



Composting

A climate-smart and sustainable agriculture solution for smallholder farmers





Soil degradation and declining fertility threaten smallholder farming in Ghana's Upper West Region (UWR). This affects productivity, increasing reliance on synthetic fertilisers. The Building Climate Adaptation Capacities (BCAC) project, implemented by SNV Ghana with funding from GIZ/EU REACH, introduced composting as an affordable, and sustainable farming practices in the Nandom and Lambussie districts.

In the past, farming communities in Ghana relied on shifting cultivation to restore soil fertility. Vast tracts of land allowed farmers to leave portions fallow, giving the soil time to regain its nutrients. Today, however, this practice has become challenging. With increasing population, expanding settlements, and limited land availability, farmers are compelled to cultivate the same plots year after year without rest. To sustain yields, many turn to inorganic fertilisers, which are not only expensive but also strain farmers' already limited incomes.

Some even resort to bush burning to clear land quickly, a practice that further depletes soil nutrients and destroys organic matter. The result is a vicious cycle of declining soil fertility, low productivity, and reduced resilience against climate shocks. This reality has raised a critical question: How can the same limited farmlands be managed in a way that maintains productivity, secures farmers' incomes, and produces healthy crops in a sustainable manner?

The answer lies in a practice that transforms challenges into opportunities - composting.

Why composting

Composting is the natural process of transforming organic waste such as crop residues, animal manure, and household leftovers into a rich, soil-friendly fertiliser. Through decomposition, these materials break down into compost, a dark, nutrient-rich substance for farming. Unlike inorganic fertiliser, compost restores the soil's organic matter, improves its structure, and feeds crops with a balanced mix of nutrients. By turning household residues, crop by-products, and animal manure into organic fertiliser, composting provides farmers with an affordable, climate-smart alternative.

For farmers, soil infertility is not just a decline in soil health, it is a decline in livelihoods. Studies show that many Ghanaian soils, particularly in the Interior Savannah zone, are inherently low in fertility, with widespread deficiencies in nitrogen and phosphorus (IFDC, 2020). Continuous cultivation and shortened fallow periods accelerate this depletion, resulting in declining soil organic carbon and nutrient stocks over time (Antwi et al., 2022). Many smallholders cannot afford enough inorganic fertiliser to compensate, which leads to lower yields and incomes. For example, research in northern Ghana shows that integrated soil fertility management (ISFM)-combining organic manure, inorganic fertiliser, and crop rotation-can increase maize yields by up to 86% and significantly improve farm income compared to conventional practices (Saidou et al., 2024). For communities, declining soil fertility fuels cycles of poverty and food insecurity. Lower yields reduce household food supply and limit the quantity of crops reaching local markets, contributing to higher food prices. Degraded soils also increase vulnerability to erosion, desertification, and loss of vegetation cover, undermining resilience to climate shocks.

At the same time, organic waste from households and farms is often left unmanaged, creating sanitation and environmental health risks instead of being recycled into productive compost.

At the policy level, soil infertility undermines Ghana's national and international commitments to sustainable agriculture and climate action. The National Climate-Smart Agriculture and Food Security Action Plan (2016-2020) explicitly emphasises sustainable land management and the adoption of climate-smart practices to safeguard food security (MoFA, 2015). Without urgent action to restore soil fertility, Ghana risks falling short of its climate adaptation and mitigation goals, as well as its ambition to ensure resilient, food-secure communities.

Recognising challenges of soil degradation, declining productivity, and the overdependence on costly synthetic fertilisers, composting was introduced as a sustainable farming practice in the Nandom, Lambussie, and Lawra districts of the UWR.





Objectives of the initiative

The Building Climate Adaptation Capacities (BCAC) project was designed to strengthen climate resilience by enhancing access to climate information, improving water security, and promoting sustainable land and soil management practices.

The project adopted a gender-transformative and climate-responsive approach, recognizing women and youth as key agents of change in climate adaptation and sustainable agriculture.

The project worked closely with partners and stakeholders to address gender-specific barriers to climate-smart agriculture.

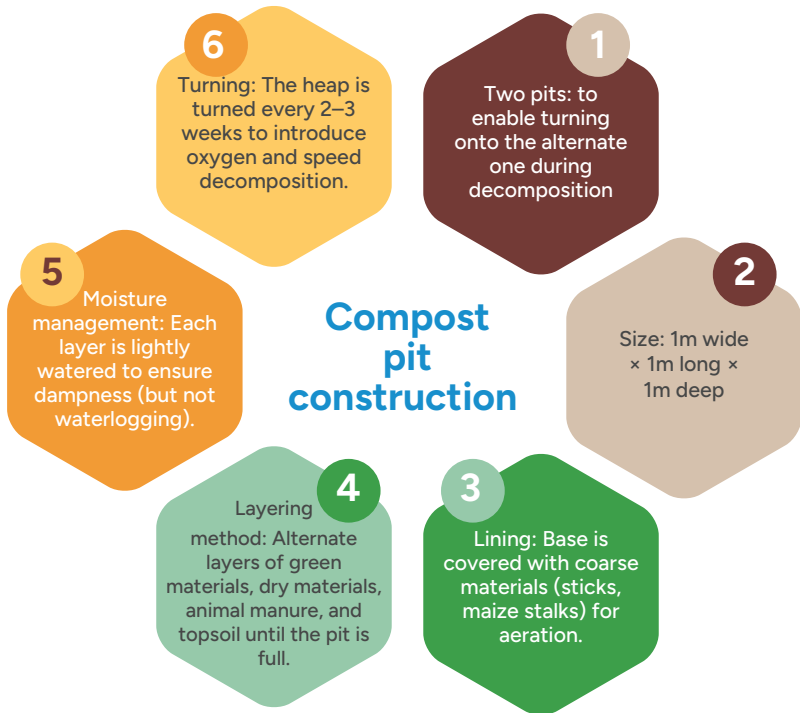
As part of its soil management objectives, the project trained over 300 smallholder farmers, with deliberate inclusion of women and youth. Training was focused on compost preparation and application, climate-smart farming practices, and sustainable soil fertility management.

By reducing reliance on chemical inputs and strengthening locally led soil conservation practices, the project contributed to improved soil health. This was implemented in Ghana's Upper West Region—specifically in the Nandom, Lambussie, and Lawra Districts.

The composting cycle

Ingredients





Tips for composting

- **Layering method:** Ensures balanced decomposition by alternating green and brown materials.
- **Moisture checks:** Farmers learned to check compost moisture by squeezing a handful (it should feel like a wrung-out sponge).
- **Turning:** Regular turning introduces oxygen, shortens composting time (6 weeks), and ensures even breakdown.
- **Ash use:** Wood ash was added to enrich compost with potassium and to reduce odour.
- **Community demonstration pits:** Farmers learned collectively, making it easier to replicate at household level.

Application methods

Basal application: Compost is applied at planting, placed into planting holes or spread along ridges.

Top dressing: Additional compost can be added around the base of growing crops during critical growth stages.

**Soil amendment/
Broadcasting:** Compost is spread and incorporated into soil before planting to improve fertility and structure.

Impact at a glance



Over 40 farmers in Nabugangn community are now practicing composting regularly.



Farmers report that the cost of fertilizing one acre of maize using compost is as low as GHs 500–1,000, compared to about GHs3,500.00–GHs4,500.00 when relying solely on inorganic fertilizers.



Many farmers are testing compost on portions of their farms before scaling to full adoption.



Over 20 women farmers have begun applying compost to their backyard gardens and selected portions of their farmlands to assess its effectiveness.

Stories of change

"I have been farming for six years but rarely thought of using composting. Since applying it, the leaves on my crops are greener and healthier. Even though gathering the materials is sometimes challenging, the results are worth it."

Marciana Belane, Nabugangn

"The first time I saw composting was on my father's farm. I didn't believe eggshells could decompose, but they did." I make compost myself, and I have the confidence that it will work every season."

Bulbee Setu, Nabugangn

"With chemical fertilisers, I was spending too much money. Now, composting costs me little to nothing. The money I save goes into my children's education."

Georgina, Nabugangn

Beyond the farm

Composting is now discussed in community meetings and women's groups, with households establishing their own pits to turn organic waste into farming input. This shift reflects not only improved yields and reduced input costs but also a growing sense of ownership and sustainability within communities.

What worked

Practical demonstrations enhanced adoption

"After seeing how my neighbour's soil is healthy, with compost, I decided to try it on part on my backyard garden, I am convinced it works. Even when it rains, the compost is not washed away unlike the synthetic" – Delle Faustina, Nabugangn Community

Cost-effectiveness drove interest:

Farmers quickly recognised the economic value when comparing composting costs (GHS 500–1,000/acre) with synthetic fertilisers (GHS3,500.00 - GHS 4,500/acre).

"I used to spend nearly all my earnings on fertiliser. With compost, I keep more money for food and my children's schooling." – Woman farmer, Lawra

Women's participation proved impactful:

Women integrated composting into backyard and kitchen gardens, improving household nutrition and, reducing expenditure.

"Now I grow vegetables at home with compost. We eat better, and I don't buy vegetables from the market every week." – Zewe Issah, Bangwon community – Lambussie

Initial scepticisms:

Some farmers doubted compost's effectiveness compared to chemical fertilisers. We encouraged partial adoption trials. Encouraging farmers to test compost on portions of land.

"At first, I didn't trust compost. But when I tried it on half my maize plot, the difference was clear. Next season, I will expand." – Richard N., Nandom

Unintended outcomes

Community waste management benefits:

Composting unintentionally reduced household waste disposal challenges.

"Before, we threw away most food leftovers. Now we turn it into compost, and the community is cleaner." – Woman farmer, Nabugangn

Knowledge spillovers:

Farmers began training peers informally, spreading adoption.

"I taught my brother in another village how to make compost. Now his farm is doing well too." – Young farmer, Bulli community Bakuoro Tonguro - Bulli community -Lambussie

Climate resilience dividends:

Compost-treated soils retained moisture longer, helping crops survive erratic rainfall.

"Even when it rains, the compost on the soil and crops does not wash away. You can still see the compost unlike synthetic fertilizers." – Idrissu Nique- Bangwon community, Lambussie

Seasonal waste availability:

Farmers themselves observed that residues such as crop stalks and manure were not always available throughout the year, which made composting difficult during certain seasons. In response, they decided on their own to start collecting and storing crop residues during harvest and to supplement these with kitchen and household waste.



Cross-sectoral impact

Although introduced as an agricultural intervention, composting demonstrates benefits that cut across multiple sectors:

- **Agriculture and soil health:** Compost restores organic matter, improves soil structure, and reduces dependency on costly synthetic fertilisers, ensuring more sustainable food production.
- **Climate and environment:** By recycling crop residues and household waste, composting reduces open burning and unmanaged waste, lowers greenhouse gas emissions, and supports circular economy principles.
- **Gender and livelihoods:** Women farmers use compost in backyard gardens to improve household nutrition and reduce food purchases, while youth participation in composting activities opens opportunities for skills development and employment.

Challenges faced

Labour requirements

Composting demands additional effort in collecting residues, turning heaps, and applying compost to the fields. Some farmers feared this could deter them from composting.

- ✓ **Output:** Demonstrations emphasised that although composting is labour-intensive at the start, it saves costs and improves soil in the long run. Farmers also began involving household members in the process to share the workload.

Length of the composting period

The 6–8 weeks required for decomposition discouraged some farmers who needed quick results.

- ✓ **Output:** Training showed that adjusting ingredients (e.g., balancing green and dry matter, removing tough leaves) could shorten the composting period. Farmers realised patience paid off, as quality compost lasts longer in the soil than chemicals.

Application on large farmlands

Some farmers worried that using compost on large farms might be time-consuming and reduce efficiency.

- ✓ **Output:** Training showed how to divide the land into manageable plots of portions of their fields for progressive scaling up. This gradual adoption helps manage labour while building confidence in results.

Availability of raw materials

Accessing enough crop residues and manure during certain seasons was a challenge.

- ✓ **Output:** Training demonstrated farmers gather composting materials earlier, especially from kitchen waste, to ensure sufficient compost for planting season.



Recommendations

- Strengthen farmer training and follow-up: Provide refresher trainings on compost preparation, storage, and timely application to reinforce adoption and ensure consistent quality.
- Promote household-level composting: Encourage families to collect kitchen waste, crop residues, and animal droppings year-round to ensure sufficient raw materials are available before planting season.
- Introduce labour-saving tools and innovations: Explore simple technologies such as shredders for crop residues, wheelbarrows, or improved compost turners to reduce the labour intensity of composting.
- Support women's participation: Design targeted programs for women farmers, particularly for kitchen gardens and small plots, to boost household food security and nutrition.
- Scaling up: Demonstration farms and farmer-to-farmer peer learning should be expanded to additional communities, with linkages to NGOs and private actors for resource support.

Conclusion

The composting intervention under the Building Climate Adaptation project has proven that with the right knowledge and support, smallholder farmers can turn agricultural and household waste into a valuable resource for improving soil fertility, reducing input costs, and enhancing climate resilience. Beyond farm-level benefits, composting contributes to better environmental sanitation and household nutrition, particularly for women-led gardens.

Looking ahead, scaling composting practices across communities will not only strengthen food security but also support Ghana's broader commitments to climate-smart agriculture and sustainable land management. The next step is to deepen partnerships, enhance training, and integrate composting into mainstream agricultural policies and practices for lasting impact.

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ABOUT SNV

SNV is a mission-driven global development partner working across Africa and Asia. Our mission is to strengthen capacities and catalyse partnerships that transform the agri-food, energy, and water systems, which enable sustainable and more equitable lives for all.

ABOUT GIZ/REACH project

The Resilience Against Climate Change (REACH) project drives the transformation towards climate resilient agricultural production and improved livelihoods in North-West Ghana. The project is a pillar of the European Union Ghana Agriculture Programme (EU GAP) and builds capacities for the widespread adoption of Conservation Agriculture (CA) as well as climate resilience through planning systems from the community to the district level. REACH is implemented by GIZ under the Market Oriented Value Chains for Jobs and Growth in the ECOWAS Region (MOVE) and co-funded by the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ).

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