

TRIP REPORT

DOMINICAN REPUBLIC AND PERU

May 5-17, 1980

John J. Nicholaides, III and Peter Hildebrand

PURPOSE:

To visit potential primary research sites for the Title XII Soil Management CRSP Steeplands Project, to discuss with appropriate host institutions and USAID mission scientists and officials the potential Project, and to sign letters of intent with appropriate officials.

DOMINICAN REPUBLIC

ACTIVITIES AND ACCOMPLISHMENTS:

MAY 5 (Monday):

Travel to Dominican Republic. Met at airport by USAID driver and Ing. Amilcar Ubiera of FERQUIDO. Met at hotel with Mr. Felipe Manteiga, Agricultural Economist, USAID/Santo Domingo, and informed of meetings scheduled with USAID, Secretary of Agriculture (SEA) and IICA scientists the following day.

MAY 6 (Tuesday):

USAID: Met with Dr. Ron Trostle, Agricultural Economist for Natural Resource Management, Mr. Rafael Rosario, Deputy Food and Agricultural Officer, Mr. Gary Kemp, Agricultural Economist Contractor with CRIES Project and Mr. Bryan Redert, Vegetable Crops Specialist and briefly with Dr. Ken Ellis, Rural Development Officer, and nematologist by training.

The Steeplands Project of the Soil Management CRSP was explained. Discussion centered on how the Steeplands Project could fit in with and supplement the various USAID/Dominican Republic soil conservation projects. All sides agreed that the projects should be integrated with the other GODR and USAID soil conservation projects to ensure maximum benefit. The USAID mission representatives stated that if the Title XII Soil Management Steeplands Project could be tied into current and future GODR and USAID soil conservation projects, and USAID/Santo Domingo thought it could, then USAID/Santo Domingo would like to see the project located in the Dominican Republic. A copy of the draft of the letter of intent to be discussed with SEA officials was presented to the USAID personnel.

SEA/IICA: Met with Dr. Cesar Lopez, Director, OSESIA/SEA; Azua Valley Project; Ing. Gustavo Tirado, Director, DIEO (SIEDRA/SEA); Lic. Raul Pineda, Assistant to Director of Research Villanueva of SEA; Ing. Aridio Perez, In-Charge, Division of Soils, CENDA (Northern Region)/SEA; Lic. José Romero, In-Charge, Public Relations, Office of International Cooperation/SEA; Ing. Julio César Peña, Director of Soils Department, CESDA (Southern Region)/SEA; Dr. Manuel Paulet, Soil and Water Management Specialist, IICA; Dr. Ron Trostle and Mr. Gary Kemp.

The Steeplands Project of the Title XII Soil Management CRSP was explained and discussed. Many questions were raised concerning the potential Steeplands Project in the Dominican Republic. Perhaps the most critical issues raised were two mentioned by Ing. Tirado. One is the limited trained human resource base in the Dominican Republic to tie into such a project. Secondly, current priorities within SEA, especially in the southern region, give more emphasis to the semi-arid, non-acid soils in the valleys (such as those around Azua) than to the Steeplands. When these two factors were combined, a less than ideal climate for the Steeplands Project was thought to exist in the Dominican Republic. Ing. Tirado had raised the issues asking that the Dominican Republic be considered as a site for the Title XII Soil Management Seasonal, Non-Acid Tropics Project. The Planning Team explained that this could be a possibility, especially as a secondary research site, at a later date but that the purpose of this trip, based on Assessment Reports 24 (USAID/Santo Domingo), 25 (IICA/Santo Domingo), 78 (SEA/DR) and USAID/Santo Domingo Cable 3962 responding to State Cable 170039, was to determine the feasibility of establishing a primary research site for the Steeplands Project in the Dominican Republic.

The draft of the letter of intent between SEA and NCSU was reviewed in detail with those in attendance. Some changes in wording and substance were suggested by the SEA and IICA representatives and accepted by the Planning Team. The Team was quite pleased that several SEA representatives and the IICA representative brought up on their own the need to develop the Steeplands Project into a cooperative one with Haiti, as the problems, though more severe in Haiti are the same, and the political climate between the two countries is right for such cooperation. Dr. Cesar Lopez stressed the vital importance of the training component of the Steeplands Project for host country scientists. Dr. Manuel Paulet emphasized the need for the host country counterparts to be assigned full-time to this particular project. The SEA representatives determined that they would like to participate in such a project and that the letter of intent should be signed by their Secretary of Agriculture. After much discussion, it was decided to allow the headquarter location of such a project to be determined at a later date by the Secretary of Agriculture and the Management Entity. Lics. Raul Pineda and José Romero and Ing. Tirado made the arrangements for the signing on Thursday, May 8. The meeting which had begun at 9:30 a.m. adjourned at 2:00 p.m.

Site Visit to Ocoa: From 3:00 to 8:00 p.m. the Planning Team traveled with Dr. Lopez to the area between Ocoa and Constanza which is west, northwest of Santo Domingo in the Cordillera Central. This area had been suggested by Dr. Sanchez in Assessment Report 78 and the SEA representatives with whom the Planning Team met as one which has erosion problems due to population pressures and cultivation of the slopes. Due to extreme damage by Hurricane David to the road and lands between Ocoa and Constanza, the Planning Team was able to travel only as far as 10-15 km N of Ocoa and thus did not see the entire area that Dr. Sanchez had on his late July 1979 visit. Additionally, planting of crops was just beginning during this early May visit. Also, the rains which normally begin in early May were late. Hence, the observations of the Planning Team are somewhat different from those of the earlier visit and the SEA representatives.

Some steepland soils (probably Dystropepts) on 20-30% slopes are being cultivated with corn, beans and other small farmer crops. Although the soils of the Ocoa area are quite shallow and one would anticipate erosion problems if heavy rains occur prior to adequate ground cover establishment, the Team did not see

either population pressures or erosion problems equivalent to those in many areas of Central America, especially Guatemala or El Salvador. Some terracing of the slopes on small farms was noticed and Sister Cecilia Smith of Ocoa told us that this was the result of the Bishop's activities with the farmers.

MAY 7 (Wednesday):

We began the trip at 6:30 a.m. to Santiago de Los Caballos in the Cibao Valley with Dr. Trostle driving us in an AID vehicle; accompanying were Drs. Lopez and Paulet. Meetings were set up with CENDA, ISA and Plan Sierra officials and scientists. The Cibao Valley, although the best developed region (primarily on Mollisols and Vertisols) in the Dominican Republic, contains expanses of less desirable soils on steepplands. The Association for the Development of Santiago, a group of about 15 powerful church, business and political leaders, including President Antonio Guzman, and Sr. Luis Crouch, established through their government and outside funding the Plan Sierra. The Plan Sierra is helping small farmers on the steepplands establish improved ground cover thereby protecting the small farm on the slopes and the larger farms and pastures in the valleys below by reducing soil erosion and subsequent siltation.

CENDA: This Agricultural Development Center for the Northern Zone of the Dominican Republic was founded in 1964, also by the Association for the Development of Santiago. It is now an extremely viable Center which has been instrumental in much of the impact development in the Cibao Valley. Its research program centers on plant breeding, plant protection, irrigation and drainage, soil fertility, classification and conservation, agricultural economics and finally extension. Crops include beans, guandul, soybeans, peanuts, corn, sorghum, cassava, sweet potatoes, plantains, papaya, pineapple, onion, tomato, coffee, cocoa, and crop associations as corn/beans, plantains/beans, cassava/corn. Multidisciplinary projects are the rule. The Northern Zone is divided into seven regions each of which can receive the following services: Soil and water analysis, fertilizer and food analysis, plant analysis, identification and control of plant pathogens, and diseases, seed production and access to agricultural machinery. Technology transfer is effected utilizing demonstration plots, farm days, observation tours, seminars, conferences, training courses and publications.

The five travelers met with Ing. Luis Peralta, Director of CENDA/SEA, Ing. Ramon Jimenez, Sub-Director of CENDA/SEA, Ing. Aridio Perez, In-Charge, Division of Soils, CENDA/SEA and Ing. Isabel Ceara, Director of Academics, Superior Institute of Agriculture (ISA) on the same grounds with CENDA.

The purpose of the trip and the Steeplands Project was explained. Ing. Peralta stated that CENDA emphasis is shifting to the mountain areas as the need for good soil conservation practices is becoming more evident. Although CENDA currently works only in the valleys and recommends no hillside farming, CENDA could begin looking at how to crop steepplands because people are doing it. The Plan Sierra was described as more extension activities, but on steepplands where erosion problems are paramount; thus, Plan Sierra was suggested as an excellent link for the Steeplands Project with strong research ties with CENDA. It was also learned that the Northern Zone for which CENDA has responsibility includes Constanza and extends approximately to within 45 km of Ocoa; therefore, the other area of interest for the Steeplands Project falls under the responsibility of both the Northern and Southern Zones.

It was mentioned that population pressure in the San José de las Matas area (Plan Sierra headquarters) is not that great since large numbers are leaving that area. Due to this tremendous exflux from most hillsides in the Cibao Valley, the population growth in the Cibao Valleu is 0.52%, while in Moncion, also in the Cibao Valley and Plan Sierra area, but without the exflux, population growth is 3.99%.

The priority of the Dominican Republic government in the near future will shift to the Steeplands as there is no alternative, said Ing. Peralta in response to a question from Dr. Hildebrand. When this priority shift comes, it is expected to center its activities on agronomic and economic steeplands research to allow the small farmers to profitably conserve a non-renewable resource.

The cooperation between CESDA, CENDA, ISA, the Catholic University in Santiago, an Ecological Association in Santiago and Plan Sierra were described as good workable relationships. CENDA would prefer that if the Steeplands Project comes to the Dominican Republic it be located in CENDA as they feel they have more to offer research scientists, but Ing. Peralta stated that CENDA will cooperate well with whatever institute headquarters the Project.

Cooperation among the various disciplines with Soil Science in a cropping systems approach was described as excellent in CENDA, the Catholic University, Reforma Agraria and ISA. CENDA's biological scientists and agricultural economists could be complemented well by economists, sociologists and antropologists at the other three institutions in the cropping systems approach of the Steeplands Project.

Ing. Peralta brought up, without prompting, that CENDA and the Dominican Republic very much want the Steeplands Project, if it comes, to be eventually a cooperative one with Haiti. This link is viewed as critical and there is true interest on the part of both governments. The erosion problems, though more pronounced in Haiti, are viewed as the same as those in the Dominican Republic. Ing. Peralta felt that such a linkage could be easily handled from the Santiago area as other such linkages are underway.

The laboratory facilities of CENDA were toured. Installation of new lab equipment and renovation of facilities, to be completed within 60 days, are expected to make the soil and plant analyses lab the most functional service/research lab in the Caribbean/Central America area. Nicholaides agrees with this projection based on his experiences in laboratories of the Caribbean/Central America.

Ing. Isabel Ceara (ISA) mentioned as we headed on the same campus towards ISA, that the Dominican Republic is interested in the cooperative steeplands venture with Haiti as the countries share the island of Hispanola and what happens in one affects the other. The Dominican Republic is interested in helping Haiti determine whether the severely eroded steeplands can be reclaimed and preventing further erosion of these soils in both the Dominican Republic and Haiti.

ISA (Superior Institute of Agriculture): Met with Ing. Norberto Quezada, Director and Ing. Ceara and explained purpose of visit and potential Steep-lands Project. Ing. Quezada was aware of the potential project, having been contacted by Ing. Luis Crouch following Dr. Sanchez visit last July 1979 and recent conversations. The importance of long-term training and the good cooperation among the various Dominican organizations were stressed. Interest in cooperating in the Steeplands Project was apparent.

ISA, essentially the parent organization of both CENDA and Plan Sierra, is a high school-college with about 25 faculty, 150 students and over 10,000 publications in its library. It and CENDA are located on adjoining properties within the same compound in Santiago. Relationships between ISA and CENDA seem outstanding, the soil and plant analyses laboratories were shifted from CENDA to ISA during the current renovation without adversely affecting service or research.

Plan Sierra and Proyecto BAO (a soil and water conservation-management project headed by Ing. Miguel Gomez of SEA) were suggested as two possible on-farm links for the Steeplands Project.

Suggested as background documents were pertinent thesis such as those by Drs. Gustavo Antonini, ("Processes and Patterns of Landscape Change in the Linea Noroeste, Dominican Republic", doctoral thesis, Columbia University, 1968) and by Dr. Robert Werge (anthropological study of cropping systems in the Constanza area, doctoral thesis, University of Florida, ca. 1974) and Dr. Diane Rochelo (another anthropological-sociological study of cropping systems management in the steeplands of the Dominican Republic, doctoral thesis, University of Florida, 1980).

Plan Sierra: We left ISA at 1:00 p.m. and traveled west through steeplands cropped with corn or beans, primarily, to San Jose de las Matas. Though viewed at a distance many of the cropped soils appear to be Eustopepts. Planting rows both with and against slopes were noted, the former being more prevalent. Though population pressures were greater than in the Ocoa area, they still did not approximate those of areas of Central America. We arrived at Plan Sierra headquarters at 2 30 p.m. in the midst of a heavy downpour.

We met with Ings. Luis Bonilla and Victor Montero and Sr. Angel Liriano, Conservationists and Foresters who described Plan Sierra over lunch. The areal extent of Plan Sierra is 250,000 ha, beginning west of Santiago, bordered on the east by the Yaque del Norte River, on the north by the Cibao Valley, on the west by the Mao River and on the south by the San Juan Province. Rainfall ranges from 750-2,000 mm. Soils are "generally acid and less than 100 cm deep". Principal communities are San Jose de las Matas, Moncion, Janico, and el Rubio.

The total population of the 25,000 families of the area approximates 150,000. Most of the farms are 5 ha. or less and produce beans, guandul, tobacco, cassava, peanuts and corn, some chickens and small livestock are raised. Soil conservation measures are not normally practiced by the small farmers, most preferring to plant with the slope of the land. The expected results occurs. Fertility of the soil is diminished after two years of cropping and cropping essentially ceases. More erosion occurs prior to returning native vegetation somewhat stabilizing the slopes.

Plan Sierra has approximately 150 employees, 8 of whom are Ing. Agrs. working with conservation. The majority of these are foresters who encourage the small farmers to plant trees on the steeper slopes and to mix trees and crops on shallower slopes.

The rains stopped with lunch, enabling the five of us to travel to some of the Plan Sierra cooperating farms. We were fortunate in that Monsignor Roque Adames, one of the initiators of Plan Sierra, and Ing. Blas Santos, Executive Director of Plan Sierra, traveled entourage with us and about 50 other visitors to one of the farms. All possible cropping mixtures of the previously mentioned crops were seen. Hildebrand was impressed with some of the mixtures, such as one of beans, yuca, squash, and shade trees for coffee.

One of the most impressive findings of the day was summed in a comment by Monsignor Adames that for him the importance of Plan Sierra is that conservation practices had arrived at the level of the small farmer. Another interesting comment was one made by Ing. Santos that the large land owners in the valleys below were supportive of Plan Sierra because it would reduce siltation from the slopes and flooding of their lands.

Plan Sierra's operations began only 15 months ago. The support for and activities of the Plan blend a wide assortment of individuals, many of whom respond to different interests. The most crucial to continue to have involved at this time is the small farmer. Cropping systems extended by Plan Sierra are, at best, "guesstimates" by mostly foresters from experience or knowledge of other "similar" areas. With strong agronomic cropping systems input and backstopping by the Steeplands Project to complement the forestry work of Plan Sierra, the resultant cropping systems can provide small farmers with the economic incentive to conserve their soils thereby reducing their losses and those of the larger farmers downslope. The SEA, IICA and USAID representatives on the trip had essentially the same impression, though intensity of support for the current Plan Sierra activities varied.

MAY 8 (Thursday):

IICA: Dr. Manuel Paulet reviewed the soil and water conservation projects in the Dominican Republic that could be involved with the Steeplands Project. A Soil and Water Conservation Project started in 1976 with two scientists, Ing. Miguel Gomez, Director, and Sr. Quintino Santana, Deputy Director and also an excellent professional. Now 40 scientists work in the project under the Sub-Secretary of Land and Water Resources.

Many of these 40 are involved with the BAO Project, a watershed area adjacent to the Plan Sierra. For the areas where it works, BAO is developing conservation plans, better technically designed than what we saw at Plan Sierra, but with much emphasis on engineering and not enough on farming techniques. The universal soil loss equation is being used as a guide in these farm plans.

The Soil and Water Conservation Project also is working in irrigated agriculture. Presently 150,000 ha are irrigated in the Dominican Republic; in five years, 250,000 ha will be. However, 30 to 40% of the gross agricultural product is produced on the 150,000 irrigated hectares. Problems exist with irrigation; with lack of controls to adequately apportion the water, many of the farmers down

canal do not receive any water while those closer to the source get excess. Salinity problems associated with irrigation also are prevalent. For these reasons, the Soil and Water Conservation group wants to begin working more in irrigated agriculture.

IICA's Soil and Water Conservation and Management Division, headed by Dr. Paulet, attempts to work with and semi-coordinate the work of the various groups involved in such activities in the Caribbean region. IICA's relationship with the soil conservation and management groups operating in the Dominican Republic and Haiti is viewed as very good and one which operates with cognizance of the various strengths and weaknesses of the participating groups. IICA linkage with the Steeplands Project is deemed crucial.

FERQUIDO (Fertilizantes Químicos Dominicanos): Met with Ing. Amilcar Ubiera, Head of Soil Fertility Section and Lab, Ing. Luis Gonzalez, Assistant Head of Soil Fertility Section and Lab, and later with Lic. Marcelino San Miguel, II, President and Ing. Ubiera. The Steeplands Project was described briefly as were capabilities and potential inputs of FERQUIDO into the Project. Nicholaides' experience in the Dominican Republic in 1976, 1977 has convinced him that any project working there stands a better chance of success if it can be tied to FERQUIDO. The company has a proven track record of getting equipment and materials necessary for any successful operation into the country. The need for such is still evident, except in private business quarters. Additionally, Ing. Ubiera, one of the most dynamic, capable soil scientists in the Dominican Republic, has just taught a series of soil fertility training courses in Haiti at the request of the Haitian government. These Haitian activities and FERQUIDO's involvement with the Steeplands Project are strongly encouraged by Lic. San Miguel.

Secretary of Agriculture: Met with Ing. R. Hipólito Mejía D., Secretary of State of Agriculture, Lic. Adan Méndez Gómez, Director, Office of International Cooperation, Ing. Tirado, Lic. Pineda, and Dr. Paulet for the formal signing of the letter of intent. A very brief discussion of the proposed Steeplands Project preceded the signing with Secretary Mejía asking if Cesar Lopez and others involved with soils were in agreement with the overall content. That strong interest exists in high quarters of the Dominican government for the Steeplands Project was evident. Sec. Mejía informed us that he will be in North Carolina sometime in June on business. He was invited to visit the planning headquarters of the Title XII Soil Management Program. Such a visit appears possible. Adjourned at 1:30 p.m.

Travel back to hotel for checkout, quick sandwich and flight to Miami from where Hildebrand would return to Gainesville to teach his graduate class on Friday and Nicholaides would travel to Peru to make final arrangement for the Planning Team visit and meetings starting Tuesday.

RECOMMENDATIONS:

The Planning Team found very good cooperation and interest among all potentially interested parties in the Dominican Republic.

It is recommended that a primary research site of the Title XII Soil Management Steeplands Project be established in the Dominican Republic, as the potential for success is good.

Due to the various agro-socio-ecological zones on the "steplands," none of which adequately generalizes for all, it is recommended that a minimum of two research sites be established: One between Ocoa and Constanza on the very shallow Dystropepts and the other in the Plan Sierra area, perhaps on the deeper, but still shallow Eutropepts.

It is acknowledged that the determination of headquarters in the Dominican Republic will be made jointly by the Secretary of Agriculture and the Management Entity. The Planning Team recommends that both parties strongly consider locating project headquarters at CENDA.

CENDA

is part of the Secretary of Agriculture;
 has jurisdiction over the site to be established in Plan Sierra;
 can work well with IICA, USAID, FERQUIDO and CESDA, the latter which will probably have jurisdiction over the site to be established between Ocoa and Constanza;
 has excellent contact with the training facilities and interdisciplinary staff of ISA and of the Universidad Católica;
 has excellent soil research facilities which are kept operable and can supply needed inputs to an on-farm extension program (Plan Sierra);
 and lastly, CENDA has the strong support of some of the top church, political and business leaders in the country.

It is recommended that the Steplands Project in the Dominican Republic be linked from inception to similar USAID projects, IICA and FERQUIDO. Each one, in aforementioned sections can further enhance chances of project success.

It is recommended that the following three senior level scientists: A soil/water conservation specialist, a farming systems agronomist and a farming systems socioeconomist, be located in the Dominican Republic in the two research sites to be established. The scientists must be fluent in Spanish, capable of working in similar developing country situations, and be competent in short- and long-term training of host country scientists.

It is also recommended that at the earliest feasible date, efforts be made to establish a cooperative Steplands Project in Haiti, perhaps with secondary research sites being located there.

ACKNOWLEDGEMENTS:

The Planning Team gratefully acknowledges the fine help of the many individuals and institutions who participated in the arrangements for our visit and meetings. Four of those individuals, Mr. Felipe Manteiga of USAID/Santo Domingo, Dr. Tony Pinchinat of IICA, Mr. Guillermo Villanueva of SEA and Sr. Luis Crouch of ADS, were

most instrumental although not involved in the meetings. To Dr. Ron Trostle of USAID/Santo Domingo, Dr. Cesar Lopez, Ing. Gustavo Tirado, Lic. Raul Pineda, Ing. Aridio Perez of SEA and Dr. Manuel Paulet of IICA, the Team is especially appreciative. A special word of thanks must be given to the USAID/Santo Domingo mission for logistical services far beyond the call of duty.

PERU

ACTIVITIES AND ACCOMPLISHMENTS:

MAY 9 (Friday)

Nicholaides travelled to Peru, arriving in Lima at 7:45 a.m.

USAID: Met with Dr. Loren Schulze, Agricultural Officer USAID/Lima at 11:00 A.M. regarding potential involvement of Title XII Soil Management CRSP Steep-lands Project in Peru. Schulze was met although Hildebrand was not along, as Schulze was leaving at 5:00 P.M. for home leave in the states. Also met briefly with Mr. John O'Donnell, Multi-Sector Loan Officer, USAID/Lima.

Much interest was expressed in the potential tie-in of the Steeplands Project with the on-going and future Ministry of Agriculture and Food (MAA) and USAID soil/water conservation programs. Soil conservation activities of USAID are centered in Cajamarca, Huaraz, Huancayo and Tarapoto. The mission has decided to concentrate its efforts in three departments, Cajamarca, San Martin (Tarapoto) and Junin (Huancayo) to have a positive impact on development rather than merely diluting limited resources. Cajamarca has perhaps as many as 15 different AID-financed projects which could be related to the Steeplands Project. For example, USAID/Lima has received word of approval for a Project Identification document (PID) for a \$1,000,000 grant to fund a three-year soil conservation project on various soils in Cajamarca (Project No. 527-0220). This will provide a pilot watershed program with institutional development for the MAA'S Direccion General de Aguas y Suelos, conservation priorities and methodology, and technical assistance development and training via one full time scientist and 8 local technicians. After this project is authorized at the mission level, a Project Implementation Order for Technical Services (PIOT) must yet be released.

Three successive years of drought in Cajamarca has produced through MAA a type of WPA in that area. USAID/Lima also is putting high priority on the Cajamarca area and for them, this would probably be the number one priority area to link the Steeplands Project.

Three Peruvians specifically mentioned as excellent to have tied in the Steeplands Project are the following:

Ing. Pablo Sanchez, Rector
 Universidad Nacional Tecnica de Cajamarca
 (moving force behind the AYLAMBO reforestation project)

Ing. Julio Lostau, Director
 Direccion General de Aguas y Sullos

Dr. Axel Dourojenni, Former Director
 Direccion General de Aguas y Suelos
 (holder of M.S. & Ph.D. degrees from Colorado State
 in Soil Management)

MAY 9 (pm), 10, 11, 12:

NCSU Tropical Soils Program business and expense in and regarding Yurimaguas.

MAY 13 (Tuesday):

INIA (Instituto Nacional de Investigacion Agricultura): Following Dr. Hildebrand's arrival, the Planning Team met with Drs. Javier Gazzo, Executive Director, and Dr. Carlos Valverde, Deputy Executive Director, who were later joined by Ing. Pablo Sanchez, Rector of UNTC, and discussed the Steep-lands Project. The possibilities interested all participants.

Dr. Valverde informed us that Dr. Josh Possner of the Rockefeller Foundation will be coming to Peru the week of May 26 to look at steeplands agriculture to determine if the Foundation might be able to tie into some programs. This is the week when Valverde will be in the states as a member of the Title XII Soil Management External Advisory Panel. Accordingly, Possner will be attended by Dr. Felix Quevedo. Should the Title XII Steeplands Project enter into Peru, it is possible that some links could be made with RF's Fragile Ecosystem Program, should it also enter Peru.

Agriculture on the steeplands in Peru was defined as varied depending on whether one speaks of the northern, central or southern steeplands. Generally, in the north (Cajamarca) small farm agriculture occurs on steeplands between 1,500 and 2,000 m, in the central zone (Huancayo) between 2,000 and 3,000 m, and in the southern zone above 3,500 m. Obviously, generalizations are only given as a rule of thumb and two days later in Cajamarca we did see considerable small farm agriculture on slopes between 2,650 and 3,000 m.

Depending on the location, time frame and tradition of the farmers in the northern, central or southern zones of the steeplands, one can find on minifundios of 0.5 ha. or less, potatoes, quinoa, corn, wheat, barley and assorted native subsistence root crops such as mashua, oca, and olluco.

Cajamarca can suffer frost damage. A recent temperature drop to -10°C was reported. The central zone (Junin department) also has frost and drought problems from May through August with the cropping period being November through March. Although the steeplands are being cropped in Junin, Drs. Gazzo and Valverde felt erosion studies would be more useful in the Cajamarca area.

Cajamarca has very heterogeneous steepland soils ranging from very acid to very alkaline. Farming annual crops and grazing sheep on the hillsides are producing erosion into the limited and thin Cajamarca Valley which is

mostly under pasture, both native and improved. Nutritional problems on the alkaline soils include excess Ca, deficient Mg and micronutrients. Present vegetation of the unimproved areas is not native pastures. Few trees are present.

The lack of trees is the reason the AYLAMBO project of UNTC has been working to reforest denuded hill tops, Ing. Sanchez told us. Terraces are constructed and various trees, especially Pinus radiati and Eucalyptus, are planted to stabilize the watersheds. This work, Ing. Sanchez feels, is as important to Peru as irrigation. Ing. Sanchez is a very articulate scientist who has a missionary zeal for the pioneering work of the AYLAMBO project. He views the denuded mountains of the area as being ill just as human beings are sick. The AYLAMBO project furnishes the medical healing with "poncho verde con franjas de arboles" in order to conserve the soils and watersheds.

The AYLAMBO project, which began 12 years ago, is an 18-year project, with the first 9 years utilizing intensive hand labor to plant the various tree species on the denuded slopes and the next 9 years to harvest the trees while continuing to plant. The project is working with farmers and is attempting to combine agroforestry, we were told; however, on our brief visit two days later we did not see evidence of the agroforestry. The project initially centered on biological studies and now has branched out to include cottage industries as well. There is now a school to teach methods and use of the products, clay and wood from the mountains. Additionally, the project has now begun a study on biogas production from human and animal wastes to furnish sufficient gas for cooking and lights in the area.

Water was described as the most limiting factor to crop or forest production in the Cajamarca area with some areas of the AYLAMBO project receiving 400-650 mm of precipitation annually.

The Association for the Development of Cajamarca has given emphasis to the AYLAMBO project and it is now funded by a combination of donors, including MAA, UNTC and USAID/Lima. Ing. Sanchez and Drs. Gazzo and Valverde emphasized that the Steeplands Project could benefit by participation of UNTC and/or the AYLAMBO project. INIA is active in Cajamarca, through its Experiment Station, headed by Ing. Tommy Farley, the CICAFOR Project, headed by Ing. Eduardo Valardi, and its contacts with UNTC via Pablo Sanchez and the AYLAMBO project. The steeplands are a high priority area for the Peruvian government as many Peruvians are concentrated in these areas and farming the steep slopes.

Following conversations which Nicholaides had with Schulze and O'Donnell on May 9, it was felt that Cajamarca would be one possible visit for the Planning Team. Accordingly, Nicholaides, through the pleasant help of CIP staff, made flight arrangements for May 13-14 to Cajamarca for the Planning Team and two more individuals, hopefully Drs. Gazzo and Valverde. Dr. Gazzo was approached about this on his and Nicholaides' return trip from Tarapoto to Lima, Peru on May 11 and Dr. Valverde the evening of May 11 via telephone. Both agreed that this was desirable and they would try to make the trip, although the tremendous travel countrywide due to Peru's first presidential

elections in seventeen years on May 8 might present some problems. As it turned out, neither was able to accompany us because of the election travel and last minute requests by the Minister to INIA.

USAID: The Planning Team met with Mr. John O'Donnell, Multi-Sector Loan Officer, concerning the Steeplands Project and potential links with current and planned soil and water conservation work in Peru. The two strong potential linking areas appeared to be Cajamarca and Tarapoto. USAID/Lima has numerous projects in the Cajamarca area, including their work with UNTC and the AYLAMBO project, the new Soil and Water Conservation Grant, an agricultural crops program, the Plan Meris (an irrigation program with small farmers), a water shed management program and reforestation programs. Thus, in Cajamarca, USAID and Peru have similar resources within which the Steeplands Project could tie. In Tarapoto is the \$19,000,000 Huallaga Central Development Project which also has many soil/water conservation activities.

Additionally, in the Research, Education and Extension (REE) Program, which is awaiting signing with the new government, is provided a setting for backstopping soil and water management and socio-economic factor studies for regional project centers in Huancayo, Chiclayo, Tarapoto, La Molina and Arequipa and for existing research sites which includes Cajamarca among others.

Thus, as with INIA, USAID/Lima has enough strong links for the potential Steeplands Project in Cajamarca to warrant further study.

MAY 14 (Wednesday):

Delay: Planning Team and Dr. Ted Olsen, Soil Water Management, USAID, Contractor from Utah State, waited from 6:30 to 11:30 a.m. for the Aero-Peru flight which was to have taken us to Cajamarca at 7:30 a.m. Decided at 11:30 a.m. to cancel arrangements as insufficient time would have remained after arrival in Cajamarca (estimated arrival at 3:00 p.m.) to cover adequately the areas to be reviewed. In afternoon made arrangements with Dr. Dick Sawyer and CIP personnel to hire CIP turbo prop to fly us into and out of Cajamarca the following day.

MAY 15 (Thursday):

Planning Team and Dr. Olsen left Lima at 7:30 a.m. via CIP plane; arrived Cajamarca 10:00 a.m. Drs. Gazzo and Valverde were unable to make trip. Met at Cajamarca (2,650 m) by Ing. Eduardo Valvardi, Director of CICAFOR (Centro de Investigacion y Capacitacion Forestal) of MAA.

CICAFOR introduces various tree species to the Cajamarca area in order to stabilize denuded slopes. Since 1976, 156 species have been introduced and tested in the 480,000 ha impact area by the 30 technicians and 150 laborers of the project. Altitude of the impact area ranges from 2,000 to 4,900 m.

CICAFOR works in the following five phases in the Cajamarca area.

1. Forestry and Ecology

	<u>Altitude, m</u>	<u>Mean Temp, C^o</u>	<u>Ppt, mm</u>
(a)	2,000-2,500	15-18	400-
(b)	2,500-3,000	13.5	750-1,000
(c)	3,000+	8	1,000

2. Production Techniques

3. Plantation Techniques

4. Plot Establishment, Management and Use

5. Demonstration Plantations

The best species to date have been Eucalyptus spp., Pinus radiati, and various Mexican species. The work is done on class VI and VII land and CICAFOR studies have revealed that of the 480,000 ha of the project area, 58% should be under forest, 32% pasture and 10% agriculture. CICAFOR establishes a convenio between the small land owners with whom it works. Research is conducted both with and without irrigation.

AYLAMBO: Traveled with Ing. Valardi to see the project of UNTC and some of the CICAFOR project area.

In the AYLAMBO project, about 14 ha of mountain side are terraced and planted with different pine and eucalyptus species to stabilize the watershed. Soils of the AYLAMBO project area appear to be calcareous Aridisols with a very thin epipedon (4 cm), and are more rock than soil.

These lands are being farmed by minifundio holders with corn, barley, squash, quinoa, alfalfa, potatoes and small pasture areas. Much erosion is evident in and below plots farmed on hillsides and also below road cuts. Sheep grazing is also causing as much or more erosion than any other source. Perhaps rotating the animals from pasture to pasture via good range management to allow pastures to reseed themselves would help.

The farmers are not using the erosion control methods developed by AYLAMBO or CICAFOR--perhaps because of the cost and that they cannot realize a quick profit on trees. It was evident to the Planning Team that if the good land stabilization methods of AYLAMBO and CICAFOR are to be adaptable by the small farmers of the area an integrated approach via agroforestry must be developed and extended. Included in this approach must also be range management for the small pasture areas on the steeplands.

Returned to Lima at 4:00 p.m. and Dr. Hildebrand left at midnight to return to the University of Florida to teach his graduate course.

MAY 16 (Friday)

INIA: Drs. Valverde and Nicholaides reviewed the draft of the letter of intent between INIA and NCSU and reached agreement on substance and wording. Final copies were typed by INIA and signed by Drs. Gazzo and Nicholaides.

USAID: Drs. Valverde and Nicholaides met with Mr. Len Yaeger, Mission Director and Mr. John O'Donnell. Mr. Yaeger stressed that the only way USAID/Lima would like to see the Title XII Soil Management CRSP Steeplands Project come into Peru would be if it could tie in with ongoing USAID and GOP similar projects. The Cajamarca and Tarapoto areas were suggested as such with complementary projects which could benefit and be benefited by the Steeplands Project.

The Plan Meris (Project No. 527-T-059) was suggested as one such project in the Cajamarca area. It is designed to improve water and land use in the watershed of the Mantaro River and bordering areas and the watersheds of the Crisnejas, Condebama and Cajamarca Rivers via financing of the following activities:

- (1) Design and construction of small-scale irrigation and drainage networks and improvements to existing systems;
- (2) complementary reforestation of adjacent slopes to prevent erosion, to conserve water and to protect irrigation structures;
- (3) sub-lending to participating farmers for investment in land development and on-farm improvements;
- (4) establishment of regional offices in the Project areas with sufficient and administrative support to provide continuing extension services in design and maintenance of irrigation systems and in water use; and
- (5) a program of technical assistance to provide advisory services to the Implementing Agency, to establish an extension service in water use to participating farmers and to perform studies for use in watershed planning and project evaluation.

Plan Meris is a \$21,000,000 project running from 1976 to 1982. Some successes have been realized, but project implementation activities have not progressed according to the targets established in the implementation plan of the Project Paper (-from Project Evaluation Summary, September 1979). Mission Director Yaeger felt that Plan Meris could be benefited by the technical agronomic expertise the Steeplands Project could offer. The Steeplands Project could be helped by linking to a small-scale irrigation network project. Such linkage would enable the agronomists to concentrate on small farm cropping systems while utilizing the irrigation networks to supply the needed water.

Return: Nicholaides left Peru for Raleigh at midnight.

RECOMMENDATIONS:

The Planning Team found very good cooperation and interest among all potentially interested parties.

It is recommended that following establishment of the primary research site of the Title XII Soil Management CRSP Steeplands Project in the Dominican Republic, another one be established in Peru, as the potential for success is good.

Due to the various agro-socio-ecological zones of the "steeplands", none of which adequately generalizes for all, it is recommended that a minimum of two research sites be established: one in the Cajamarca area and the other in the Tarapoto area.

It is recommended that the Steeplands Project in Peru follow a cropping systems approach and be linked from inception to similar USAID and GOP projects, thereby increasing the probability of success.

It is recommended that two senior level scientists: one a range management specialist, the other a soil/water management and conservation specialist, be located in Peru to work in the two research sites to be established. The scientists must be fluent in Spanish, capable of working in an interdisciplinary team, have had significant successful experience in similar developing country situations, and have competence in short- and long-term training of host country scientists.

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