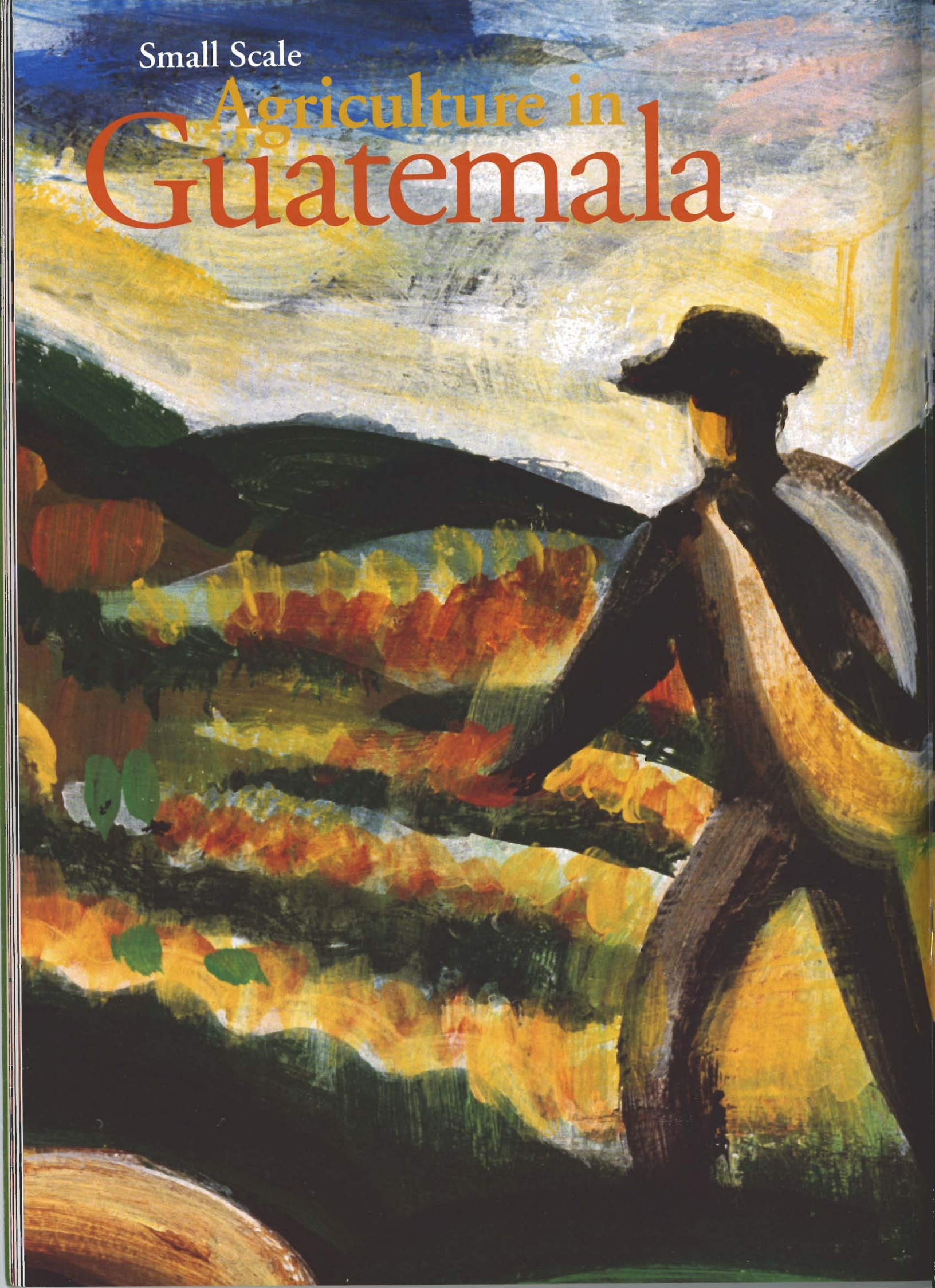


Small Scale

# Agriculture in Guatemala





# In

the mid- to late 1970s, the concept of small-scale agriculture was spawned at Brigham Young University by Drs. Laren R. Robison and N. Paul Johnston as a self-sufficiency model to provide nutritionally balanced food and cash income to rural farm families on one hectare (2.47 acres) of land. Theoretically, all of the food crops necessary for human consumption and those needed to support the production of animals could be produced on the hectare of land. Major crops included energy (corn) and protein (soybeans, black beans, pinto beans) sources for human and animal consumption. In addition, each family dedicated an area for a family garden, a rich source of vitamins and minerals. The program was completed with a source of meat (broiler chickens), eggs (laying chickens), and milk (milking goats). Each family was encouraged to establish some sort of an income venture such as a crop that could bring a high return in the market, animals such as broiler chickens, or perhaps a nonagricultural enterprise.

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## IMPLEMENTATION

The program has been successfully implemented in Ecuador, Chile, Mexico, and Guatemala. However, the best example of the positive effects of the program on people's lives is now underway in the southeastern region of Guatemala, Chiquimula (land of birds). It is a mountainous, dry terrain that is highly dependent on rainfall. The



population is basically composed of subsistence farmers who have considerable difficulty making a living because of small land holdings, poor soil, and erratic rainfall. Adult male family members will often spend a month or two away from the home working on large agricultural enterprises to earn the supplement income needed to survive.

A five-year project initiated in 1991 with 13 families in seven surrounding communities has now grown in excess of 450 families in 23 communities. The project is coordinated jointly with the Central Universitario de Oriente (CUNORI), a four-year agricultural education division of the University of San Carlos at Guatemala City, and the Ezra Taft Benson Agriculture and Food Institute (BI).

## FAMILY SELECTION

CUNORI personnel assist the Benson Institute representatives in the selection of family participants from a list of potential villages. Villages desiring assistance formally request help from the CUNORI rural development advi-



sor, who in turn sends development students and advisors to the community to interview a number of families in the village, considering such issues as cropping practices, family nutrition, social activities, and health practices. From these villages the institute representatives then select families to participate in the program.

## FARMERS ASSOCIATIONS

In each village farmers associations consisting of 10 to 20 families are formed, directed by an elected president, vice president, secretary, and treasurer. Associations work together to purchase agricultural inputs (seed, fertilizer, feed, and animals) more economically and to sell harvested products (corn, beans, and animals) more profitably. In addition, they train one another in the various phases of the program. Training is accomplished by forming committees that become specialists in such areas as home gardens, animal raising, stove building, storage bin manufacturing, and latrine installation. Benson Institute specialists train the committees, who in turn train members of their associations. Once an association is organized, it is ready to receive credit.

## CREDIT PROGRAM

The program encourages farmers to plant crops more intensively and to introduce animal production. Since the participants are very poor, the only way they can reach this level of farming is to receive a source of money to purchase the additional inputs (seeds, fertilizer, feed, and animals). Because of meager holdings and unstable earning power, institutional loans are not available to subsistence farmers. This need is met by the extension of loans from the Benson Institute to the associations. Each association is loaned the amount that the collective group will need to implement the program. Individual farmers then can borrow from the association according to farming needs. A typical loan ranges from \$100 to \$300 and is repaid to the association from crop and animal proceeds. Farmers make a formal agreement of repayment and can borrow in the future up to the amount that they have repaid. Loan repayments are possible because crop yields are as much as five times greater under the new farming system.

## TECHNICIANS

The associations are organized and trained by a team of Guatemalan specialists including agronomists, animal

scientists, home economists, nurses, and nutritionists, directed by CUNORI professor Dr. Hugo Davila, DVM. The specialist team is trained by BYU professionals in technical know-how (agronomy, animal science, and nutrition), organization, and leadership. On Mondays the team plans its weekly activities, participates in training sessions, shares experiences, and formulates strategies for program implementation and problem solving in the communities. The remainder of the week is spent in the communities training association members in cropping practices, animal production, technology (i.e., stove, latrine, and storage bin building), and credit management. Because this training is inversely related to the time in the program, the new associations added each year receive more training than the more experienced ones.

ACCOMPLISHMENTS

■ **Crops (corn and beans)**—Association members have considerably increased their yields of corn and black beans, principle Guatemalan crops. This has largely been achieved by improved planting practices, fertilizer application, and pest and plant disease control. Traditionally, Guatemalan farmers plant corn in rows one meter apart and at 60 cm intervals with four to six seeds per drill. Under the institute program, single seeds are planted 15 cm apart. Approximately 91 percent of association farmers now use single seed plantings for corn.

Hybrid corn seed is not used in the program, because farmers select seed from the previous harvest for planting. The institute teaches farmers how to select seed from the following cropping year using stratified mass selection. To maintain high genetic variability, the farmer selects seed from every environmental change on his farm, such as a slope, hill, wash, or sandy or heavy soil, and mixes the seed for the next year's planting.

Soybeans have been introduced into the area as a source of protein for chicken feed. Soybeans are usually combined with corn to form 90 percent of the chicken's diet. An increasing number of farmers are now growing soybeans as broiler or layer chickens are introduced. In addition, soybeans have also been used by association members to fortify tortillas and to produce soy milk and other nutritious drinks.

■ **Family garden**—The Benson Institute has encouraged association members to plant family gardens to produce foods that will supplement the vitamins and minerals that are deficient in a corn-bean diet. Planting gardens is not a typical cultural practice in Guatemala; however, the program has been well received in the Chiquimula project, and now 83 percent of the families plant gardens and

enjoy fresh vegetables on a regular basis. Excess vegetables are sold in the market for additional income. The gardens are usually located near the house and consist of an array of native and common vegetables.

*Native and common vegetables produced in association family gardens.*

NATIVE VEGETABLES	COMMON VEGETABLES
<i>Chipilin</i>	<i>Cabbage</i>
<i>Hierba mora</i>	<i>Peppers</i>
<i>Guisquil</i>	<i>Spinach</i>
<i>Chotate</i>	<i>Lettuce</i>
<i>Quilate</i>	<i>Carrots</i>
<i>Loroco</i>	<i>Radishes</i>
	<i>Onions</i>



Technicians train farmers in purchasing quality seed, using terraces, contouring the land, and using compost piles. Many farmers have considerably increased the quality of soil in their gardens through the use of compost. The piles are situated close to the home for easy access to plant waste, manure, and water.

Many of the farmers have adjacent land for fruit, and they produce papaya, bananas, lemons, oranges, and avocados.

■ **Broiler and layer chickens**—Small farms in this area



are basically those of crop farmers, and they produce few animals. As a part of the BI program, members are encouraged to raise broiler and/or laying chickens and goats where forages are available. Chicken production has become profitable with a 15 to 52 percent return on investment. Generally, an association family will grow 10 broilers or layers at a time—in the case of broilers, selling eight and consuming two. The institute has been assisted in financing this aspect of farming through the Trickle-Up Foundation. Trickle-Up will donate \$50 to assist a farmer raising chickens and, when pens are completed and birds in place, another \$50 to continue the project.

■ **Grain storage**—At harvest time farmers have two options for their corn and bean crops: (1) store the crop for family consumption or (2) market the crops and buy food as needed by the family during the year. Most farmers traditionally market their production because of losses encountered in storage due to rodents, moisture, and insects. Now, with the assistance of a government organization called Postcosecha and the BI, farmers are being trained to build their own storage bins. The BI provides funding for materials, and Postcosecha trains the farmers to build the units.

■ **Income enterprises**—As part of the program, the BI is encouraging families to develop income-generating enterprises. With the assistance of BI technicians and CUNORI faculty and students, rural families are adopting different income-generating projects. Presently, farmers have pursued the following revenue-producing ventures:

- *The sale of agricultural inputs such as fertilizer, pesticides, and seeds*
- *The sale of grains (corn and beans)*
- *Rope making*
- *Broiler meat production*
- *Building grain storage bins*
- *Vegetable production*
- *A nursery to produce coffee, loroco, lime, and orange plants*
- *A small country store to sell basic farmer products*

■ **Stoves and latrines**—With the assistance of the local health department and Plan Trifinio, the BI is promoting the installation of a latrine in every household and improved stoves that require less wood for cooking. Traditional stoves are located on the ground, and the smoke is not ventilated out of the house. Under the traditional method, cooking food was always susceptible to dirt and other contamination from the ground. The improved stove is at waist level, uses one-third less wood than the

traditional stove, and ventilates smoke out of the home. Most associations have a specialist trained in stove building by Plan Trifinio who assists other association members. Approximately 40 percent of association families have adopted improved stoves.

The health department provides free materials for latrines. The associations request the number of latrines needed for the community through the BI, which provides the transportation of the materials to the community. Then the farmers prepare the pits and personally install the latrines. Formerly none of the families had latrines, but now over 79 percent have installed them.

■ **Nutrition and health**—Dr. Lora Beth Brown, assistant professor of nutrition at BYU, and Lillian M. Izurieta, her graduate student, surveyed the association members and found a number of challenging nutritional practices that compromise the health of the family.

- ◻ *Limited quantity of food*—Villager diets consist almost exclusively of corn and beans. Daily, an adult consumes 15 to 20 corn tortillas and two cups of black beans supplemented with small amounts of sugar and fat. The absence of overweight people in the community suggests a diet deficient in calories.
- ◻ *Beliefs that hinder good nutrition*—Parents often classify foods into categories of “hot” and “cold” (unrelated to temperature or spiciness). “Cold” foods are thought to be harmful for children under age two or for sick people of any age. Distressingly, these foods are among the most nutritious and include beans, vegetables, eggs, meat, and cheese.
- ◻ *Lack of understanding that children’s growth is a barometer of health*—Parents are prone to believe that their children’s small size is normal, because there are so few well-nourished children in the community.
- ◻ *Inadequate weaning foods*—It is customary to feed tortillas and bean broth to children at the time of weaning.
- ◻ *Infrequent feeding with over-diluted foods*—It was observed that children whose body weights fell below standard growth curves ate infrequent and diluted meals. Children of normal weight received thicker food from three to five times a day.
- ◻ *Hand washing*—Mothers with children of abnormally low weight washed their hands less frequently.
- ◻ *Attitudes*—Mothers of malnourished children were fatalistic and negative and leery of change.

To correct these and other health and nutrition problems, the home economist, nutritionist, and nurse form a team to address these issues. The team works directly with the wives of association members, teaching them improved health, nutrition, and hygiene practices.

*Teaching programs to improve family health and nutrition.*

PROBLEM	PRINCIPLE TAUGHT TO FAMILIES
<i>Relationship between disease and improper disposal of human waste</i>	<i>Construction and maintenance of latrines</i>
<i>Prevention and treatment of diarrhea</i>	<i>Prevention methods and preparation of rehydration fluid</i>
<i>Treatment of parasites</i>	<i>Prevention and elimination of parasite infestation</i>
<i>Breast-feeding</i>	<i>Nutritional importance of mother's milk</i>
<i>Nutrition</i>	<i>Need for a variety of nutritious foods and the value of family gardens in meeting that need</i>
<i>Food preparation</i>	<i>Importance of improved stoves that are off the ground and introduction of new nutritious dietary items such as soybean milk</i>

■ **Soybean drinks and supplementation**—Growing soybeans was a new experience for small farmers in this geographical area. As previously mentioned, soybeans were intended for use in chicken feeds. Since raw soybeans interfere with protein digestion, they must be heated before feeding to animals. Farmers found, while roasting soybeans for animals, that the toasted soybeans have an appealing taste and are desirable for human consumption. With the encouragement of the farmers, the health and nutrition team explored alternative human foods derived from soybeans. Additional uses that have found favor with our families are a soybean drink, soybean milk, and corn tortillas supplemented with soybeans. Soybeans contain 38 percent protein and 20 percent fat; hence, they supply not only quality protein but also much needed calories in the diet. As an example of their use, it has become customary for many families to now add 20 percent soybeans to the tortilla maza (mix), which nearly doubles the protein content of the tortilla—from 8 to 14 percent.

■ **Community projects**—In each community where it is involved, the Benson Institute allocates funds for special projects to help the entire community. In most instances, the community has elected to use the money to improve some aspect of its school, such as latrines, new desks and chairs, a kitchen for school lunches, a storage area, or grounds improvements. Other projects have included water availability to individual homes, irrigation canals, and a water storage reservoir.

STUDENT INVOLVEMENT

As part of their training, graduating students from CUNORI have to provide a service to the community. Usually students will do an internship with a develop-

ment organization or a government agency. During the past three years, the BI program has benefitted from graduating students assisting in association communities. For example, during the past semester, eight BS candidates and 10 vocational degree candidates completed internships in Guatemalan villages through the BI/CUNORI program. They were assigned to work half of their time with association members and the other half with non-members who are interested in learning more about the program. Because these students have participated in every aspect of the program, they have become conversant with the model and could assist with its adaptation in their own communities.

SUMMARY

The BI village agriculture program has had a positive influence on the lives of approximately 3,000 people in southeastern Guatemala. Crop yields have increased significantly, making food available to meet glaring nutritional deficiencies and providing needed disposable income. The quality of food available to the family has been improved by the introduction of vegetables, meat, and eggs in the diet. Sanitation and health are much improved because of home training lessons on nutrition and health as well as the construction of latrines. Scarce wood supplies for cooking are used more efficiently because of the construction of improved stoves. Food is available during drought conditions because grain and beans are now properly stored. Family income has been improved considerably through revenue-producing enterprises. Families are also learning the principle of financing a farm enterprise in part through credit. Nutritional practices resulting in malnutrition have been identified, and nutrition education programs correcting these deficiencies have been implemented. □

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