WOMEN'S ASSOCIATION FOR COMPOST AND OTHER AGROECOLOGICAL PRACTICES IN BURKINA FASO

Location: Southern Burkina Faso

The highly weathered soils of West Africa's semi-arid Sudanian and Sahelian agro-ecological regions suffer from naturally low levels of organic matter that have been further degraded by agricultural intensification and shifting cropping patterns. Additional organic matter, such as compost, is vital to improving the soil's water-holding capacity and long-term fertility. In the late 1980s, Pag-La-Yiri (PLY), a Burkina Faso women's organization, also known by its French name, l'Association des Femmes de Zabré, launched an extension campaign that trained over 8,000 women in compost production and use between 1987 and 2002. Crop yields subsequently doubled.

CHALLENGE

Declining soil fertility in semi-arid West African soils presents a major challenge to food security in the Sudanian and Sahelian regions of Senegal, Mali, Burkina Faso, Niger, Cameroon, and Chad. A complex web of social, economic, political, and ecological factors has decreased fallow periods, which typically allow soil organic matter regeneration. To offset yield losses, farmers have also expanded cultivation onto more marginal lands. Cropping intensification has produced large-scale erosion and the loss of organic matter,[1] wreaking havoc on the soil's productivity.[2] Researchers have documented annual soil-carbon loss as high as 150 kg per hectare in Sudano-Sahelian cereal cropping systems. One study noted nutrient losses of 22 kg in nitrogen, 25 kg in phosphorus, and 15 kg in potassium, per hectare per year.[3] Attempts to improve soil fertility through exclusive use of synthetic fertilizers are costly and have actually contributed to decreasing yields.[4]

Increasingly variable rainfall seriously exacerbates semi-arid West Africa's degraded soil challenges. The FAO lists this east-west belt between the Sahara and the coast as one of the driest and most variable zones in Africa; years of extreme rainfall or drought are becoming the rule rather than the exception. With average annual rainfall ranging from 600 to 800 mm in the Sudanian zone, 400 to 600 mm in the Sudano-Sahelian zone, and less than 400 mm in the Sahelian zone, extreme variations can leave fields parched in some years and flooded in others. Low levels of organic matter inhibit soil's water-holding capacity. As a result, moisture quickly evaporates, making crops extremely prone to drought stress in dry years.[5]

RESPONSE

To buffer against growing climatic variability and the yield loss or crop failure that subsequently follows, organic matter supplements—manure, compost, and crop residues—are essential. These applications are the foundation of most agro-ecological farming systems and soil-water conservation projects. In the semi-arid Sudanian and Sahelian agro-ecosystems, small amounts of compost can significantly improve soil quality, fertility, and productivity.

As a fertilizer, good compost provides macro and micronutrients for plant uptake. Most chemical fertilizers become soluble upon contact with water and can be washed away by heavy rainfall before they can be used by the crop. In contrast, compost nutrients become available for plant uptake more slowly. Compost also increases the soil's cation exchange capacity (CEC)—its ability to hold nutrients in a plant-available form, improves the soil's long-term fertility, biological activity (crucial for soil health),[6] structure, and resistance to erosive water, tillage, or wind. Aggregation of compost material improves soil porosity, allowing for increased water holding capacity in dry periods—particularly in sandy soils—and improved drainage under extreme rainfall.[7]

Concerned about the declining soil fertility in southern Burkina Faso, PLY launched an agroecological project in 1987. The group's mission is to use its community activities "to assure food self-sufficiency for its target population in a spirit of solidarity and sharing." PLY's specific goals were to restore soil fertility through organic methods, control erosion through appropriate technology, and promote income-generating activities in the communities, especially for women.

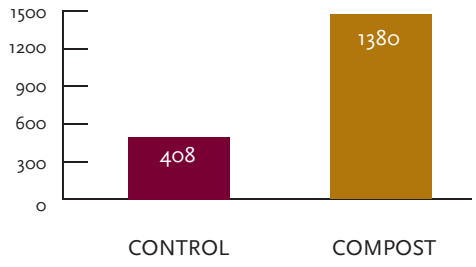
The organization—its name means, "the woman is the foundation of the home" in Moré language—first requested agro-ecological training for its members at the Pierre Rabhi Agroecology Training Centre in Gorom-Gorom. Twenty-five PLY members learned to make compost and to apply it in small, concentrated pockets, then seed it with grain. Compost production is labor intensive, but a small amount suffices if it is concentrated around the base of the plant rather than evenly spread across the entire field.

Shortly after the initial training, PLY partnered with the Centre Ecologique Albert Schweitzer (CEAS), a Swiss organization working in Burkina Faso, to conduct a facilitator-training program that would help extend key knowledge to other women. Five women from the provinces of Boulgou, Zoundwéogo, Kadiogo, and Zandoma were trained in compost production and soil conservation techniques such as rock walls and bunds to control erosion. In 1989, five one-hectare demonstration plots were established to conduct experiments and hold workshops. Plots were cropped with sorghum and millet in the rainy season and vegetables irrigated with well water during the dry season. Groups of 20 came from surrounding villages for training in compost production and use. Participants received a 20 kg bag of compost at the end of the day-long workshop but were also responsible for producing compost at home. In addition to compost production, PLY members also produced seedlings of N-fixing leguminous tree species.

RESULTS

- Within the first year, 500 women had been trained. By 2002 over 8,000 women had been trained in composting and manure-pit production. For their successful work in restoring degraded soils in southern Burkina, the group received the UN Environment Programme's (UNEP) "Saving the Drylands" award.

Figure 1: Change in sorghum yields with application of 10 tons of compost per hectare (kg).



"Contribute to the thriving of women in rural areas through meeting their needs and daily concerns."

–Pag-La-Yiri's first mission

Millet harvest. © Juliette Martin-Prével

- On-site research conducted by agronomists from CEAS and the Institut de l'Environnement et de Recherches Agricoles (INERA) revealed yield benefits from compost.[8] Sorghum yields in on-farm experimental plots in Mediga, for example, tripled over controls following application of ten tons of compost per hectare—from 408 kg per hectare to 1,380 kg per hectare. Applications of five tons of compost per hectare at Yimtenga raised yields by 45 percent. The number of grains per panicle (buds or flowers) more than doubled.
- Compost application also significantly improved the soil's water holding capacity. When crops are sown late, they often miss the early rains, which can lead to stunted growth or total failure. Application of five tons per hectare mitigated the impact of late crop sowing. In plots without compost, late sowing produced a 90 percent yield decrease from one ton per hectare to 87 kg. Plots amended with compost yielded an average of 1,853 kg per hectare, even when sowed late. While the various factors leading to the increase were not teased out experimentally, these marked differences are best attributed to a combination of compost's fertilizing capacity and water-holding ability.[9]
- Compost applications also improved various chemical and physical soil quality indices. Application of five tons per hectare raised CEC by 50 percent.
- The combination of compost with other soil and water conservation techniques—contour rock and grass lines, for example—increased sorghum yields significantly enough to offset both compost costs and labor costs for contour line construction.[10] Adding compost to fields where contour lines had been installed increased farmer revenue 16 percent over fields fertilized with urea, or between 109,480 to 138,180 FCFA ($227 to $286) per hectare after a single season. Yields in plots amended with compost—between 2.5 to 2.7 tons per hectare—were nearly twice that of areas enriched with 1.4 to 1.5 tons of urea.[11]
- Following the successes of their original projects, PLY expanded its focus to other sectors, including family planning, child-nutrition education, literacy, community radio, and other women's empowerment programs. When it was founded in the village of Zouaga, Zabré department, in 1975, the PLY had 375 members. Today it boasts over 11,000 women, the majority of whom have participated in the organization's trainings in compost production and agroecological farming systems.
- While agronomic research and successes from groups like PLY demonstrate compost's invaluable role in sustainable and productive agro-ecosystems, steps are needed to facilitate its widespread adoption. Studies have revealed that a lack of access to tools, carts, manure, and labor hinder compost production. Investment in simple infrastructure and extension, in conjunction with the promotion of small-scale livestock husbandry, can strengthen smallholder systems.[12]

"It is often said that when you do something you will have against you those who do the same thing, those who do the opposite, and the great majority, who does nothing at all, and often because they do not understand what it is you want to do."

–Suzanne Ware, President of the Pag-La-Yari women

Compost Pit. © Terrie Schweitzer

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ENDNOTES

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FRONT PAGE PHOTO:
Women after a work-day in fields, Burkina Faso. © Juliette Martin-Prével