

Document 1009A

CEREALS PRODUCTION II (685-0235)
PROJECT PAPER SUPPLEMENT

USAID/SENEGAL
JANUARY, 1985

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

TABLE OF CONTENTS

1.0. Executive Summary and Recommendations

1.1. Executive Summary

1.2. Recommendations

2.0. Project Background and Accomplishments

2.1. Project Background

2.2. Project Accomplishments

3.0. Project Extension Background: Approach, Objective, Approach and
Project Elements Relationship to GOS and USAID Priorities

3.1. Project Objective

3.2. Project Approach and Elements

3.3. Relationship to GOS and USAID Priorities

4.0. Project Implementation

4.1. Project Implementation Plan - Condition Precedent

4.2. Implementation Plan

4.3. Evaluation

5.0. Financial Aspects

5.1. USAID Funding

5.2. GOS Contribution

5.3. Effects Of Providing Additional Funds

5.4. Procurement Implementation and Payment Method

5.5. Justification of Payment Method

5.6. 121d Determination and Audit Coverage Considerations

ANNEXES

ANNEX 1 - Regional Legal Advisor's Memorandum

ANNEX 2 - Project Data

ANNEX 3 - Logical Framework

ANNEX 4 - Economic Analysis

ANNEX 5 - GOS & Peace Corps Financial Contribution

ANNEX 6 - Estimated Project Outputs

ANNEX 7 - Scope of Work - TA Forester

ANNEX 8 - Estimated Technical Assistance Cost/Year

ANNEX 9 - Waiver for Vehicle Procurement

ANNEX 10- Financial Status - Cereals II Project

CEREALS PRODUCTION II (685-0235)
PROJECT PAPER SUPPLEMENT

1.0 EXECUTIVE SUMMARY AND RECOMMENDATIONS

1.1 Executive Summary

1.11 Problem

Approval is required to extend the PACD of the Cereals Production II projet by 33 months through December 31, 1987.

1.12 Background

USAID proposes to extend the PACD of the Cereals II project and provide additional resources as required to carry out an agroforestry/soil conservation pilot program in the Thies and Diourbel regions of Senegal. These activities build on work initiated under the Cereals II project, take into account various recommendations of the project evaluation, respond to concerns expressed by GOS officials and contribute to the goal of the Cereals II project of maintaining and/or improving agricultural productivity.

The purpose of the Cereals II project is to "improve extension and research capabilities of the Government of Senegal to reach the entire farm family with improved cultural recommendations designed to increase food production and farm incomes in the Groundnut Basin". As the project has evolved, Senegalese and USAID officials have come to realize that maintaining

and improving agricultural production in the Groundnut Basin (GNB) can only be accomplished through the use of agricultural production systems and techniques which protect the natural resource base, maximize the use of rainfall and meet the needs of the rural populace for food, fuel, forage and other products. The GNB, which accounts for approximately 65% of Senegal's cereals production and 75% of the national cultivated area, is experiencing severe environmental degradation in many areas due to human and livestock population pressure, drought and inappropriate farming techniques. In the Cereals II project area of Thies and Diourbel, SODEVA (regional extension agency for the GNB), ISRA (Senegal's agricultural research institute), and Eaux et Forêts (Senegal's water and forest agency) have been working closely with USAID and others to identify test and disseminate techniques of agroforestry, soil and water conservation, village level woodlots and windbreaks, and the integration of livestock into the production system.

A recent project evaluation and various GOS documents (i.e. Problèmes Posés par le Développement Agricole du Bassin Arachidier, Rôle de la SODEVA, Septembre 1983) have noted the importance of the GNB has for Senegal's economy and the need for long-term solutions to the natural resource deterioration of the zone. The evaluation team also highlighted the accomplishments of the project which included strengthening the research/extension linkages; upgrading SODEVA's capability to disseminate extension themes and monitor their impact; and promoting technologies and/or activities to reduce labor intensive tasks of women, generate income and conserve fuel. The team recommended that USAID continue assistance to SODEVA and ISRA to promote "crop diversification, related livestock activities, and soil conservation and regeneration activities". Environmental reclamation through the establishment of windbreaks, tree planting and farming techniques to restore soil degradation have been successfully carried out in various countries in the Sahel (A.I.Niang, 1983, F.A.Gulick, 1984). Results obtained in these

countries suggest that production can be increased by 40-50% for groundnuts and 23-63% for pearl millet. It has been documented also that shelterbelts in Northern Nigeria have provided improved microclimates for field crop establishment during years in which the onset of the rains was particularly tardy. Due to the fact that the Groundnut Basin is indeed an area of low agricultural production and that of an intense pressure from large population, it is important to try these new techniques. It appears today that the soil degradation factor along with the worsening drought condition are most serious. A system by tree culture plantation and conservation practices would be best and could contribute to restore the soil and boost agricultural production.

The recommendations contained in this PP supplement for extending the project, and making necessary modifications in the implementation of project activities take fully into account the importance of the GNB to Senegal's economy, the crucial point at which Senegal finds itself in addressing serious problems of environmental degradation, the evolution of the Cereals II project, and recommendations from recent evaluation and consultancy reports. USAID agricultural and forestry project management staff have assessed the situation and concur with the need for emphasizing forestry intervention within the farming system.

The extension of the project will permit agroforestry and soil and water conservation techniques appropriate for the conditions in the Groundnut Basin to be identified, tested and monitored over three crop seasons. In addition, it will enhance the coordination among Senegalese agencies and improve their ability to implement an integrated agricultural production and environmental protection project. It will also lay the foundation for future multi-donor long-term efforts to halt the serious environmental degradation occurring in a geographic area of key importance to Senegal's economy.

1.2 Recommendations

It is recommended that you authorize: an extension of the Project Assistance Completion Date of 33 months through December 31, 1987.

2.0 PROJECT BACKGROUND AND ACCOMPLISHMENTS

2.1 Project Background

The Cereals Production II project, was authorized in 1979 for \$7.7 million. It was designed primarily as an institutional building project to continue and reinforce what had been achieved under phase I (1974-1979), i.e., strengthen SODEVA's institutional capability to interact with the national agricultural research organization (ISRA) to formulate and evaluate joint field trials and to convert results into financially viable extension recommendations. These results were to be more effectively transmitted to the farmer leading to increased income and diversified agricultural production in the expanded area.

The major activities of the project through which these objectives were to be achieved were as follows:

- 1) up-grading SODEVA's staff to meet the evolving needs of the project area;
- 2) strengthening SODEVA's ability to produce and use audio-visual extension aids;
- 3) enhancing SODEVA's ability to collect and analyze data on the macro and micro economic effects of its activities in the basin;

4) tightening the link between applied research and extension in the basin; and

5) creating a women's Extension Unit within SODEVA to develop and pursue a strategy to ensure women's access to information, factor inputs and other sources required to reinforce their economic role.

The strengthening of the institutional needs of SODEVA and ISRA, it was hoped, would translate directly into increased cereals yields and thus increase the farmers' income.

The project funded technical assistance, training, commodity procurement and operating costs. The GOS contribution was for salaries and associated recurring costs.

2.2 Project Accomplishments

An evaluation of the Cereals II project (RONCO Consulting Corporation, January, 1984) identified the major accomplishments of the project as being the strengthening of SODEVA and ISRA/CNRA. The evaluation notes that partly through AID's assistance under the Cereals I and II projects, SODEVA has evolved" into a more professional and capable extension organization and has "fostered effective links with CNRA, with the result that a feedback system now exists through which the results of on-station research are tested in on-farm trials, and farmer reactions are transmitted through SODEVA back to CNRA".

SODEVA has encouraged and supported activities by women's groups to increase income and reduce time consuming household tasks (i.e. vegetable production, use of millet mills and improved cookstoves). Cattle fattening

operations and reforestation interventions have been assisted by SODEVA's extension efforts. Some functional literacy programs have been initiated. SODEVA is beginning to expand the use of audio-visual materials in its extension programs and has expanded its ability to monitor and evaluate its impact in the rural areas.

In spite of the project's accomplishments a major objective, that of increasing cereal yields, was not attained. Crop diversification effects were also only partially successful. These results were attributed to several factors including: lower than normal rainfall in several years; inadequate provision of improved seed, fertilizer and pesticides; the suppression by the government of an agricultural credit program affecting farmers' ability to purchase production inputs and agricultural equipment; and government pricing and marketing policies which acted as disincentives to production. USAID was aware of these problems but continued to support the institutional building activities with SODEVA and ISRA while awaiting the elaboration and implementation of agricultural policies to resolve some of these issues.

Although the Cereals II project did not achieve all of its objectives, based on the progress that was made, the evaluation recommended continued support to "SODEVA's extension and ISRA/SODEVA applied research activities". The evaluation proposed this support be used "to strengthen SODEVA's ability to extend new recommendations for continued crop diversification, related livestock activities, and soil conservation and regeneration activities".

3.0 PROJECT EXTENSION: BACKGROUND, OBJECTIVE, APPROACH AND PROJECT ELEMENTS RELATIONSHIP TO GOS AND USAID PRIORITIES

Background: In recent years, the combined efforts of increasing population, declining fertility of the soils and a prolonged period of below

normal rainfall, have posed formidable obstacles to Senegal's ability to feed its people. This problem is particularly acute in the Groundnut Basin, (the area of this project's focus), which includes over half of the country's population and produces the bulk of Senegal's cereals and peanuts.

USAID has been working closely with Senegalese officials to identify and promote interventions in the project zone which would better address the environmental and economic constraints. It has funded several studies, which have laid the framework for current and future initiatives in the project area. Many studies, such as the one by Peter Freeman, the others by W. Webber and J. Major helped to heighten awareness of the environmental problem. This further attested to by Senegal's President having hosted a minister level conference of Sahelian and Northern African countries and donor agencies in July 1984 to address this issue.

The GOS considers the desertification and soil degradation of its most productive lands a priority issue. With assistance from USAID and other donors, the GOS has initiated several interventions to combat the problem. These include numerous forestry interventions by SODEVA and Direction des Eaux et Forêts (DEF) and the dissemination of soil conservation technologies developed by ISRA. These various interventions did not yield superior results in building and restoring the environment because they were disparate and very small scale operations in regard to tremendous population pressures. However, similar interventions in Niger, Nigeria and India have yielded better results in soil regeneration and conservation and they merit to be tried in the GNB of Senegal.

In November 1983, Senegal was faced with a worsening situation following a year of severe drought. Various government officials recognized that for an agro-forestry/soil conservation program to succeed maximum coordination would

be required among the technical agencies. As a result, an interagency meeting was held and a committee was established to elaborate a pilot scheme under this project for the Groundnut Basin. This committee included representatives from SODEVA, ISRA, Eaux et Forêts and USAID. Since that time, a series of working meetings has been held to discuss improving coordination within ongoing activities, determine the state of research in Senegal on techniques including windbreaks, composting and identify villages where an integrated approach could be emphasized. Each agency has elaborated a document on its work related to soil conservation, agro-forestry and the integration of livestock into production systems in the GNB. The report by ISRA (Dégénération et Régénération des Sols dans les Régions Centre-Nord du Sénégal -- Cap-Vert-- Thies -- Diourbel-- Louga -- by C. Dancette and L. Sarr) discussed the evolution of research since 1950 related to addressing the problem of soil degradation.

In late March 1984, USAID requested the assistance of two consultants under the AID/W Environmental Planning and Management Project to visit Senegal, meet with Senegalese agency and ministry level officials and through field trips assess the severity of the problem and provide further guidance in developing a pilot program. Their findings (A.W. Webber and J.T. Major, Report and Recommendations on Soil Conservation and Regeneration in the Groundnut Basin of Senegal, April 1984) supported the direction being taken by the interagency committee under the Cereals II project and provided a number of useful recommendations related to research and training concerns; the need for higher level coordination; cost-sharing considerations; extension approaches; and the optimal zone for interventions. A specific recommendation called for extension of the Cereals II project to focus more on soil and forest conservation, increase the use of audio-visual programs in the extension of appropriate themes, and include Eaux et Forest as a participant

agency. The Thies, Diourbel zone was judged to be the area where AID resources could have maximum impact on halting environmental degradation and maintaining or increasing agricultural productivity.

SODEVA, ISRA and Eaux et Forêts, working in close collaboration, subsequently elaborated a program of agroforestry and soil conservation activities for the 1984 season. Research trials on organic fertilizer were carried out in 20 villages. This was the second year for these trials. In sixteen villages woodlots and windbreaks were established. Extension efforts focused on encouraging group interest and participation in the agroforestry program. The 1984 program highlighted the need for: a) the timely provision of inputs (i.e. seedlings, fencing, pesticides, water), b) high levels of coordination/collaboration among field level and management personnel of the various agencies and c) a well developed set of criteria for the selection of villages in which to conduct activities. Although the survival rate of seedlings was less than hoped for, in part because of another season of very low rainfall in the target area, the experience was valuable for the three Senegalese agencies in identifying appropriate measures to avoid problems in the future. Moreover, it showed a willingness on the part of the three agencies to work together and confirmed the high level of interest of villagers for this type of program.

The extension of this project will permit carrying out interventions to combat the real threat posed by recurrent drought and an accelerating degradation of Senegal's natural resource base. This extension does not represent a change of project purpose which is the long term achievement of production increases, however, the nature of interventions to achieve the project purpose has been modified to reflect the need for greater integration of agricultural production and soil conservation techniques. This slight reorientation of project approach may enable the stabilization of productivity and then increase production under drought condition.

The consensus of all existing studies on the Groundnut Basin, both by USAID and the GOS concludes that the current situation is serious and that efforts to address the problem of environmental degradation should be increased. The Cereals II project provides an excellent vehicle for these interventions. It already provides USAID with several years experience and valuable knowledge gained by working in the project area. This experience has also brought a familiarity with the major GOS institutions operating in the project area.

3.1 Project Objective:

Extending the Cereals II project thru December 31, 1987 will enable USAID, in conjunction with three Senegalese agencies (SODEVA, ISRA, DEF) and Peace Corps, to carry out specific activities aimed at arresting the soil and environmental deterioration of the soil resource base in the Groundnut Basin of Senegal. This experimental program will stress the use of agroforestry and soil conservation techniques to maintain and/or improve soil fertility and meet various village needs.

Specific objectives include:

1) initiate in 60 villages in the Thies and Diourbel region a series of agroforestry activities to:

- a) reintroduce trees in the production system
- b) demonstrate the role and importance of tree planting in maintaining soil productivity; in satisfying the needs of villagers for fuelwood, construction materials, and livestock and human food; and in improving farm revenue

c) in connection with forestry, demonstrate the beneficial use of agricultural sub-products in the farming system (i.e. compost, animal waste, livestock fodder)

2) test and validate agroforestry techniques by conducting adaptive research of tree species, plantation techniques, use of animal wastes and crop residue.

3) obtain adequate information on the degree of environmental degradation, the interest of villagers, the procedures for effective action on the part of Senegalese agencies in project implementation and the technical and economic feasibility of project interventions to permit the elaboration of a long-term, large-scale agroforestry project.

3.2 Project Approach and Elements

3.21 Technical Interventions

Project activities fall into two interrelated categories. These include agroforestry, reforestation and soil conservation. Field level interventions will be conducted in sixty pilot villages with thirty villages beginning activities in 1985, twenty in 1986 and 10 in 1987. While a modest rate of increase in participating villages is planned, level of activities within a given village will concurrently expand. In this way, interventions will be concentrated to allow required levels of supervision and evaluation. Villages will be selected based on several criteria including:

a) size - average population of 200-300 to insure maximum villager participation;

- b) geographic location - pilot villages will be located central to neighboring villages to enhance the demonstration effect;
- c) land availability - due to the fact that most of the available land is currently under cultivation, selection will be based on the provision of fenced plots designated for project purpose;
- d) water availability - participating villages will be selected on the basis of easy water availability either because a well exists or that a dry one can be improved at a relatively inexpensive cost;
- e) interest of the population in the program and willingness to contribute resources (i.e. labor, land) to project activities.

Major emphasis will be put on the planting of trees, both as woodlots and as windbreaks. Village nurseries will be established where water is available in sufficient quantity and quality to provide an alternative source of seedlings to Eaux et Forêts. The provision of wells and the maintenance of existing wells to assure water for tree establishment will also be addressed. Attention will also be given to planting and protection of the Acacia Albida tree. This multi-purpose tree is an ideal element in any agroforestry approach as its leaves provide fertile organic matter while its roots fix soil nitrogen.

SODEVA will select villages and develop with villagers an implementation plan showing dates and targets of achievement. Eaux et Forêts will provide trees and advise on the types and species of trees to plant. Emphasis will be given to quality factors such as survivorship of trees, maintenance of fences and woodlots and appropriate end use rather than quantity - number of trees, villages or hectares planted. The project will be flexible enough to increase

or decrease the number and amount of project activities depending on the cooperating agencies and ability of the villagers to absorb the interventions. Special attention will be given to the provision of water where necessary.

Tree planting will take into account multi-use objectives (i.e. soil conservation, provision of livestock and human food, provision of fuelwood and construction materials). Appropriate species (considering environmental and end-use factors) for each village will be identified with the assistance of CNRF and Eaux et Forêts agents. In addition to forestry interventions, farmers will be encouraged to use animal waste, crop residue and compost in conjunction with chemical fertilizer to help maintain soil fertility.

Fencing: Three types of fencing appear to offer the most appropriate means of plant protection. They are live fencing, bambou fences and individual fencing around single plants especially for the windbreaks. The least expensive fencing method will be identified and built to insure tree protection.

Water: A few nurseries will be constructed in selected villages where water is available in required quality and quantity for nursery operations where wells do not exist. In those selected villages the project intends to improve existing wells and provide water lifting devices to facilitate nursery operations.

Cost Sharing: Participating farmers are expected to provide labor and material for fencing when available. The project will pay for other material inputs such as inoculants, plastic bags, pesticides, transport and other materials for well improvement. Farmers will also be responsible for digging the compost pits.

This project will only finance inputs directly related to agroforestry/conservation concerns (i.e. trees, fencing, extension costs). Because of the close interrelationship between soil conservation and agricultural production, a large thrust of this program will be to promote techniques which have positive effects on crop yields as well as environmental protection. Windbreaks, protection of acacia albida and composting all fit this category. Forestry species will be given free of charge. Fruit and nut trees will be sold to farmers at 100% of cost. Money generated from tree sales will be put into a revolving fund. The money will be managed by the Project accountant in a separate book and will be used to purchase unforeseen and small office supplies or be used for a reward system to the best participant farmers in the program. Any decision on the use of money must be approved by USAID.

3.22 Extension Activities

The role of the extension service is critical in this project. Extension agents assisted by Peace Corps Volunteers will be responsible for identifying potential project villages, meeting with village groups and individuals to explain project elements and demonstrate the importance of conservation and reforestation activities, providing inputs, organizing visits to other villages where similar activities are well established, organizing village training, and obtaining feedback from villagers on the suitability of interventions and approach to implementation. Extension agents will be aided in their work by SODEVA's audio-visual center which will produce relevant AV materials for field use. SODEVA constructed a well equipped center and purchased AV projection vans under the Cereals II project. To improve the capability of this center and assure that research findings are being incorporated into AV materials, the project will fund a modest level of support to establish a documentation center for agroforestry/soil conservation

materials and to produce AV materials. The research information center at Pout, constructed with Cereals II project funds, will house the collection of documents, films, slides etc. on this subject. The TA forester will assist in obtaining and organizing relevant materials.

SODEVA will provide 23 part time agents plus the Director of the project to work 30% of their time for the Project. ISRA will have 3 researchers while E & F will assign 2 engineers. Peace Corps will assign 6 people to the project who will be located in villages and be charged with nursery work and the establishment of woodlots, windbreak and plantation of *Acacia albida* in the fields. Peace Corps participation is agreed upon in principle. However Peace Corps and SODEVA have not finalized the terms of Peace Corps participation.

Field demonstrations, training sessions at CETAD or CNRA and visits to other villages will be used along with AV materials to promote the program. As part of its annual implementation plan, SODEVA in consultation with other agencies will define the specific nature of demonstrations, training and AV production.

3.23 Joint Off-Station Adaptive Research and Demonstration

The current division of responsibilities among the GOS agencies dealing with soil conservation, agroforestry and agricultural research and production makes effective coordination a prerequisite for successful intervention. These agencies are SODEVA (Extension), ISRA (Research), CNRF (Forestry arm of ISRA) and DEF (Forestry).

As Webber and Major observed, "although joint activities have been undertaken, activities of these agencies tend to be dispersed discrete and rarely seem to build on each other. While single interventions may have an indeterminant impact, the combined effect of multiple actions in a single area could be significant".

This project proposes to promote the coordination among agencies for maximum development effect. It will fund joint adaptive research and demonstrations between ISRA and SODEVA. Activities under this category could include:

- 1) soils analysis to assess the level of soil fertility and degradation;
- 2) fertilizer trials comparing different combinations of chemical and organic (i.e. animal waste, compost) fertilizer;
- 3) trials of different tree species in a variety of ecological zones;
- 4) evaluation of the acceptability by villagers of various species for fuelwood and construction materials;
- 5) evaluation of various types of fencing (living fences, local materials) for performance, cost and acceptability;
- 6) evaluation of Nitrogen fixing tree species and inoculum on crop yields;
- 7) assessment of various planting arrangements for windbreaks.

SODEVA and ISRA will elaborate an annual research/demonstration program for USAID approval prior to any expenditures for this activity. The research plan will specify objectives, funding requirements, proposed research methodology, key researchers, schedule for field activities and coordination meetings, nature of data analysis and reports which will be prepared and timeframe for their submission to project officials.

3.24 Training

Current research identifies lack of sufficient trained personnel as one of the major constraints affecting GOS agencies operating in the G.N.B. SODEVA, ISRA and Eaux et Forêts have expressed the need for training in the area of agroforestry and natural resource management. This includes short-term as well as long-term training at the Masters degree level. The extension of this project will, however, only consider short-term training requirements. Masters degree training would require two to three years and would thus fit better in a subsequent long-term project, or under regional initiatives which have funds for this purpose.

Short-term training will be provided to personnel from the three Senegalese agencies in the management and evaluation of agroforestry/soil conservation programs. Where deemed appropriate, study tours and in-country seminars will be included. It is estimated that ten (10) individuals from SODEVA, five (5) from ISRA and five (5) from Eaux et Forêts will receive appropriate third-country or US training.

Training will be provided to SODEVA extension agents in various agroforestry/soil conservation practices and ways to utilize audio-visual materials and demonstrations in support of project activities. This training

will be conducted at CETAD or other in-country facilities. Peace Corps Volunteers will be used where possible for training actions subject to conditions of the protocol established between SODEVA and Peace Corps.

3.25 Technical Assistance

Although various Senegalese technical assistance personnel working for SODEVA, ISRA and Eaux et Forêts have considerable experience in agricultural production and reforestation practices, Senegal has few individuals trained to coordinate an experimental program of the type discussed above. For this reason an expatriate forester with experience in agroforestry/soil conservation extension activities in the semi-arid tropics will be recruited to help implement the project. He/she will be responsible for assisting GOS agencies in the elaboration, implementation, monitoring and evaluation of an experimental program integrating agroforestry, soil conservation. He/she will be assigned to SODEVA, based in Thies and will serve as a liaison among Senegalese agencies and USAID. The forester will provide guidance in the use of audio-visual materials in SODEVA and Eaux et Forêts extension programs and assist in the collection of documentation regarding agroforestry/soil conservation programs in semi-arid zones which will be maintained at the documentation center at SODEVA's Pout training facility. The scope of work for the TA forester is given in Annex 7.

The need for short-term technical assistance is envisioned in such areas as soil science, forestry, economics and documentation. The short term technical assistance will be provided through the 8A firm. Linkages will also be established with S&T support projects to obtain other TA through PASA arrangements with the Soil Conservation Service, Forest Service and other US government agencies involved in natural resource management. The TA will be charged with the responsibility of helping determine the training needs. He

will assess different training opportunities capable of enhancing the project and submit proposals to the USAID Project Officer for approval. The location of the TA in Thies is crucial. The pilot nature of these activities, the need for close constant monitoring & coordination of field interventions in a timely fashion as well as the fact that the activities are heavily field oriented require that the TA be located where the action is taking place. The TA Forester and Project Director will report directly to USAID project manager and SODEVA's Technical Director. They will be responsible for any activity undertaken to achieve project goals. They will be aided by the personnel designed by the participating agencies as well as other material inputs from SODEVA, E & F, ISRA, Peace Corps and USAID.

3.26 Commodities

Water lifting and conveyance equipment will be purchased as required for the project villages. This project will purchase two four-wheel drive vehicles to be used by project personnel. One vehicle will be assigned to the long-term TA forester. The other will be primarily for the use of consultants and USAID personnel in support of project activities. A flat-bed truck for the transport of trees, fencing materials and other supplies will also be purchased. In addition six mobyettes will be purchased for use by Peace Corps Volunteers.

A waiver for the procurement of vehicles from Geographic Code 936 (Special Free World) is attached as Annex 9.

3.27 Management Issues

The GOS Project Director will be charged with the responsibility of carrying out the project objectives successfully.

The AID project officer will assist in providing the necessary leadership and coordination of the various aspects of this project. The GOS Project Director and USAID Project Officer will be guided by signed working protocols between SODEVA and each of the participating agencies. Recent experience in working with SODEVA, DEF and ISRA suggests that an effective monitoring and evaluation system should be established to enhance project success. The AID project officer, in collaboration with SODEVA will establish this monitoring system and periodically evaluate the project's progress. A meeting between representatives of the different agencies, the TA, the Project Director and USAID Project Officer will convene every month to discuss project progress and redirect interventions as required to attain goals.

To enhance coordination, the project proposes to put the following management structures in place:

- The group will visit project sites and acquire a first hand assessment of project prior to the meeting. This approach brings together those who know responsible for the project site and the field level. The USAID project manager would facilitate coordination of committee meetings. SODEVA will be responsible for field operations. E & F is charged with the tree production and the technical assistance in collaboration with the forester. CNRF will design and implement the applied research component. SODEVA will provide 24 part time agents and a full time coordinator. A full time accountant paid out of project funds will work exclusively on the project account. E & F will assign two engineers, ISRA will provide 3 researchers, Peace Corps will also assign 6 volunteers to the project.

- Senior level officials of each agency and USAID project management personnel will meet and provide guidance in developing annual workplans, reviewing progress reports and assessing the need for major modifications in project interventions and/or the approach to implementation. It would also

facilitate the collection and exchange of technical information both within and among the different agencies concerned with agroforestry/soil conservation. The committee would play a key role to developing more effective, long-term cooperation and coordination between institutions.

- SODEVA will designate a full-time project coordinator to be based in Dakar plus two field Project Directors, one for Thies and one for Diourbel. Working closely with the TA forester, this individual will assure that annual workplans are developed, resources provided in a timely and effective manner, field activities will be carried out in accordance with interagency protocols and project objectives, and financial reports and technical reports prepared for submission to project and USAID officials. ISRA, Eaux et Forêts and Peace Corps will appoint representatives to serve on the field level and senior technical level coordinating committees to assure that each agency meets its obligations under the project.

- Periodic meetings between the USAID Director and GOS agency senior level officials and project management personnel to reinforce AID's commitment, monitor progress and discuss outstanding issues. These would be held as part of the USAID project implementation review system on a yearly basis.

3.28 Protocols Between Agencies

This project will require maximum coordination among the various implementing agencies (ISRA-CNRA and CNRF, Eaux et Forets, SODEVA and Peace Corps) for it to succeed. ISRA/CNRA and SODEVA currently have an effective protocol for conducting off-station research. This protocol will be modified to include more involvement by CNRF/ISRA's forestry department in carrying out and monitoring research activities. The SODEVA/ISRA Protocol will also consider ways to strengthen collaboration between ISRA and SODEVA in assuring

the dissemination of research results. SODEVA and Eaux et Forêts will develop a separate protocol regarding the arrangements for the provision of technical assistance and seedlings. These protocols are conditions precedent to disbursement of funds for field activities.

Both SODEVA and Eaux et Forêts have worked closely with Peace Corps volunteers in rural development, forestry and renewable energy activities. Efforts will be made to fully associate Peace Corps volunteers with various aspects of this program. An existing protocol between Peace Corps and SODEVA will be reviewed and modified to utilize volunteers in implementing field activities, preparation of AV materials and conducting training sessions on forestry and environmental concerns. The protocol will define numbers and types of volunteers required, delineate lines of authority and responsibility and describe procedures for use of project funds. The participation of Peace Corps is agreed upon subject to a successful negotiation between SODEVA & PC on the modality of that participation.

3.29 Relations with And Linkages to Other Projects and Institutions

Linkages will be established or reinforced with AID/W and with regional and international projects, institutions or centers. Linkages with projects may include S&T's Soil Management Support Project, Tropsoils CRSP, Dryland Farming Project and Forestry Support Project. The enhancement of relationships with regional or international centers and institutions may include: the International Council for Research in Agroforestry(ICRAF) in Nairobi, ICRISAT, IITA, CILSS.

3.3 Relationship to GOS and USAID Priorities

This project extension addresses a crucial problem of soil degradation and desertification in a major agricultural production area of Senegal. Both the GOS and USAID believe the development and implementation of effective programs to maintain the productivity of the GNB should be given much greater attention. In the FY 1985 CDSS, USAID, stressing the seriousness of the environmental degradation in the GNB, discussed efforts underway with the GOS to develop an appropriate strategy which would "lead to a broad-based, multi-agency, multi-donor action to reverse the degradation of soils in Senegal's central farming area". USAID reaffirmed its commitment to this effort in the CDSS FY 1986 Update submitted in March 1984 indicating USAID projects were focusing on two long-range problems including "the accelerating erosion of Senegal's environment, particularly the soil and fuelwood resources necessary to grow and cook food products". Concern by leading Senegalese officials including President Diouf has led to a meeting among various countries in the area held July 1984 in Senegal to discuss measures to combat the acceleration of environmental degradation. AID/W also recognizes the need to reanalyze development approaches in marginal areas. The agency's forestry strategy of February, 1984 states "AID will foster increased cooperation between agriculture and forestry in the development of integrated programs and projects", and will support agroforestry as an integral part of farming systems development and research.

4.0 PROJECT IMPLEMENTATION - CONDITION PRECEDENT

The Amendment will add a condition precedent as follows:

Condition Precedent: No funds from this Project Amendment will be disbursed to the local account until agreed upon protocols have been signed between SODEVA and the respective participating agencies.

4.1. Project Implementation Plan

4.2. Implementation Plan

The following implementation plan is proposed:

- March 1985
- PP supplement is approved.
 - Grant agreement is signed.
 - Joint research trials are completed and analysis begun of 1984/85 season.
- April 1985
- SODEVA project account is set up.
 - PIO/T is prepared for long-term TA forester and recruitment begun.
 - PIO/C is prepared for vehicles and vehicles are ordered.
 - Protocols are established or modified between GOS agencies regarding collaboration in carrying out research and extension activities and the provision of seedlings.
 - Evaluation is conducted of 1984 reforestation program.
 - Villages are selected for the 1985/86 season.
 - Short-term training needs are identified.
 - An assessment is completed of needs for well construction/improvement and water lifting devices in villages participating in 1985/86 program.
 - Materials are ordered for research and demonstration activities.
 - PIO/C is prepared for water lifting and conveyance devices and commodities are ordered.
 - Contract is executed by SODEVA for well repair, deepening.

-Meeting is held to discuss findings of 1984/85 research and field activities, and establish program for 1985/86 season.

-SODEVA tree nursery established at CETAD.

-1985 research program is elaborated and agreed to by GOS agencies and USAID.

June 1985

-Vehicles arrive and are delivered to project site.

-SODEVA training program for field agents is initiated.

-Long-term TA assumes position.

-Short-term TA soil scientist provide assistance in carrying out soil survey in project villages.

August 1985

-Well improvements are completed & water lifting device installed in villages involved in 1985/86 program.

September 1985

-Joint SODEVA/ISRA/USAID field visit of research trials

November 1985

-Joint SODEVA/ISRA/USAID field visit of research trials

Note: The same sequence of events related to research and extension interventions would be followed in subsequent years. Short-term training outside Senegal and short-term technical assistance will be programmed each year as part of an annual implementation plan. Training opportunities and TA needs are under review.

4.3. Evaluation

A continuous evaluation of project accomplishments and progress will be carried out by the project committee twice a year. Appropriate changes which can help redirect the project towards reaching set project goals will be made during the project reviews. Use of the minimum data set procedures developed under the AID/W - AFR/TR/SDP - and the project will be considered in one or two representative locations. At the end of two seasons, a major evaluation will take place. The following parameters will be measured. They are the number of hectares or trees planted, survival rates, number of villagers participating and the total number of people affected, the quality of data collected for analysis, knowledge of soil type, its capability to support vegetation and an adequate knowledge of the basic parameters affecting the technical economic feasibility of project intervention to permit the elaboration of a long-term, large-scale agroforestry project. The evaluation will also determine the relevance of research, the effectiveness of working protocols and the effective use of inputs by SODEVA to successfully disseminate the proposed package of intervention. That is the use of the documentation center, utilization of audio visual materials and operational linkages between the different agencies.

Project Accomplishments

Projected levels of project agroforestry accomplishments (i.e. hectares of woodlots and number of windbreaks planted, hectares of cropland where *Acacia albida* trees are protected are shown in Annex 6. One documentation center will be strengthened and twenty Senegalese trained in the design, implementation and evaluation of agroforestry and soil conservation programs by the end of the project.

5.0 COST ESTIMATES

5.1 USAID Funding

USAID funding is shown in Table 1. A detailed discussion of activities funded by USAID is given in Section 3.2 thru 3.4.

5.2 GOS Contribution

The GOS contribution represents salaries and in-kind support for each of the three agencies involved. Specific contributions for SODEVA include salaries and indemnities of extension agents and support staff in the two regions, at Pout's AV and training center and in Dakar; the use of AV production/projection facilities; the provision of vehicles for use by its staff; and, various overhead and operating costs (i.e. office space, utilities, telephone). ISRA's contribution includes salaries and indemnities of researchers and support personnel; use of research facilities (i.e. CNRA and CNRF) and laboratories; the provision of vehicles for use by its staff; and, overhead and operating costs (i.e. office space, utilities, telephone). Eaux et Forêts will contribute salaries and indemnities for field and support staff; the provision of vehicles for its staff; and overhead and operating costs (office space, utilities, telephone). The GOS contribution is estimated at 270,000 dollars for SODEVA, 75,000 dollars for ISRA, 60,000 dollars for Eaux et Forêts for a total of 405,000 dollars (See Annex 5). Peace Corps contribution is estimated at 270,000 dollars.

5.3 Effects Of Providing Additional Funds

The purpose of this project extension is to carry out an experimental program involving the close collaboration of three Senegalese technical

agencies to determine appropriate techniques to arrest soil and environmental degradation in the central GNB and maintain soil productivity. The importance of this geographic area to Senegal's economy has been noted elsewhere in this report. It is based on the heightened awareness by government officials, scientists and development specialists of the consequences that continued, accelerated environmental degradation would have for both the inhabitants of the GNB and Senegal. It is further based on the recognition that an integrated approach is the only one appropriate to meeting the needs of the area.

Provision of funds will enable carrying out and evaluating the effect of a series of interventions which are deemed critical to slowing environmental degradation in the GNB. It will build on activities funded thus far under the Cereals II project, particularly in the areas of expanding audio-visual materials use in extension programs and the enhancing of research/extension collaboration. This project extension will lay the foundation for larger-scale longer-term efforts in the region.

TABLE 1

USAID FUNDING
ESTIMATED BUDGET (\$000)

	<u>AID DIRECT PAYMENT</u>	<u>LOCAL ACCOUNT</u>	<u>TOTAL</u>
<u>Technical Assistance</u>			
a) Forester, 32 pm	320		320
b) Consultants, 10 pm	100		100
<u>Commodities</u>			
a) Water lifting devices	200		200
b) Vehicles & mobylettes	50		50
<u>Training</u>			
a) Short-term, Local		50	50
b) Short-term, US & Other	160		160
<u>Operating Costs</u>			
a) Research activities	150		150
b) Demonstration, extension and field activities (SODEVA, ISRA and Eaux et Forêts)		300	300
c) Well construction and improvement	140		140
d) Documentation	20		20
e) Seedling Production	150		150
f) Soil & Plant Analysis/ Soil Survey	125		125
<u>Sub-Total</u>	<u>1415</u>	<u>350</u>	<u>1765</u>
<u>Contingency 15%</u>	<u>212</u>	<u>52</u>	<u>264</u>
<u>TOTAL</u>	<u>1627</u>	<u>402</u>	<u>2029</u>

5.4 Procurement Implementation and Payment Method:

<u>ITEM</u>	<u>METHOD OF IMPLEMENTATION</u>	<u>METHOD OF PAYMENT</u>
<u>Technical Assistance</u>		
- Long term (32 pm)	- AID/W contract with 8A firm	- USAID Direct
- Short-term (10 pm)	- Work orders under central contracts, IQC's and inter-agency cooperative agreements	- Direct payment
<u>Commodities</u>		
- Water lifting devices	- USAID issued purchase order	- Direct Payment
- Vehicles	- USAID issued purchase order	- Direct Payment
<u>Training</u>		
- Short-term, Local	- Organized by GOS agencies who provide materials & stipends	- Advance to Local Account
- Short-term, US & Other(16pm)	- USAID issued invitational travel orders of PIO/P's managed by TA firm	- USAID Direct
<u>Operating Costs</u>		
- Research	- Managed by ISRA, Fixed Price Reimbursable Contract	- USAID Direct
- Demonstration, extension monitoring & evaluation	- Coordinated by SODEVA & carried out by GOS agencies	- Advance to Local Account
- Wells	- Contract between SODEVA and well diggers	- Direct Payment
- Documentation	- Managed by SODEVA	- USAID Direct
- Seedling Production	- Managed by SODEVA & Eaux et Forêts	- USAID Direct
- Soil Analysis	- Coordinated by SODEVA & carried out by ISRA	- USAID Direct
- Contingency (15%)		
TOTAL		

5.5 Justification of Payment Methods

Technical Assistance: Long and short term TA will be through a contract with an 8A firm. The project manager will directly review all vouchers and supporting documentation and provide administrative approval prior to payment.

Training: Short-term US and third-country training will be funded under mission issued invitational travel orders or PIO/P's managed by the TA firm. In each case the project manager working closely with the mission training division in PDO will monitor training. The project officer will prepare vouchers, review documentation and provide administrative approval prior to payment. Funds are also provided for in-country training through PIO/P's. SODEVA will submit supporting documentation including a statement that training was performed and was in accordance with project objectives. USAID project manager will monitor in-country training, review GOS submitted supporting documentation for these expenses and provide administrative approval.

Operating Costs: SODEVA will set up a separate bank account for this project. The account will be monitored every month. Advances will be made to the account based on detailed implementation letters signed with SODEVA which establishes funding levels and items funded for an agreed upon time period. Funding will be provided thru SODEVA's account for its activities as well as travel and per diem for ISRA and Eaux et Forêts personnel assisting in field activities. Financial reporting by SODEVA will be done monthly so that advances to the account will not exceed funding needs for more than 60 days of operations. Advances to the local account are considered essential to meeting project objectives and facilitating project implementation. The USAID project manager and financial analyst will periodically review project financial records kept at SODEVA.

USAID will issue a purchase order for seedlings furnished by Eaux et Forêts and soils analysis carried out by ISRA. SODEVA will verify that seedlings and soils analysis have been received under the project.

USAID will enter into a fixed price reimbursable contract with ISRA for research activities conducted under the project. This contract will specify the type of research to be carried out, number of trials required and reporting requirements. The TA agronomist and SODEVA's project coordinator will verify research to conduct and determine whether analysis and research reports are satisfactorily completed.

Costs incurred by ISRA or Eaux et Forêts (i.e. travel, per diem, materials) in providing other technical services to the project will be reimbursed by SODEVA from the project account. SODEVA will in turn provide proper justification to USAID for accountability of these expenditures.

Well construction and or improvement expenses will be paid directly by AID. SODEVA will subcontract with well diggers for this activity. SODEVA will submit well construction plans to USAID for review and approval prior to awarding contracts. SODEVA will verify that construction/improvement specifications have been followed and this will be checked by USAID.

The USAID project manager will review vouchers and documentation submitted by GOS agencies for conformance to implementation letters and will provide administrative approval.

Commodities: USAID will handle procurement of vehicles and water lifting and conveyance devices. USAID regulations regarding pesticide use will be adhered to. Procurement by SODEVA will be shelf-item or local procurement. USAID project manager will review procurement carried out by GOS agencies to assure conformance with implementation letters.

5.6 121d Determination and Audit Coverage Consideration

The Cereals II project has received a positive 121(d) determination. As discussed above, only SODEVA, will receive advances through a separate bank account under the project.

memorandum

MINNEA. 1

DATE: January 11, 1985

REPLY TO: *cfm*
ATTN OF: Alex Newton, RLA

SUBJECT: Subject: Senegal Cereals Production - Phase II; 3-year Extension of Life-Of-Project

TO: S. J. Littlefield, Mission Director

A question has arisen as to your authority under DOA 140, revised, to extend the subject project for 3 years. The project was authorized on Dec. 11, 1979, the Grant Agreement was signed 20 days later on December 31, 1979, and the PACD was set at Sept. 30, 1984. The authorization states that this project involves "planned obligations of not to exceed \$7,700,000 in grant funds over a 5 year period from the date of authorization". It does not state, for example, that the "life-of-project" starts from the date of authorization. Under DOA 140, revised, Mission Directors in Class A posts have "the authority to approve extensions of the life of a project for a cumulative period not to exceed three years". Section 4 (2) (D) of DOA 140, revised. It does not use the term "PACD" here DOA 140, revised, also states that "the life of project runs from the estimated date of signature of the project agreement or other obligating document to the PACD". Accordingly, it is quite clear that you have the authority to extend the life of project 3 years and such authority runs starting 5 years from either the date of authority (Dec. 11, 1984) or date of initial obligation (Dec. 31, 1984). In no event would it run from the actual PACD in this particular case. I believe rather strongly that you have the authority to extend the PACD to Dec. 31, 1987 because under DOA 140, revised, it seems rather clear that the drafters considered the term "life of project" not to start at the date of authorization but at the date of obligation to take into account that there is always a gap between project authorization to project obligation. Admittedly, the authorization itself read in conjunction with DOA 140, revised, is somewhat ambiguous, but what seems unambiguous to me is the intent of the drafters of DOA 140, revised -- if you have a 5-year project, the 5 years is meant to start from the signing of the grant and that mission directors of class A posts should be able to extend grants in such circumstances by 3 years (for a total life-of-project of 8 years) from date of initial obligation. That seems clearly to be the intent and, of course, it also makes good programmatic sense.

ANNEX 2
PROJECT DATA

Project Number	685-0235
Project Title	Senegal Cereals Production II
Date Project Authorized	December 18, 1979
Date Original Agreement	December 31, 1979
Original PACD	September 30, 1984
Amended PACD	March 31, 1985
LOP Funding	\$ 7,700,000
Proposed New PACD	December 31, 1987

-36-
ANNEX 3
LOGICAL FRAMEWORK

<u>NARRATIVE SUMMARY</u>	<u>OBJECTIVELY VERIFIABLE INDICATORS</u>	<u>MEANS OF VERIFICATION</u>	<u>ASSUMPTIONS</u>
<p>-Maintain and/or enhance soil productivity in the Thies and Diourbel Regions of Senegal to help meet food and fuel subsistence needs.</p>	<p>-Production Records -Project Evaluations -Research Reports</p>	<p>-Review of Production Records, & Research and Progress Reports; Project Evaluations</p>	<p>-The GOS and donors agree to support long-term interventions and investments in the project area. -Villagers, religious leaders and others support the need to protect the environment</p>
<p>a) Identify, test, disseminate and evaluate a series of agroforestry and soil conservation techniques designed to maintain soil productivity</p>	<p>a) Production Records; Research Reports; Project Evaluations</p>	<p>a) Review of Production Records, & Research & Progress Reports; Project Evaluations; Field Visits</p>	<p>a1) Villagers will be receptive to the types of interventions planned;</p>
<p>b) Improve the capability of GOS agencies to design, implement & evaluate agroforestry & soil conservation programs</p>	<p>b) GOS & USAID training records; Evaluations of GOS planning documents</p>	<p>b) Review of GOS & USAID training records, GOS proposals submitted for donor funding & technical reports prepared by GOS</p>	<p>a2) A high level of collaboration & coordination can be developed & maintained among SODEVA, ISRA & Eaux & Forêts; and at higher GOS levels; a3) GOS agricultural policies and its restructuring of various GOS institutions will allow for the timely provision of required production inputs (i.e. improved seed, chemical fertilizer, pesticides & agr. credit for the purchase of inputs & agr. equip. & the maintenance of the latter); a4) Appropriate techniques identified will be effectively disseminated in the rural areas;</p>
<p>a) Appropriate (i.e. cost effective, socially acceptable, technically & economically feasible) production systems are identified & being disseminated.</p>	<p>a) An integrated agroforestry/soil conservation program is being carried out in 60 villages b) Twenty Senegalese from SODEVA, ISRA & Eaux & Forêts have received appropriate short-term training. c) A documentation center has been strengthened at Pout.</p>	<p>a) Project evaluations; Field trips; Review of Project Progress & Technical Reports b) Review of GOS & USAID training records and progress reports. c) Visit to documentation center; Review of Progress Reports.</p>	<p>a5) The GOS will provide the required level of budgetary support in a timely manner; & a6) Villagers will make sufficient quantities of land available for tree planting.</p>
<p>b) Senegalese personnel are trained in the design, implementation & analysis of agroforestry/soil conservation programs.</p>			<p>a1) GOS agencies are committed to collaboratively carrying out an integrated agroforestry/soil conservation program;</p>
<p>c) A documentation center on agroforestry/soil conservation is well established.</p>			<p>a2) GOS provides required funds for salaries & operating costs. a3) Production inputs are adequately made available.</p>
<p>a) Technical Assistance b) Training c) Commodities d) Construction e) Operating Costs f) Contingency</p>	<p>a1) 320,000 for long-term TA a2) 100,000 for short-term TA b1) 50,000 for in-country training (short-term) b2) 160,000 for US & third-country training (short-term) c1) 100,000 for water lifting & conveyance c2) 50,000 for vehicles & molyettes d1) 100,000 for well construction & improvement e1) 150,000 for research e2) 300,000 for demonstration, extension, monitoring & evaluation e3) 20,000 for establishment of documentation center e5) 150,000 for tree seedling production e6) 125,000 for soil and plant analysis f) 15% of total budget (i.e. 264,000)</p>	<p>USAID & GOS financial records including grant agreements, earmarking documents and financial reports.</p>	<p>b) GOS personnel with required language and technical skills can be identified and relevant training scheduled. c1) GOS technical agencies are willing to collaborate to share information; c2) SODEVA provides a documentationist to work in this center Suitable financial accounting procedures can be established to assure timely availability of funds.</p>

ANNEX 4
ECONOMIC ANALYSIS OF PROJECT

INTRODUCTION

Contrary to the usual method of project feasibility study which compares the costs of project to the benefits from project, this analysis aims at determining acceptable levels of project costs given its expected benefits. In doing so, the analysis will show the cost range within which project costs should be in order to obtain a minimum positive rate of return.

The nature of the project, as described in the core of the PP supplement, more closely resembles that of research and development exercise rather than a truly tried production run. More specifically, we are attempting to determine what is feasible regarding various approaches to (1) renewable fuel production; (2) reforestation to reverse desertification; and (3) soil conservation to increase crop yields.

It is not an overstatement that in research and development the cost of the pilot unit is fairly high. This is because we are fabricating a model from "scratch". Once we have created a model, modified it, learned from it and ultimately improved it, then the end result is the entity which will bring home the "trees and fruits", so to speak.

The project is divided into 3 components, a plantation reforestation system (forest species and fruit trees), an intercropping reforestation system, (using *Acacia Albida*); and, a windbreak system. The following

analysis contains the basis for determining the costs of the project, given the expectation of quantifiable benefits from the project.

Before we proceed though, it is worth reminding that there are a number of benefits (and costs) that elude precise quantification. These are mentioned in a second part.

PART ONE

I - DIRECT BENEFITS FROM PROJECT

A - VILLAGE WOODLOT COMPONENT

1) Specific Assumptions

The direct benefits produced by the project by the seventh year of plantation will be firewood and building poles that the villagers' organizations will be able to keep for home uses or sell on the local market.

Using an expected, conservative, yield of 4 cubic meters/ha/year, wood will be cut three times: the 7th year, the 12th year and the 17th year. Table 1 shows the production of wood products on 1 hectare woodlot for the life of the project. 80 percent of the wood produced is firewood and 20 percent poles at respectively CFA 8,832 (or \$19.6) per cubic meter and CFA 13,657 (or \$30.3) per cubic meter (World Bank Price Estimates for 1985 converted into dollars, \$1.00 = 450 CFA).

Prices of wood products are expected to rise at 3 percent per year in real terms for the next 20 years, thus reflecting the increasing scarcity of wood products. The evaluation of prices of wood products is shown in Table 2.

TABLE 1: WOOD PRODUCTION (CUBIC METER/HECTARE)

	<u>Firewood</u>	<u>Building Poles</u>	<u>Total Production</u>
Production of the 7th year cut	22.4	5.6	28.0
Production of the 12th year cut	16.0	4.0	20.0
Production of the 17th year cut	<u>16.0</u>	<u>4.0</u>	<u>20.0</u>
	54.4	13.6	68.0

TABLE 2: EVALUATION OF PRICES OF WOOD PRODUCTS IN REAL TERMS,
1985-2004 (U.S.\$ PER CUBIC METER)

<u>PROJECT YEAR</u>	<u>FIREWOOD</u>	<u>BUILDING POLES</u>
01 : 1985	19.6	30.6
07 : 1991 (*)	23.4	36.5
08 : 1992	24.1	37.6
09 : 1993	24.8	38.7
10 : 1994	25.5	39.9
11 : 1995	26.3	41.1
12 : 1996	27.1	42.3
13 : 1997	27.9	43.6
14 : 1998	28.7	44.9
15 : 1999	29.6	46.2
16 : 2000	30.5	47.6
17 : 2001	31.4	49.1
18 : 2002	32.3	50.5
19 : 2003	33.3	52.0
20 : 2004	34.3	53.6

(*) 1991 will be the year of first cut, if the project starts in 1985.

2. Gross Income

The value of total production of wood products from 1 hectare woodlot is calculated as follows (using prices from Table 2).

<u>US \$</u>	<u>Firewood</u>	<u>Building Poles</u>	<u>Total Gross Value</u>
Value of the 7th year cut	524.20	204.40	728.60
Value of the 12th year cut	433.60	169.20	602.80
Value of the 17th year cut	<u>502.40</u>	<u>196.40</u>	<u>698.80</u>
TOTAL	1,460.20	570.00	2,030.20

Calculation of the present value of 3 cuts of one hectare village woodlot planted in 1985 at different discount rates:

<u>Rates of Discount (%)</u>	<u>P R E S E N T V A L U E (\$)</u>			<u>Total Gross Income From One Hectare</u>
	<u>7th year cut</u>	<u>12th year cut</u>	<u>17th year cut</u>	
1	679.8	534.7	589.8	1,804.3
2	634.6	475.0	498.9	1,608.5
3	592.4	422.6	422.8	1,437.8
5	518.0	335.8	304.7	1,158.5
7	453.9	267.6	221.5	943.0
10	373.8	192.3	138.4	704.5

B - INTERCROPPING COMPONENT

1) Specific Assumptions

- Agricultural land areas in the project zone are divided into 55 percent for millet cultivation and 45 percent for groundnuts cultivation.

(H.Josserand & C. Ross: Consumption Effects of Agricultural Policies; Senegal Case Study. CRED - August, 1982).

- Acacia albida has maximum beneficial effect on agricultural production between 20 and 40 years of age.

- Average yields in project zone are:

. Millet: 500 kg/ha

. Groundnuts: 500 kg/ha

in fields without Acacia trees but using minimum amounts of fertilizers.

- Between 20 and 40 years of age Acacia albida can increase millet production by 30 percent and that of groundnuts by 30 percent at a minimum planting rate of 50 trees per hectare. These rates of increase represent conservative rates while research results mention 50 - 100 percent rates of increase - (Felker, 1978).

2) Gross Income

Therefore, on an average hectare of land in the project area the potential agricultural gain attributable to the intercropping activities will be:

0.55 x 150	= 82.5 kg of millet
0.45 x 150	= <u>67.5</u> kg of groundnuts
- Total gain	=150.0 kg

At the official price of CFA 60/kg of either crop, the value of the potential gain is CFA 9,000/Ha (or \$20.0) per year from the 20th to the 40th year of the trees.

However, it is assumed that earlier slight increases in crop yields will occur between the 15th year and the 19th year of plantation up to the 20th year when maximum potential gain is attained.

The value of the total potential gain is therefore : CFA 215,100/Ha of intercropped land area (or \$478) from the 15th to the 40th year.

Calculation of the present value of the potential income gain from one hectare interplanted to Acacia trees (using constant prices of agricultural products):

Discount rates (%):	2	3	5	10
Present value (\$) :	274.2	210.8	126.4	39.0

C - FRUIT TREE COMPONENT

1) Specific Assumptions

- Many fruit tree species are available that would best suit the soil conditions in the project area. One possible planting pattern of fruit trees would be to plant several species on the same land. For simplicity, pure stand of cashew trees is assumed here.

- Cashew tree starts bearing fruits 5-7 years after planting, depending on rainfall conditions and necessary amount of care. For this analysis, fruit bearing starts 6 years after planting, with a conservative yield estimate of 90 kg fruits per hectare.

- Yield increases from the 8th year to the 15th year and then decreases for the remaining life of the project (from the 16th year to the 20th year).

- Yield estimates after the 6th year:

	<u>KG/HA/YEAR</u>
6th and 7th years :	90
8th to 10th years :	160
11th to 15th years:	250
16th to 20th years:	180

2) Gross Income

At a price of CFA 100/kg of fruit, the gross income from 1 hectare planted to cashew trees will amount to CFA 281,000/ha (or \$624.4/ha).

The 6th and 7th years harvest :	18,000 CFA
The 8th to 10th years harvest :	48,000 CFA
The 11th to 15th years harvest:	125,000 CFA
The 16th to 20th years harvest:	<u>90,000 CFA</u>

TOTAL (6th-20th years) : 281,000 CFA

Calculation of the present value of gross income from one hectare planted to cashew trees (using constant prices of fruits):

Discount Rates (%) :	2	3	5	10
Present Value (\$) :	479.0	384.7	329.8	184.6

II - PROJECT COSTS

As mentioned in the introduction of this analysis estimates of benefits carried out in the preceding section represent a basis for determining acceptable levels of project direct quantifiable costs. These costs include:

- a) Development costs, including such items as land compensation, survey, construction of wells, access roads, clearing.
- b) Equipment costs, including vehicles, pump units, small tools, fencing materials, etc.
- c) Staff salaries, housing costs for management, professional employees, technicians, office workers, general laborers, computed farmers' labor.

- d) Operating costs, including seedlings, fertilizer, insecticides, fuel and oil, machinery repairs, building and equipment maintenance.

The real exercise here is to search for cost estimates that will equate the discounted benefits at some acceptable discount rates. The table below summarizes different levels of discounted benefits that would be the maximum costs per unit of land, if the project were to be economically viable.

TABLE 3
ESTIMATED MAXIMUM PER HECTARE COSTS PER COMPONENT OF PROJECT

DISCOUNT RATES (%)	WOODLOT COMPONENT (\$)	FRUIT TREE COMPONENT (\$)	INTERCROPPING COMPONENT (\$)
2	1,608.5	479.0	274.2
3	1,437.8	384.7	210.8
5	1,158.5	329.8	126.4
10	704.5	184.6	39.0

Project officials will maintain careful records of expenditures directly attributed to the implementation of field-level interventions. Costs of seedlings, and transport, tree protection and extension services will be compared on a periodic basis with maximum acceptable costs for a particular intervention to obtain a positive rate of return. Because of the pilot nature of this project, substantial costs (i.e. for technical assistance, training, operating costs) are associated with research, institutional strengthening and data collection activities. These costs will not be included in the assessment of the economic returns for each technical intervention (i.e. woodlot, windbreak, protection of nitrogen fixing trees).

PART TWO

INDIRECT BENEFITS

The scale of the project is not large enough to have an important impact on general prices in the project area. But its success and possible expansion have the potential to improve other aspects of the economy throughout the project area, such as improving agricultural productivity, supplying basic products needed for economic development, providing other benefits (e.g., amenity, shade, reduced expenditure of time and labor in collecting fuel, etc...).

Furthermore, real savings by consumers from stabilized or reduced prices of fuel, increased yield from crop fields and/or increased weight of livestock, would be diverted to the purchase of other essential items such as better food, clothing and health care. These alternative uses of savings would help further enhance the quality of life in the villages.

Environmental conditions in the project area will benefit from these reforestation activities:

- shading of ground under trees will reduce evaporation from soil surface,
- trees will reduce temperatures in their immediate vicinity,
- the presence of trees will abate wind and water erosion of the soil,

- penetration of the soil by the roots of trees will aid aeration in the soil and promote increased water retention,
- on the intercropped land, the *Acacia albida* add to soil fertility by depositing organic matters in the form of leaves. Grown as fertilizer crops, the fallen leaves of the trees rot away to form humus.

The combined effects of these factors should help delay the process of desertification.

Most important of all, the project will provide the villagers a means to directly participate in reversing problems challenging their very existence. Through their acquisition of basic technology in resource management and their collaboration over time with Extension, Forestry and Research personnel, and Peace Corps Volunteers, the villagers will be better equipped to deal independently with such problems in the future without any external resources.

ANNEX 5

GOS & PEACE CORPS CONTRIBUTION

The GOS contribution represents the salaries of researchers, technicians and support staff as well as the use of GOS facilities and logistical support. The following figures were obtained with consultation of respective agencies.

SODEVA	\$ 270,000
ISRA	75,000
E & F	60,000
Sub-Total	405,000 (*)
Peace Corps	270,000
TOTAL	\$ 675,000

(*) This represents 18% of LOP funding (405/2,189,451)

ANNEX 6
ESTIMATED PROJECT OUTPUTS

<u>Iten</u>	<u>1985/86</u>	<u>1986/87</u>	<u>1987/88</u>	<u>TOTAL</u>
Village Woodlots (No.) (a)	30	20	10	60
Windbreaks (No.) (b)	30	50	30	100
Acacia Albida (Ha) (c)	600	1000	1200	2800
Compost Pits (No.)	10	12	8	30

(a) Estimated average of one hectare/village

(b) Estimated two lines of windbreaks/village approximately 2,000 meters in length

(c) This action includes protecting existing acacia albida and planting additional ones to achieve optimum density/hectare. SODEVA will list hectares planted and hectares protected in its status reports.

ANNEX 7
SCOPE OF WORK - FORESTER

The project forester will serve a crucial role as technical coordinator of project activities. This project stresses the interrelationship between agricultural production and soil and water conservation. Therefore, this individual must have considerable experience in forestry/soil conservation aspects and environmental matters. He/she will work directly with the SODEVA project coordinator to advise on technical aspects of project interventions and be based in Thies. He/she will:

- 1) assist in the coordination and supervision of the technical program;
- 2) aid in the identification of pilot villages and elaboration of annual workplans;
- 3) monitor all field activities (i.e. research, extension, training) in close collaboration with other agency representatives;
- 4) consolidate relevant documentation from Senegal and elsewhere on agroforestry and soil conservation;
- 5) assist in the preparation of progress reports and the evaluation of project activities; and
- 6) serve as a member of the field-level coordinating committee and a liaison with the senior technical level committee and USAID.

Skills Required

- 1) MS or PHD in forestry or soil conservation;
- 2) Minimum of five years work experience in agricultural development activities in semi-arid or arid regions with preference for the Sahel;
- 3) Experience with extension, research, agroforestry and soil conservation programs; and
- 4) Fluent French language ability (oral and written minimum FSI 3/3)

ANNEX 8
ESTIMATED TECHNICAL ASSISTANCE COST
PER YEAR FOR FORESTER (a)

<u>Item</u>	<u>Amount (\$)</u>
- Salary	40,000
- Transportation	2,000
- Household Effects	6,000
- US Storage	1,500
- Post Differential (15%)	6,000
- Defense Base Insurance (4.64)	1,856
- FICA, Medicare (8.40% of \$39,600)	3,326
- Overhead (b) (100% of salary)	40,000
- Housing (rental & utilities - \$1,200/mo)	14,400
- Furnishings (c)	2,000
- Temporary Lodging	1,000
- In-Country travel/per diem	2,000
<u>TOTAL</u>	<u>120,082</u>

(a) Cost calculated is for single person.

(b) Based on contract with 8A firm.

(c) Furniture and appliances purchased under the Cereals II project will be used by TA. Amount budgeted is for replacement of certain items.

ANNEX 9

WAIVER FOR VEHICLE PROCUREMENT

ACTION MEMORANDUM FOR THE MISSION DIRECTOR

FROM: John McMahon, ADO

SUBJECT: Senegal Cereals Production II Project (685-0235)

PROBLEM: Your approval is requested for a source and origin waiver from Geographic Code 000 (U.S. only) to Geographic Code 935 (Special Free World) for the purchase of two four-wheel drive vehicles and a 2 1/2 ton flatbed four-wheel drive truck and 5 mobylettes for use in an agroforestry/soil conservation pilot program implemented by SODEVA in collaboration with ISRA (Senegal's Agricultural Research Institute and Eaux et Forêts (Senegal's Water and Forestry Agency) and Peace Corps in Senegal's Groundnut Basin. In addition, authorization is requested to waive the provisions of section 636 (1) of the Foreign Assistance Act of 1961, as amended, that motor vehicles financed with AID funds be manufactured in the United States.

A) Cooperating Country	Senegal
B) Project	Cereals Production II
C) Project Number	685-0235

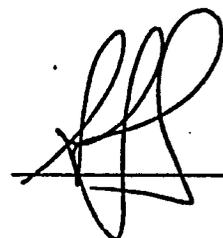
research sites. The truck will be used to transport tree seedlings, and fencing and other materials to project villages. The molyettes will be used by Peace Corps Volunteers. Since the project vehicle will be used almost exclusively outside of Dakar, the choice of vehicle must reflect the availability of spare parts and servicing in secondary towns in the project area. Service and spare parts must be readily available in these areas to insure prompt servicing and maintenance and avoid costly delays to the project which would result if this were done in Dakar, or if parts are not available in these areas for U.S. manufactured vehicles. In the case of Senegal, the only service facilities outside Dakar with trained mechanics and spare parts inventories are for the French-made Peugeot and Renault and for Brazilian-made Volkswagens. Thus, the circumstances satisfy the criteria for determining that the required commodities are not available from countries in the authorized Geographic Code, as set forth in Handbook 1B, Chapter 5B4A (2).

B. Waiver of Section 636 (1)

In addition to the general source and origin limitations on the procurement of commodities, Section 636 (1) of the Foreign Assistance Act (FAA) prohibits the procurement of vehicles of non-U.S. manufacture. However, the provisions of section 636 (1) may be waived when special circumstances which may merit waiving the requirement include "present or projected lack of adequate service facilities and supply of spare parts for U.S. manufactured vehicles". Since, as discussed in the source and origin context, U.S. manufacturers do not provide the necessary spare parts and service representation in Senegal, the special criterion set forth above is satisfied.

RECOMMENDATION: For the above reasons, it is recommended: (1) that you conclude that special circumstances exist to waive the requirements of section 636 (1) of the FAA; (2) that you waive the source/origin requirements set forth in Handbook 1, Supplement B to allow procurement of two passenger

vehicles and one truck and 16 mobyettes from countries included in Code 935;
(3) that you certify that exclusion of procurement from free world countries
other than the cooperating country and countries included in Code 941 would
seriously impede attainment of U.S. foreign policy objectives of the foreign
assistance program

Approved: 

Disapproved: _____

Date: _____

9/26/85
FUNDS 22
AVAILABLE

ANNEA 10
CEREALS II PROJECT (685-0235)
FINANCIAL STATUS

	(\$)
Funds Obligated	7,700,000
Funds Earmarked	6,010,549
Funds Unearmarked	1,689,451
Funds Which Could Be De-Earmarked	500,000

Amount Available for Agroforestry Program Equals Unearmarked Funds Plus Funds Which Could Be De-Earmarked (1,689,451 + 500,000 = \$ 2,189,451)