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rds of Change

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PHOTOS BY JIM CURLEY



All over Kenya are villages where farmers still shell white maize with their thumbs, where oxen still pull plows—villages where farming goes on much as it has for centuries. But the

same villages are also open to innovation in a way that is more Third Wave than Third World.

MU is a central player in a decade-long international effort to offer modern agricultural techniques to nations in need. Faculty and students help Kenya become self-sufficient, lessen its dependence on foreign aid, and move it toward becoming a market for Missouri and American goods.

Villagers, often women, learn to be better stewards of their land. They work with scientists to adopt new seed strains, new farm implements and new farm animals to boost their economic strength. A specially bred goat, for instance, is a better source of cash and food and even social cohesion than the variety Mother Nature provided. More on the amazing goat later. But for now, getting a better sense of these villagers' lives will make the case for helping them all the more compelling.

Families in Kenya's rural Highlands are big, many with up to seven children under age 13. Kenya's 25 million population will double in about 20 years, which is triple the growth rate in Missouri. So, any improvements to farming and family life will soon affect millions of Kenyans.

As fast as families are growing, their farms are shrinking due to the custom of dividing land equally among offspring. Since Kenyan independence from Great Britain in 1963, food production has steadily shifted from large plantations to family-based agricultural units called shambas—small-holder family farms.

In 1990, Kenyan agriculture was composed of 3,700 modern, commercial operations. Many grow



MANY MEN LEAVE THE SHAMBA (SMALL FARM) FOR NINE MONTHS OF THE YEAR LOOKING FOR OFF-FARM INCOME TO HELP SUPPORT THE FAMILY. AT LEFT, WOMEN TAKE MAJOR RESPONSIBILITY FOR MANAGING THE SHAMBA.





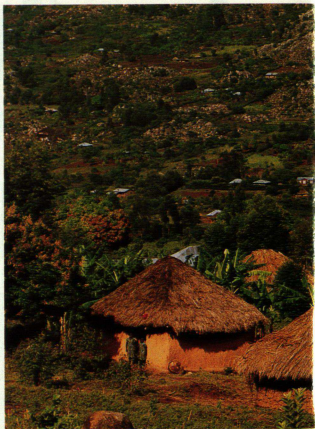
FAMILY AND FRIENDS SHELL CORN ON HENRY WAKONYA'S FARM IN WESTERN KENYA.

tea and coffee, the nation's primary agricultural exports. These plantations occupied 40 percent of Kenyan farmland—generally possessing the best soils and linkage to markets. The remaining farmland was divided into the shambas of more than 1.7 million small farmers. White maize is a crop long central to nutrition on the shamba. Even though maize brings in cash when in surplus, these families are poor. Agriculture employs 75 percent of the work force, but it generates just 30 percent of Kenya's gross domestic product. As many as one-half of farm husbands must leave the land for nine months of the year and go to Nairobi in hopes of picking up seasonal labor. They send cash back to the homestead, but their separation stresses the family structure. Farm girls take care of younger siblings. Boys help around the shamba and wonder when they can find work in the city. It's the women—mothers, aunts, older unmarried daughters—who often manage the family farm.

Management has quite recently meant diving into intensive manual labor with traditional hand tools. They plow fields of white maize with teams of two or perhaps even four oxen pulling a simple single-blade plow. Then come planting, cultivation, protecting crops from pests, and finally harvesting. How can MU faculty and others help improve this generations-old farming pattern? Answer: in many direct and indirect ways.

The College of Agriculture, Food and Natural Resources' international programs office has led a \$25 million, decade-long outreach involving numerous institutions in America and Kenya. Faculty and graduate students have traveled to Kenya. MU has coordinated all 73 of the Kenyan graduate students who trained in America at 20 universities—more than a quarter of them have graduated from MU. Twenty-four faculty and staff have provided a total of 138 months of short-term assistance. Engineers advised on machinery and physical plant, sociologists planned committee structures and diffused ideas, statisticians helped design research and interpret findings. The list goes on. Its bureaucratic labels mislead. MU people are touching the very core of farm life in Kenya.

Among the most successful innovations is the Kenya dual-purpose goat—a smaller animal than the native cattle Kenyans traditionally keep, but a larger and more practical creature than some native goat breeds. Scientists bred an animal that matures sooner and produces more meat and milk than



native stock so shamba farmers could justify keeping it. The goat had to adapt to local rigors of nutrition, health and management, even with families that hadn't kept animals before. For all that careful breeding to help, the goat itself had to be accepted by farmers. That's a tall order for a small goat. But it turned out that the "dual purposes" of meat and milk were a great understatement of the animal's worth. A few examples:

Its smaller size compared to cattle means putting less wear and tear on the landscape and that younger children can help with tending. Children can carry in the green leafy tops of sweet potatoes or other root crops and tie them to trees at the goat's eye level. This method of feeding—an innovation in itself—lets animals consume leaves more thoroughly because it keeps them from trampling the feed.

These goats also provide organic fertilizer that can enrich the shamba family garden. The produce of such gardens helps feed the household or can go to local markets for barter or sale. The goat's "contribution" to such gardens is important because little or no cash is generally available to buy fertilizer, and many shambas haven't traditionally kept



WORKERS AT THE KITALE RESEARCH CENTER SHELL WHITE MAIZE FOR PLANTING DURING THE MARCH RAINS. THE CORN HAS LONG BEEN CENTRAL TO NUTRITION IN FARM HOUSEHOLDS.



animals with that purpose in mind.

The goat also has helped villages come together for the common good. Farmers in Kilifi pooled funds to buy veterinary medicines and talked about investing in other enterprises. If the goat hadn't come along, they said, such discussions may never have come up. Among families with so little money to spare, these are remarkable investments in new products and new kinds of community relations.

And now to give the agencies involved their due. Although their names sound bureaucratic, remember that their work initiates desperately needed change. Since 1988, this program has been funded by the United States Department of State's Agency for International Development (USAID) through its National Agricultural Research Project (NARP). Under NARP, MU has been the lead institution for the Mid-America International Agricultural Consortium (MIAC). Through MIAC, MU professionals work closely with the Kenya Agricultural Research Institute (KARI), a govern-

**SHAMBAS DOT THIS
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mental agency that receives an appropriation but which generates some of its own capital through its innovative projects. USAID also has helped fund the multi-university efforts of the Small Ruminant Collaborative Research Support Program, which was key in developing the dual-purpose goat. This is outreach big time.

Fifteen years ago almost no commercial horticulture in Kenya looked to a foreign market. Today, family and commercial farmers supply more than a quarter of the large cut-flower market in Amsterdam. Flowers are transported to Nairobi, where they are airlifted to Amsterdam, sold at dawn flower auctions, and delivered to retailers—all within 30 hours of being picked.

Imagine a shamba's evolution from raising white maize mainly for family needs to a commercial cropping pattern for raising gladiolus, Easter lily, freesia or alstroemeria for a market nearly 5,000 miles distant. Such willingness to accept innovation and experimentation in Kenyan agriculture has been shaped in good part by the creative involvement of MU professionals.

The evolution includes a remarkable shift to a cash economy as well as a shift toward a more urban outlook. Growers are increasingly dependent on foreign markets, on far stricter timetables than traditional grain markets. They must become more literate. They must prepare and cultivate their fields in ways that have little parallel in the traditions of oxen pulling a single-blade plow through unirrigated soil. In the crop calendars of the flowers lies a rigor that helps teach smallholders about the exacting patterns of applying petrochemical fertilizer. High quality standards required of flowers grown for commercial export elevate both the expectations and the requirements of the farmers as they plant, cultivate and harvest this new product. In this process, the "shamba" is moving closer to the city. And rural Kenyans move closer to self-sufficiency. *

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VERONICA KEMBOI MILKS THE FAMILY COW. HISTORICALLY IN DEVELOPING COUNTRIES, WOMEN WHO ARE ACTIVE IN NEW ENTERPRISES AND WHO ARE BETTER EDUCATED TEND TO HAVE FEWER CHILDREN.



LUCY WAINAINA FARMS SEVEN ACRES OF VEGETABLES AND FLOWERS, INCLUDING ALSTROEMERIA, WHICH ARE GROWN FOR EXPORT. SHAMBAS ARE MOVING TOWARD A CASH ECONOMY.