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FARM KNOW-HOW FOR HUNGRY WORLD

During the 1965 fiscal year, the U.S. Department of Agriculture sent agricultural experts to 26 countries and planned training programs for 4,879 agriculturists from 118 nations. The project was part of an effort to help solve the problem of world hunger through the use of technical help and training. A new USDA agency coordinates this work. The International Agricultural Development Service (IADS) has only 75 employees, but it receives assistance from its parent agency, the USDA, and from state agricultural colleges, farm organizations, cooperatives, private companies, and other groups.

The IADS carried out a wide variety of technical assistance and training projects all over the globe during fiscal 1965. Operating funds are provided by the Agency for International Development (AID), which has overall responsibility for foreign aid.

Efforts of USDA technicians have ranged from tsetse fly research in Africa to assistance in setting up a price-support system to encourage India's 60 million farmers to produce more food. Foreign nationals who come to the United States for training may stay just a few weeks to visit this country's farms or they may attend U.S. universities for several years and earn advanced degrees.

The IADS recognizes that agricultural growth is a key to economic development and political stability in the developing countries and that, as these countries achieve higher levels of economic growth, they become better customers for U.S. commodities. In addition to the 198 agricultural technicians assigned to 48 projects in Latin America, Asia, and Africa during the 1965 fiscal year, plans are now firm to send more specialists abroad in 1966.

The USDA points out that two-thirds of the world's people suffer varying degrees of malnutrition. The small gains made in food production in many of the developing countries have been quickly absorbed by rapidly-growing populations. Efforts of the USDA are aimed at helping these nations to diversify their agriculture and to meet their domestic food needs more adequately through increased yields.

Thus far, the largest USDA-AID agricultural project has been in Brazil, where a 19-man team, working with the Brazilian Government, is advising on problems concerning credit, agricultural economics, cooperatives and marketing, price stabilization, soil conservation, and animal-disease control. Just a few years ago, vegetable farmers in El Salvador grew only one meager crop each year. Today, through the help of a USDA-AID resident agricultural team, these people are being taught how to fertilize and irrigate their crops and to market them the year-round through a central farmers' market. The use of credit, with which to purchase good seed and fertilizer, is helping to raise the level of living of these subsistence farmers.

During 1965, the agency's Foreign Training Division continued its 20-year tradition of training agriculturists from other nations in the

FEDERAL RESERVE BANK OF DALLAS
DALLAS, TEXAS

United States. The Division plans and coordinates training for these people — whose "education" is sponsored by the Agency for International Development, the United Nations, and private companies — and sends them to appropriate places in the United States to learn their particular trades. In addition to receiving technical instruction, "participants" are encouraged to become involved in the American community and its varied activities. Cooperating land-grant universities and private companies work together each year to provide foreign trainees with such special programs.

For example, a team of 19 agriculturists from India came to the United States in 1965 to study fertilizer technology and use. The group spent 18 weeks with land-grant universities, the Tennessee Valley Authority, and manufacturers of fertilizer and equipment. The special course included work on how to disseminate their U.S. training when they return to their own countries. A similar course is planned for 1966 and will include 60 men from 10 underdeveloped countries.

Higher Beds for Higher Peanut Yields

Results from several peanut experiments at Texas A&M University's Plant Disease Laboratory at Yoakum, Texas, have been tabulated and released, reports Dr. A. L. Harrison, in charge of the A&M field station. A height-of-bed test reveals that peanut yields rise as the height of the bed increases. In the tests, peanuts were planted in a furrow, below ground level, on level ground, on a medium-high bed (3 to 4 inches), and on a high bed (5 to 6 inches).

Peanuts planted below the ground yielded 3,076 pounds per acre; on level ground, 3,143 pounds; on a medium bed, 3,362 pounds; and on a high bed, 3,578 pounds per acre. Dr. Harrison states that the increase in yield probably results from the improved aeration of the soil and more effective utilization of available moisture on the higher beds. Moreover, "dirting" of peanuts on level ground or below the ground is conducive to disease.

In another test at the A&M field station, single, double, and triple rows were planted at different seeding rates. All peanut acreages were irrigated. In every case, double rows outyielded single rows, and in 50 percent of the tests, triple rows produced more than double rows.

Dr. Harrison says that on multiple-row plantings, it is best to use a herbicide to control weeds or a rotary hoe in which the teeth mesh. He notes that it costs little more to adapt machinery to handle multiple-row crops, but cautions that the practice will pay only on irrigated peanuts.

Prescribed Burning in Texas Forests

A survey conducted by the Texas Forest Service shows that the use of prescribed burning in east Texas forests has increased during recent years. Practically all of the burning has been done under the supervision of graduate foresters, with 80 to 90 percent of the burning producing the desired results.

Prescribed burning is a forest management practice that may be defined as the application of fire to the land, under certain conditions, which will result in a burn that accomplishes specific silvicultural, wildlife, grazing, or fire-hazard reduction purposes. One of the benefits of prescribed burning is the prevention of annosus root rot in susceptible pine stands. Also, larger quantities of browse and grass, which make forested lands more desirable to lessees of grazing land, are made available.

Several training sessions on the techniques of prescribed burning have been held by the Texas Forest Service for private and public foresters. A demonstration plot is maintained in each of the pine-hardwood counties of east Texas. Approximately 30,000 acres of land were prescription-burned in east Texas during 1964, compared with 23,000 in the previous year. About 95 percent of all burning was done by large landowners, both individual and industrial.

Two-thirds of the burning done thus far has been to achieve hardwood control. An additional 29 percent of the prescription burning

has been for seedbed preparation; 4 percent, for fire-hazard reduction; and 1 percent, for the improvement of forage for wildlife.

Although the cost of prescription burning in Texas averages about 75 cents per acre, the lack of experienced contractors to do the work seems to be the principal deterrent to small landowners. A former hindrance, the lack of firebreak equipment, has been largely offset in some districts since 1964, when the Texas Forest Service made equipment and operators available for hire at a nominal charge.

Inexpensive Low-Volume Ground Sprayer

In preliminary tests, boll weevils have been controlled through the use of a ground sprayer that applies insecticide at ultralow rates, according to Dr. Edwin P. Lloyd, Entomologist with the Agricultural Research Service. The new sprayer can be assembled from readily available parts for about $200.

The low-volume spray technique, which was first developed by the ARS for use with aircraft, is regarded as a milestone in safe, economical use of pesticides. By applying less insecticide, farmers not only save time and money but also minimize hazards to livestock, wildlife, and other forms of life.

The new sprayer is mounted on a high-clearance rig. Basically, it consists of a bank of eight solid-stream nozzles that meter a concentrated insecticide formulation onto eight pairs of rapidly spinning stainless steel discs. The liquid is forced through the nozzles by compressed air in the container that holds the liquid.

Stop Seepage from Stock Ponds!

Disking sodium carbonate into the soil of western stock ponds that dry up before the end of the grazing season can reduce seepage to less than one-fourth of an inch per day. According to the Agricultural Research Service, soil samples taken from the bottom of treated test ponds showed that sodium carbonate had changed the grainy clay soil into nearly water-impermeable soil. This development is of major importance to farmers and ranchers in areas where pond seepage reduces water supplies and thus limits or eliminates grazing.

Sodium carbonate seals the soil through the process of ion exchange. Positive-charged sodium ions become attached to negative-charged clay particles. The sodium causes the particles to swell when they become wet, and then break apart and fill the pores in the soil.

The ARS researchers say that additional study is needed to determine how long sodium-treated ponds will retain water. They believe, however, that adding small quantities of sodium carbonate to the pond water periodically will prevent the additional calcium ions from increasing the seepage rate. The ARS says that a 1-acre pond can be sealed with sodium carbonate for about $250. The cost of additional treatments would depend upon the rate at which calcium ions reenter the soil.

Spray-On Insulation

The starch from a single bushel of corn can be used to make enough polyether for an inch-thick layer of light-weight foam which, when dry, will insulate the exterior walls of a 50- by 25-foot home, according to the Agricultural Research Service. Starch-based polyether is an industrial raw material that utilizes a major farm commodity. When sprayed in place as a foam — around pipes and between wall studding, for example — the product adheres to almost any surface, dries immediately, and forms a rigid layer of insulation that is molded to the contour of the surface.

Commercial urethane foams (which made thin-wall refrigerators possible) are now being used for insulating dwellings, buildings, freezers, and refrigerated trucks and tank cars. Rigid urethane foam is also used for buoyancy in boats, buoys, and life preservers. Commercial production is expected to reach 100 million pounds annually by 1968.

A recent study by a commercial firm, under contract with the ARS, shows that the starch-based polyether can be made for about 15 cents per pound in a plant producing 10 million pounds a year. This volume of polyether would

use the starch from 100,000 bushels of corn. The starch-based foam is flame- and humidity-resistant, and its strength compares favorably with that of commercially available foams.

Successful Operation on Unborn Lambs

A method of correcting birth defects in unborn human beings could be one development of research which is being conducted by a team of scientists from Johns Hopkins University School of Medicine, the Armed Forces Institute of Pathology, and the U.S. Department of Agriculture. The discovery that a lamb fetus can be delivered, operated on, and then returned to the uterus for a normal birth could open the door to an entirely new surgical approach in human and veterinary medicine, according to the U.S. Department of Agriculture.

Working at Johns Hopkins University, the scientists have redelivered lamb fetuses several times in various stages of development, treated them medically or surgically, and then returned them to the uterus, with no apparent harm to the fetus. Lambs have then been born in a normal manner at the proper time. Medical researchers are already at work in an effort to develop similar operating techniques that will correct birth defects in human beings.

Discovery of Sweet Potato Enzyme

The process of making instant sweet potato flakes has been improved through the discovery of a new enzyme in sweet potatoes, reports the U.S. Department of Agriculture. Industry may also find uses for the enzyme (an alpha-amylase) in the preparation of cereals and in fermentation processes; however, USDA chemists say that more information is needed about the properties of the enzyme, as well as a practical method of isolating it in pure form.

Only small quantities of the enzyme are found in freshly-dug sweet potatoes, but the amount builds up during storage; consequently, the potatoes can be kept firm during the canning process only if they are canned shortly after harvest. The enzyme builds up during even short periods of storage and, activated by the heat of processing, helps to convert some of the starch to sugars. This characteristic makes the sweet potatoes too soft for use as a top-quality canned product. Conversely, in the manufacture of instant sweet potato flakes, the alpha-amylase is desirable in the potatoes because it helps make them sweeter and softer for processing.

Industrial Oil in Wild Plant From Spain

A plant that grows wild in southern Spain shows promise as a potential domestic crop for the production of a valuable industrial oil, points out the U.S. Department of Agriculture. Seeds of the plant, *Euphorbia lagascae,* are rich in epoxy fatty acids, which are now made synthetically for use in plastics, paints, and other industrial products. These naturally occurring acids were not known to exist until recently, when they were found in another wild plant, *Vernonia anthelmintica.*

Of the thousands of foreign plants that have been screened by utilization scientists of the USDA's Agricultural Research Service, Euphorbia and Vernonia are the only ones that have been found to yield significant amounts of epoxy acids.

Euphorbia seeds are twice as oil-rich as those of Vernonia. Analyses of Euphorbia seeds reveal that they contain between 40 and 50 percent oil, and that about 60 percent of this oil is epoxy fatty acids. Although Vernonia oil has a higher epoxy acid content, Euphorbia contains so much more oil that it appears to be a richer source of the acids.

Experimental seedings of Vernonia indicate that the plant should be widely adapted to the Cotton Belt and the southern part of the Corn Belt. Since Euphorbia was test-planted for the first time in 1965, it is too early to pinpoint the areas where the crop will be best suited, according to the USDA.