



Director's Newsletter

Simon E. Malo

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Escuela Agrícola
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P.O. Box 93

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ZAMORANO Learning by Doing

ESCUELA AGRICOLA PANAMERICANA - Teaching today's youth to feed tomorrow's world

DIRECTOR'S MESSAGE

Water, water every six months but not a gallon for irrigation the rest of the year

The majority of the tropics suffer from the same problem. Rains are localized or markedly seasonal and during the dry season, which lasts from 4 to 10 months depending on the location, things get bone dry. Consequently the great challenge of food production in the lower altitudes is to have enough water for year-around irrigation.

Unlike soils in temperate climates those of the tropics are shallow and low in organic matter. A year-around warm climate encourages oxidation and the consequent disappearance of the fertile top-soil. If irrigation were available we could obtain as many as 3 harvests of corn, the equivalent or higher in tonnage than what the fertile soils of lowa produce in a single harvest. Our recurring complication is how to control soil moisture: during a brief intense rainy season we may have an excess of water, causing plant roots to die of asphyxiation, and during the long dry season they die for lack of moisture.

The critical issue today regarding water is how to ensure that the rains will return every year and once they do how to store enough water for the dry season. This brings us to the importance of proper conservation of the forests, particularly in higher areas where condensation and the formation of clouds take place.

We urgently need to stop the relentless destruction of the watersheds where man with an ax, powersaw, or match stick is the most destructive

element. If this continues we will have a slow but sure "desertification" of Central America. Basically it is a problem of educating the public. At Zamorano we consider seriously this looming problem and are taking measures to resolve it. One step in the right direction has been the creation of the "Biological Reserve of Mount Uyuca" which by Honduran law was created in 1984 and ratified by the Congress in 1985.

The School has put within the Reserve part of its property, the only area of Mount Uyuca with an intact cloud forest, having been preserved and properly managed for the last 45 years. Outside the School property the forest no longer exists as such. It is hoped that in time a new cloud forest will rise virtually out of the ashes in the surrounding area. It is estimated that a "climax" forest or one in "equilibrium" may take, depending on the locality, as long as 200 years to regenerate itself.

FORESTRY PROGRAM

This Program has approximately 3000 hectares of forest under its management. There are 500 Ha. in the Zamorano Valley, 2400 Ha. on the slopes of Mount Uyuca and 100 Ha. of cloud forest on top of this mountain. The altitude of the 500 Ha. in the valley is 800 meters above sea level. This is marginal land not suitable for agricultural production. The precipitation is 1100 mm, distributed from May to October. It is here that we have plantations under intense management and investigation.

The 2400 Ha. on Mount Uyuca include a large area extending from 900 meters to 1700 m or more. There are primarily two native species of economic value in this forest: *Pinus oocarpa*, which is found at elevations of 900 m to 1500 m and *Pinus maximinoi*, at 1500 m to 1700 m. The precipitation in this zone varies from



Students racing to fight fire an Mount Uyuca.



Reforestation of Mount Uyuca.

1200 mm to more than 2000 mm. Here the forest is managed for the production of lumber.

The cloud forest, in different stages of natural succession, is found from 1700 m to 2000 m and is the primary source of water for the Zamorano Valley. The precipitation in this area exceeds 2500 mm and usually is closer to 3000 mm. This is an ecosystem under absolute protection and the only activities permitted are for educational and scientific purposes.

In the valley there are adaptation trials of about 50 forest species, including many native species and exotic ones from the tropics of Asia, Africa, and Australia. Dating from 1981 the research has focused on production of wood for furniture, tool handles, firewood, charcoal, forage, and the possibility of organic non-contaminating insecticides. An example of adaptation research is work with species of *Eucalyptus camaldulensis* and *Acacia mangium*. Spacing trials of selections of *Bombacopsis quinatum* and *Tabebuia rosea* have been established. There are also permanent growth and yield plots of *Gmelina arborea* and biomass production of *Leucaena leucocephala* var. k-8. In 1981 the plantations were started with 1,000 seedlings; in 1986, the rate of reforestation was 35,000 seedlings, and to date approximately 85,000 hardwood seedlings have been planted.

In December 1986, we will finish the development of a model management

plan for 900 hectares of pine in Uyuca. This plan is being written for a five-year management program. To help implement the plan, a network of 35 permanent growth plots were established to observe the growth and yield of this forest. The forestry program has concluded the edition of local volume charts for *Pinus oocarpa* and *P. maximinoi* and is analyzing the trunks of fallen trees of both species for a growth chart. The bulk of the reforestation is with these two species. In 1981, approximately 12,000 trees were planted, increasing to 40,000 trees in 1986. During the recent six years of activities in Uyuca, about 120,000 seedlings have been planted.

The Biological Reserve of Mount Uyuca, consisting of 234 Ha. plus a

surrounding area of protection of 2000 Ha. was created by Presidential Decree No. 1343 of October 10, 1984. This accord was ratified by the Honduran Congress under Directive No. 211-85. In May 1986, Zamorano and the Honduran Forestry Development Corporation (COHDEFOR) signed an agreement in which the Biological Reserve is placed under the technical management of the school.

AGRONOMY

Special emphasis is being given to research in the second year's program of independent cultivation of basic grain crops. The goal is to provide an opportunity for students to learn to plan and carry out research on supervised field plots. Examples include: fertilization trials on bean crops; yield comparisons from multiple cropping of beans and corn; grain and silage yields from four varieties of sorghum; the effect of varying levels of nitrogen, phosphorus, and lime on *Rhizobium japonicum*; and, evaluation of triticale and amaranthus varieties grown at Zamorano. The results of this research will be available in booklet form early in 1987.

New research is under way in the fish culture project. Tilapia are fish that attain sexual maturity while still small in size. A new technique has been utilized to produce all-male populations to eliminate fish reproduction during the fattening phase. Newly-hatched fish are fed concentrate containing testoste-



Cultivation of the terraced hillsides. of Mount Uyuca.



Learning to handle an important source of protein.

rone. The hormone affects the development of the undifferentiated gonadal cells, causing all fish to become males. This new procedure makes work with tilapia more efficient, and less pond area is necessary for fingerling production.

ANIMAL SCIENCE

Under a cooperative program between the Agricultural Credit Unit of the Central Bank of Honduras, Zamorano is transferring forage seed and germplasm to nursery plots in five different areas in the country. During the present year the School's forage section harvested legume seed from the following species: *Mucunaa prureins* (Velvet bean), *Lablab purpureus* (Dolichos) and the *Cooper* and *Tinaroo* varieties of *Neonotonia wightii* (Forage soybean). Work has continued on crosses of Zamorano-10 (*Pennisetum purpureum*) with millet (*Pennisetum americanum*) for the purpose of producing hybrids of better nutritive value and higher productive capacity.

Our Dairy and Beef units participated in the National Livestock shows in September. As has been the tradition, our Holstein and Jersey cows won the best prizes. The Brahman breed won the reserve great champion, the junior champion for bulls, and the junior champion for heifers.

HORTICULTURE

The area of this department has increased by 20 acres. Students in the fruit section have planted 12 acres of mango, 3 acres of avocado and 2 acres of cashew nut trees. Sparagus and strawberries have also become established crops. Research has continued with the introduction of new varieties of vegetable crops. Results from 1985 trials have been published and are available to those interested.

These activities are a result of the acquisition of equipment for planting, transplanting, and bed-forming, and the addition of a micro computer for processing and analyzing data. A handbook on "The Cultivation of Horticultural Crops" is for sale at the school's bookstore.



Mango harvest, the fruit of hard work.

PLANT PROTECTION

The integrated pest management project (MIPH) offered courses in pest management of corn and bean. They are directed to research technicians and extensionists working at the Ministry of Agriculture and other private and public agencies. These courses have also been offered to farming communities in counties surrounding Zamorano.

Dr. J. Castaño has recently published, with the assistance of Zamorano graduates, three guides to plant pathology: "Guide for Diagnosis and Control of Plant Diseases", "Laboratory Modules of Plant Pathology", and "Basic Principles of Plant Pathology". These publications are for sale at the school's bookstore.

PLANNING AND DEVELOPMENT

In gratitude for the generous support by the USAID office American Schools and Hospitals Abroad (ASHA) in Washington, D.C., we would like to report that the construction of four single apartments and four houses for married staff have been completed. The following construction is under way: a new post harvest lab. for fruit and vegetables; a honey processing lab.; a dairy processing lab.; a barn and milking parlor for water buffalos; a swine unit; an extension to the library; and a dormitory for fourth-year students.



Makoto Inaba pasteurizing juice with students.

DEAN'S OFFICE

The number of applicants who have taken the exam to enter Zamorano this year is 35% higher than that of last year. We would like to express our appreciation to the Zamorano Alumni Association for their assistance in all the Latin American countries.

We would also like to thank the USAID missions of Ecuador, El Salvador, Honduras and Panama for scholarship assistance to Zamorano students from these countries. The German Foundation for Development (DSE) has also provided generously with scholarships for students from Bolivia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, and Nicaragua. We would also like to take the opportunity to thank all individuals, institutions, foundations, and

companies for their contributions to the education of Latin American youth at Zamorano.

In September, Drs. C. Beeman and J. Cheek of the University of Florida (IFAS) offered a two-week course on

teaching methodology for our professors. This was made possible by support from the offices of the United States Information Service (USIS) and proved of such value that it has been agreed to have a follow-up.

A Japanese graduate student came to Zamorano for a week of research and demonstration of his appropriate technology food processing systems. In a portable can, Makoto Inaba carries a pasteurizer (see photo). Zamorano students pasteurized orange juice and bottled it under Makoto's supervision. This system could be invaluable to small farming communities.

We would like to welcome a weed specialist, Oscar Paniagua and his family to Zamorano. Also, we extend our best wishes to professors K. Andrews, C. Gandarillas, F. Fiallos, A. Flores, R. Suazo, and R. Zelaya of our staff who are on temporary leave at U.S. universities.



Annual rodeo show at Zamorano.



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