near Kaibo. He is also expected to obtain data on the income of unofficial settlers and people in the traditional village for comparison with the income of the AVV settlers.

Chad

As a contribution to our overall study of the economics of small and medium scale irrigated agriculture, a study is being made of irrigated vegetable production near N'Djamena. This survey, which was originally supposed to get underway in May of 1978 but was suspended due to the political situation, has been resumed under the direction of Ms. Ellen Dietchman-Boulet. A preliminary survey of land use, demographic characteristics of farmers and the available labor supply has been completed and a report is in progress. A detailed survey to obtain labor use and production data in vegetable farming will continue into 1979.

Niger

The study of irrigated farming at Tara, which was initiated by Ir. F. Van de Walle, has not been continued since it was necessary for Ir. Van de Walle to depart Niger. However, preliminary discussions have been held with the AID Mission/Niamey with respect to a possible collaborative effort as a part of the Niamey Productivity Project. This activity, if initiated, will be under separate funding to permit a full year of data acquisition.

Purdue Campus Activities

The very extensive field data collection activities which have been initiated under these two projects are resulting in the acquisition of a very large volume of data which must be processed and stored in a manner which will make it readily accessible for computer analysis. Under the direction of Dr. Margaret Saunders, with assistance from Dr. Joe Goodwin and Mr. Ken Jones, an intensive effort has been underway at Purdue to develop a data processing system. To facilitate the handling of data, questionnaires have been developed which provide for precoding of data so that data can be punched directly from questionnaires. However, given the level of training of interviewers used in the field, the implementation of precoded questionnaires has been only partially successful. In order to facilitate the transfer of data from the field to campus for computer analysis and to avoid conflict situations with host countries with respect to taking original copies of data out of the country, a system has been developed for utilization of minicomputers in the field. Minicomputers have been purchased and placed in Upper Volta and Mali. Computer programs have been developed which make possible the transfer of data from questionnaires to magnetic tape by relatively unskilled technicians. The computers and programs were taken into the field and explained by Dr. Goodwin during the summer. Through preliminary trials in the field and experimentation with questionnaires on campus, an effective program for in-field coding of data directly from questionnaires onto magnet tape through utilization of minicomputers has been developed. Data is currently being encoded by the use of minicomputers in Mali, Upper Volta and on the Purdue campus. In addition, data collected early in the field activities is

being hand-coded and punched onto cards. The processing of data is well underway, both in the field and on campus.

One of the ultimate objectives of the extensive primary data collection activity in the Sahelian countries is to provide a data base sufficient for the development of computer models of typical farm units in these countries. Dr. Goodwin is currently developing a generalized linear programming model which will have the capacity to accept data specific to a particular geographic region resulting in a computer model of the typical farming operation. The model is being developed with flexibility to incorporate production activities and resource constraints of the various agricultural activities for different members of the farm household. That is, it will consider not only farming activities for the household head but also activities of wives, sons and others participating in the family farming operation. This is an important modeling capability in that it provides for internal consideration of labor tradeoffs between family members. The initial model formulation will be a revenue maximizing model. It is anticipated that this model may, at a later date, be modified to incorporate goals other than revenue maximization in the objective function. This generalized linear programming model of Sahelian agricultural production units will be utilized by several of the graduate students in their data analysis and thesis preparation.

Mr. Henry Manteuffel has joined the Purdue West African Project team and will have primary responsibility in the preparation of a handbook for analysis of small and intermediate size irrigation perimeters. Preparation of this project analysis handbook will draw upon conceptual work done by Mr. Art Westneat and Mr. Ed Weiler and will utilize data acquired by Weiler, Sundman and Fieloux in Senegal. It is anticipated that data pertaining to

small perimeter irrigated agriculture in Senegal, collected by M. Fieloux, will be utilized to test and illustrate the benefit cost analysis techniques encompassed in the handbook. Dr. Wally Tyner is providing supervision for Mr. Manteuffel in this activity.

The next six months will involve a rather substantial reduction in our data acquisition activities in the field and a very substantial increase in on campus data processing, analysis and preparation of theses and reports. Considering the very significant inherent operational difficulties involved in an extensive data collection activity such as has been undertaken in this project, progress to date has been exceptional. We feel that the quantity and quality of primary micro agricultural production data which is being developed under these projects is unsurpassed for Sahelian West Africa. This data base will be an important resource, not only for the remainder of these projects, but for AID, the participating Sahelian countries and other donor agencies in technical assistance projects planning and evaluation. While the remaining time and funding of these contracts will not provide for complete exploitation of this data base, we anticipate that the analysis which will be conducted will provide important insights into the nature of agricultural production in the Sahelian region.

As an adjunct to the projects and to satisfy the needs of the staff and students, the document collection on West Africa is being cataloged. So far, 3500 documents have been cataloged, with an average of 7-9 entries per document. Normally, there are 225 pieces out on loan at any one time.

Dr. Margaret Saunders is now working on a review of the social organization of the Wolof family as it affects farming and decision making on farming.