BIOINTENSIVE AGRICULTURE TRAINING PROGRAM IN KENYA

Location: Kitale, Kenya

Manor House Agricultural Center provides training in low input farming as an alternative to conventional methods, which are heavily reliant on external inputs. Farmers practicing biointensive farming techniques experience significant yield increases and improved soil fertility and grow more nutritious crops. Since 1984, over 100,000 farmers have received this training, and an estimated 200,000 households now use methods of biointensive agriculture.

CHALLENGE

A three-year drought in the early 1980s created acute food insecurity and hunger in far-western Kenya. Compounding this situation, Kenya's agricultural policies have traditionally emphasized intensive agriculture and cash crops for export, thereby neglecting smallholder farmers who work on an average of 1.1 hectares and make up the majority of producers. Following the drought, cereal imports went from 160,880 tons in 1983 to 556,448 tons in 1984, a 245 percent increase,[2] which subsequently caused an increase in local prices. In the following years, farmers sought new sustainable food production methods and ways to replenish and sustain soil fertility and productivity. Manor House Agricultural Centre (MHAC) has been a key resource to help thousands of farmers through this shift.

RESPONSE

MHAC is an indigenous nonprofit organisation located in Trans Nzoia district near Kitale. Founded in 1984 to foster sustainable smallholder farming practices, the Centre provides practical training to diverse groups—young people, farmers, government agency and NGO staff—and conducts adaptive research using demonstration gardens and livestock facilities.[3] Using the "Grow Biointensive" method developed at Ecology Action in Willits, California,[4] MHAC has helped thousands of farmers adopt farming techniques to improve soil productivity and foster sustainable production.

Designed to help smallholders grow the most food on the least land, this low-cost agriculture technology is highly beneficial in Kenya, where farm size has steadily decreased, soil has deteriorated, water is often severely limited, and farming inputs are prohibitively expensive for most producers.

For maize cultivation, the practice emphasizes growing beds with more surface area that should be "double-dug," for improved aeration, maximum root growth, improved water retention, and growth of healthy microorganisms. Soil fertility is maintained through compost. Close spacing of plants increases yields, facilitates the optimal use of nutrients, light and water, and creates a vibrant mini-ecosystem under the resulting leaf canopy. Open-pollinated seeds help preserve genetic diversity and enable farmers to develop their own acclimatized cultivars.

Companion planting (or intercropping) takes advantage of natural synergies that increase yields, with some attracting helpful insects and others repelling pests. Borage, for example, is an herb that helps control tomato worms, while its blue flowers attract bees. A dual focus—on calorie farming for the gardener and carbon farming for the soil—ensures adequate nutrition for producers as well as soil and farm sustainability.

MHAC organizes a two-year certificate course for students as well as weeklong farmer workshops, and also offers courses for NGO and government extension workers, ranging from six weeks to three months. Programs also provide training in livestock production skills, appropriate technology solutions, small business management and agroforestry.[5] Training topics include principles of organic agriculture, crop and animal husbandry, education in economics, farm management, agroforestry, family nutrition, and computer training.[6]

The Manor House approach includes hands-on teaching. It begins by introducing the concept of organic agriculture, which is then followed by practical demonstrations. Various demonstrations are done on a group plot. Members are expected to duplicate the technology on their farms:[7] double-digging, composting using locally available materials, and preparing raised beds for vegetable planting. Disease and pest control strategies include pyrethrum, a natural insecticide produced by the pyrethrum daisy *Chrysanthemum cinerariaefolium*, as well as other natural control methods, such as planting sunflowers to attract predators, using local plant extracts to control maize stalk borer, and intercropping to reduce tomato blight.

Biointensive systems include various techniques to maximize yields, preserve soil fertility, and improve farmers' livelihood, for instance, intensive planting by avoiding rows, planting seeds or seedlings using a hexagonal spacing pattern. As plants mature, their leaves touch, which provides a shaded "mini-climate" under the leaves, retains moisture, protects the valuable microbiotic soil life, retards weed growth, and facilitates higher yields.[8]

Biointensive systems also combine "calorie farming," planting special root crops (including potatoes, sweet potatoes, salsify, burdock, garlic, parsnips) in 30 percent of the growing area, and "carbon farming," planting dual-purpose seed and grain crops (including corn, wheat, amaranth, millet, and oats) on 60 percent of the area to produce a large amount of carbon-rich material, which is used to build compost for improving and maintaining the soil ecosystem's microbial life.[9]

Fruit drying workshop. © MHAC

Many farmers have doubled their yields and saved money by reducing or eliminating costly pesticides from their production techniques.

A student attends to broilers at MHAC's Livestock Department. © MHAC

RESULTS

- By 2015 more than 570 students had graduated from MHAC's two year diploma and certificate courses. Over 100 Kenyan NGOs have been started by its graduates to teach "Grow Biointensive" practices and other related technologies aimed at sustainability. In 2001, a study estimated that as many as 200,000 households used some combination of biointensive methods.[10] No recent household study has been undertaken but, as of 2015, MHAC estimates that approximately 2 million people have gained knowledge and skills through MHAC training, research and community based agricultural extension programs.[11]
- The average yields for crops under biointensive agriculture are 2-4 times higher than in conventional farming. Yields 2.5 and 4 times superior have been observed for the Maize variety "namba nane" and kales respectively.[12]
- Soil fertility has improved,[13] and water supplies and retention have stabilized. "Double digging" curtails water loss by eliminating the hard pan usually found in cultivated soils.
- Studies comparing "Grow Biointensive" agriculture to conventional agriculture show that the former uses 70 to 90 percent less water, which can be attributed to higher soil organic matter levels, near continuous crop soil coverage, and adequate fertility for root and plant health. The system requires 50 to 100 percent fewer purchased inputs, and 99 percent less energy.
- A 2001 study from the University of Essex surveying 26 communities in eight districts found that 75 percent of households are now free from hunger during the year, and the proportion of households buying vegetables has fallen from 85 percent to 11 percent.[14] Another training of 540 farmers through the Integrated Rural Community Empowerment Program (IRCEP) helped participants grow enough food to provide three meals a day to their families by using biointensive methods. After the program, farmers and their families not only produced enough food for themselves, they also generated an average income of $30 per month from excess crops sold at the market.[15]
- Infrastructure and market access in the area have improved, and farmer incomes have risen. Most households can now afford school fees—primary, secondary and college—by selling extra produce. Additionally, some households have actually been able to invest in capital assets—dairy cows, poultry projects, rental houses, maize millers, and others—less than a year after treating a quarter-acre acre plot with biointensive cultivation practice.

The double digging process involves sequential hand cultivation to soil depths from 0.6 to 1.3 meters in conjunction with large amounts of compost, which create heavily mulched raised beds that provide an excellent media for crop roots. The goal is to produce a "living sponge-cake" in the soil, with 50 percent pore space for air and water—optimally half of the pore space for each. The other 50 percent of the soil is mineral matter, including rock fragments, and a small amount of organic matter.

More than 400 students have graduated from the MHAC's two-year certificate program.

Farmers prepare the compost. © MHAC

- Social benefits—group partnerships, improved community cohesion and cooperation—as well as health and education benefits to farming households and the general community have been reported too.
- Manor House is recognized for its work and has been involved in advocacy and policy issues through the Participatory Ecological Land Use Management (PELUM-Kenya), a membership association of over 40 organizations. Organic farming is currently under consideration in Kenya's Agriculture policy. Therefore, the future of biointensive agriculture among smallholder farmers in Kenya is bright.[16]

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ENDNOTES

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16 Communication with MHAC Director, *Op. Cit.*

17 Omare Musa N. and Paul L. Woomer. *Op. Cit.*

FRONT PAGE PHOTO:
Students harvesting kale. © MHAC