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TROPSOILS

SOIL MANAGEMENT CRSP

931-1311

A. Research Finding Relevant to LAC Countries where CRSP is not operating

1. Managing Water to Restore Forests

Research in the Guesselbodi forest of Niger found that simply mulching barren, crusted soils with the branches left over from wood-cutting greatly increased soil moisture and porosity, and promoted the natural re-seeding of key forest species.

2. Protecting Young Millet From Sandstorms

Adapting a West Texas farm implement to animal power, scientists showed that the "sandfighter" holds great promise for protecting young millet crops from standstorms in Africa's Sahel. The device, forms tight clods that trap sand and reduce the blast and burial of young plants, on Niger's extension farms.

3. Finding Low-Cost Sources of Nitrogen

In the Cerrado region of Brazil, active legume, mucuna, a common green manure, can survive a dry season to supply succeeding food crops with a large portion of the nitrogen they require.

4. Continuous Cultivation on Acid Soils

At Yurimaguas, Peru soil scientists established that, with careful management, adequate fertilization and lime, continuous cultivation of food crops is possible on the acid, infertile soils of the Amazon Basin. After 21 consecutive crops, a rotation of rice, corn and soybeans yielded an average of 7.8 tons of grain per hectare per year, and overall soil fertility in the test field actually improved.

5. Low-Input Technology Bridges Gap

After demonstrating that continuous cultivation of food crops is possible in the acid, infertile soils of the humid tropics, scientists at Yurimaguas have taken the next step to put together a low-cost, "low-input" technology which includes the use of hearty, acid-tolerant cultivars, conservation tillage, residue cycling and small amounts of fertilizers, has produced

rice yields five times greater than those on the typical farmer's field.

6. A Simpler Method of Evaluating Farmland

A new system of classifying soils by their fertility and cropping potential has greatly simplified the job of evaluating new farmland in the tropics. The system, called Fertility Capability

Classification, has been refined and tested with TropSoils support, and is being rapidly adapted for use by research and extension centers around the world.

7. Matching Technology to Settlers' Needs

Through interviews, time-allocation studies and on-farm observation, the research team in Indonesia has been able to assess the settlers' skills and needs, and has used the information to begin shaping the kind of soil-management practices best suited to the people and setting.

Research for LAC

B. Importance to these Countries.

1. Although limited in extent, dry sandy areas are important in many countries. A ~~xxx~~ a thin mulch which will help to establish native vegetation could protect and diminishing firewood source.

2. The sand fighter may also have only limited applicability in LAC but could be very useful along shorelines and on the margins of some of the drier areas.

3. The identification of an acid tolerant drought resistent legume could prove very important to much of the wet-dry tropical area in LAC. Results so far show that the major portion of nitrogen fertilizer required by corn can be either salvaged or fixed by this legumme prior to the normal planting season. This also promises more efficient use of phosphate and potash fertilizers and will assist in controlling weeds.

5. Demonstration that soils of the humdi tropics are not nearly as fragile as often assumed is extremely important to farmers, investors and country planners. Well watered areas can be developed on a rational basis and not just mined of the fertility in the biomass and abandoned.

6. The low-input extension of the continuous cultivation research offers hope for the poorest farmers and for governments encouraging the development of an infrastructure to support farmers. If they can produce before everything is in place, they can help pay for its creation.

6. The Fertility Capability Classification system offers a means of more rapid technology transfer, requiring much less complete information than Soil Taxonomy. Furthermore, a simple computer program has been devised which will make it accessible to persons with access to either and Apple or IBM PC.

7. The example of the input of an anthropologist in design of soil management

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provides a model which can be profitably followed in all LAC countries. It can sharpen the focus of the research on the problems perceived by farmers. It can mean that results will be quickly adopted because they are both economically ~~and~~ sound and culturally acceptable.

C. How Technology Can be Transferred to these Countries

1. Travel of project personnel to other countries is one of the best way to spread the word. Formal meetings, workshops and seminars help to structure this travel.

2. Research scientists and extension officers may visit the research sites and see the work in progress, much more convincing than hearing reports.

3. Publication is important. Articles in major journals are recovered by any serious bibliographic search. These journals are usually available in libraries of universities and prinicpal research centers.

4. The students trained under the program are among the most effective vehicles to carry the information to new sites. In 1983-84 seventeen post graduate students from developing countries and 14 Americans worked on the CRSP.

D. Specific Next Steps.

1. Additional country visits should be worked in when travel to one of the principal research sites is planned. All travellers should be equipped to provide a seminar or at least a stimulating briefing on the work they are directly involved in.

2. Each CRSP Management Entity should receive a copy of the AID Country programs for countries with similar ecological conditions.

3. The authority to go directly to participating universities to conduct research of interest to Missions should be used at an early date but with due care that theese universities dre not overextended.

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Soil Management CRSP

Though still a young program, the Soil Management Collaborative Research Support Program---TropSoils---has already generated important technologies ready to help solve agricultural and forestry problems in developing nations in the tropics. Some of the highlights are:

Managing Water to Restore Forests

Research in the Guesselbodi forest of Niger found that simply mulching barren, crusted soils with the branches left over from wood-cutting greatly increased soil moisture and porosity, and promoted the natural re-seeding of key forest species. This research could play an important role in the fight to preserve valuable forests and slow desertification in Africa's Sahel.

Protecting Young Millet From Sandstorms

Adapting a West Texas farm implement to animal power, scientists showed that the "sandfighter" holds great promise for protecting young millet crops from sandstorms in Africa's Sahel. Plans are underway to test the device, which forms tight clods that trap sand and reduce the blast and burial of young plants, on Niger's extension farms. The results could help Sahelian farmers decrease crop loss and increase food production.

Finding Low-Cost Sources of Nitrogen

Building on years of successful research in the Cerrado region of Brazil, researchers have begun a comprehensive set of studies aimed at finding practical, inexpensive ways to manage nitrogen and increase yields on acid-savanna soils. In one promising study, mucuna, a common green manure, has proven that it can survive a dry season to supply succeeding food crops with a large portion of the nitrogen they require. This kind of low-cost approach to nitrogen management could increase the productivity of farmers in the acid savannas and elsewhere, who very often cannot afford chemical nitrogen.

Continuous Cultivation on Acid Soils

Researchers at Yurimaguas, Peru dispelled some long-held misconceptions about tropical soils when they established that, with careful management, adequate fertilization and lime, continuous cultivation of food crops is possible on the acid, infertile soils of the Amazon Basin. After 21 consecutive crops, a rotation of rice, corn and soybeans yielded an average of

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7.8 tons of grain per hectare per year, and overall soil fertility in the test field actually improved. The findings may help save many hectares of forest by reducing the need for new fields.

Low-Input Technology Bridges Gap

After demonstrating that continuous cultivation of food crops is possible in the acid, infertile soils of the humid tropics, scientists at Yurimaguas have taken the next step to put together a low-cost, "low-input" technology that will enable poor farmers to multiply yields without relying heavily on expensive chemicals and equipment. This low-input technology, which includes the use of hearty, acid-tolerant cultivars, conservation tillage, residue cycling and small amounts of fertilizers, has produced rice yields five times greater than those on the typical farmer's field. The technology offers an important transition stage between traditional no-input, shifting cultivation and high-input cropping in the humid tropics.

Paddy-Rice Research Inspires New Farms

Paddy-rice research at Yurimaguas has inspired a booming new industry in the Peruvian Amazon. Peruvian workers at the research station used the paddy-rice techniques they learned there to establish their own rice plantations. They succeeded, and more settlers followed, establishing a community of some 30 families, each with 20 or 30 hectares of flooded rice. Last year, Peru was self-sufficient in rice for the first time in many years, largely because of the expansion of flooded-rice agriculture into the Amazon.

A Simpler Method of Evaluating Farmland

A new system of classifying soils by their fertility and cropping potential has greatly simplified the job of evaluating new farmland in the tropics. The system, called Fertility Capability Classification, has been refined and tested with TropSoils support, and is being rapidly adapted for use by research and extension centers around the world.

Matching Technology to Settlers' Needs

Using innovative approaches that have raised considerable interest in the U.S. and abroad, an anthropologist specializing in farming systems, has helped soil scientists work with farmers to improve research and farming techniques in the Sitiung transmigration settlements of Indonesia. Through interviews, time-allocation studies and on-farm observation, the research team has been able to assess the settlers' skills and needs, and has used the information to begin shaping the kind of soil-management practices best suited to the people and setting.

Training New Scientists

In the course of its research, TropSoils regularly trains graduate students and technicians, increasing soil-management expertise around the world. In 1984, 16 foreign nationals conducted their studies with TropSoils support, and many more students from the U.S. got valuable international experience.

Applying Results Through Extension, Workshops and Networks

Thanks to its collaborative design, TropSoils is well suited to the rapid dissemination of research results in developing nations. Here are a few examples of how results are reaching users:

--Technologies in the semi-arid tropics, such as work with the sandfighter and forest-soils management, are being applied through collaborators such as the AID Mission to Niger and an AID forestry project in Niger. In addition, these results will flow into SAFGRAD, the Semi-Arid Food Grains Research and Development network.

--In West Sumatra, TropSoils scientists are collaborating with Indonesian scientists and extension workers to assess transmigrant farmers' needs and to apply the results of the farming--systems research described above.

--Results in the humid tropics of Latin America are being widely shared with scientists, extension workers and farmers. In Peru, the National Agricultural Research and Extension Institute (INIPA) is extending TropSoils results through about 200 research and extension workers stationed in the Selva. On-farm research and direct ties with INIPA extension agents have acquainted TropSoils scientists with farmers and their needs. The Soil Management Network for the Humid Tropics, in which TropSoils scientists are active, links institutions around the world. In addition, TropSoils information is rapidly being dispersed in other soil-management networks, such as REDINA and IBSRAM.

--TropSoils has assisted in the development of an important new training center at Yurimaguas, Peru, where regular workshops and courses will train scientists and extension workers in soil--management technology. Recently more than 20 scientists from across Latin America gathered at the center for a comprehensive workshop on soil-management techniques in agro-forestry.