Itanya Africa Group



KITUI Baseline Study Report

Vertical Gardens Project, Kitui County

Household Survey and Soil Assessment of Participating Farmers

Funded by **The Haller Foundation** and **Regen Trust**

Sample: 32 farming households

AUGUST **2026**

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1. Executive Summary

Among farmers in Kitui county:

84%

say last season's harvest didn't meet their household's food needs.

78%

have experienced crop loss, mostly caused by the lack of water and farm inputs.

72%

have never received Good Agricultural Practices (GAPs) training.

This report presents the findings of a baseline household survey and rapid soil assessment carried out among 32 farming households in Kitui County, Kitui West, ahead of the Vertical Gardens Project, funded by **The Haller Foundation** and **Regen Trust**.

The purpose of the baseline is to establish an evidence-based profile of the farmers the project will work with their household circumstances, current farming practices, water access, food and nutrition situation, and soil condition so that project design, training content, and future impact evaluation are grounded in an accurate starting point.

The picture that emerges is consistent and clear. This is an older farming population constrained by farming inputs and water. Over half of respondents are 55 or older, more than half farm one acre or less, and 84% say last season's harvest did not meet their household's food needs.

Crop loss is very common and 78% have experienced crop loss, most often attributed to lack of water and lack of farm inputs, followed by poor soil and pest and disease pressure. Exposure to structured agricultural training is low, 72% have never received Good Agricultural Practices (GAPs) training and 66% have never heard of regenerative agriculture.

Leafy vegetables are eaten regularly, 91% of households ate them at least more than thrice in a week but only 41% grow their own; the rest rely on the market, and cost is by far the biggest barrier to eating more (71% cite cost as the main constraint).

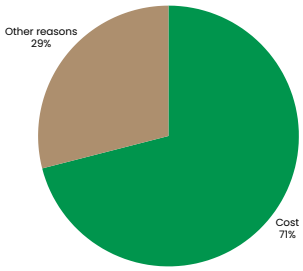
91% of households consume leafy vegetables at least thrice a week, **but only** **41%** grow their own vegetables

Interest in growing leafy vegetables near the home is almost universal (97%), even though 78% have no prior knowledge of vertical gardens. Soil observations reinforce the case for a regenerative approach: no earthworms were recorded on any of the 32 plots assessed, and two-thirds of plots are bare or only partially covered by vegetation or mulch, both classic indicators of degraded soil biology that regenerative techniques are designed to rebuild.

On the social and economic side, farming decisions rest mainly with the person interviewed (75% are the main decision-maker) and most respondents (72%) control income from farm produce themselves, which is a favourable condition for adoption of new practices.

Forty-one percent of households have no income source beyond farming, underlining how directly food security in this population depends on what the farm produces.

Taken together, the baseline supports a project design centred on hands-on GAP and regenerative-agriculture training, home-based vertical gardens for leafy vegetables, and practical support for water access and soil rebuilding, delivered using accessible methods.



71%

of households cite **cost** as the main constraint to eating more vegetables

41%

of households completely rely on farming for their income

2. Background and Methodology

2.1 Project context

The Vertical Gardens Project, supported by the Haller Foundation and Regen Trust, aims to improve household food security and nutrition among smallholder farmers in Kitui County by introducing regenerative agriculture practices and home-based vertical gardens for leafy vegetable production. Ahead of implementation, a baseline study was commissioned to characterize the participating households and assess their social and agricultural conditions, providing a reference point against which the project's future outcomes can be measured.

2.2 Sample and instrument

The baseline draws on a structured household survey administered to 32 farming households, combined with a simple visual soil assessment (color, presence of earthworms, surface cover, water absorption, and structure when squeezed). The survey covered household demographics, land and crop management, water access, harvest performance and food security, knowledge and use of Good Agricultural Practices (GAP) and regenerative agriculture, leafy vegetable consumption and production, attitudes toward vertical gardens, income and decision-making, and overall life satisfaction.

All figures in this report are drawn directly from the 32 completed responses. Where a question allows multiple answers (for example, sources of income, challenges to accessing income, or GAP practices used), percentages are based on the number of households citing each option and can sum to more than 100%. Given the modest sample size, findings should be read as an indicative profile of this farmer group rather than a statistically representative picture of Kitui County as a whole.

Sample size:

32 farming households

3. Demographic and Household Profile

Respondents: **53%** were 55 years or older **vs** **3%** youth

Older adults make up 53% of the farmers interviewed in Kitui Central, compared with just 3% of youth. This low level of youth participation reflects a broader national trend in Kenya. Young people face several barriers to entering agriculture, including negative perceptions of farming, limited access to land, high costs of labor and agricultural inputs, and inadequate access to training and skills development.

The average household size is six people, with the largest household comprising 23 members. Among the households surveyed, the average number of children under the age of 18 was three.

Levels of education among respondents

- **31%** completed secondary education
- **25%** completed primary education
- **22%** attended primary school without completing it.
- **19%** attained higher education
- **3%** have no formal education

Education levels vary, but overall indicate relatively limited formal schooling.

Overall, 50% of respondents had primary education or less, highlighting the need for training approaches that rely on practical demonstrations, visuals, and simple, accessible language rather than text-heavy materials.

Most respondents (75%) are the primary decision-makers for farming activities, while 22% share decision-making with another household member. Only 3% reported that another household member, often their spouse, makes farming decisions independently.

This provides a strong foundation for the project, as most participants receiving training are directly involved in making decisions about farm management and agricultural practices.

4. Livelihoods, Land and Income

4.1. Income sources

41% of households reported having no other source of income beyond farming

This indicates a high level of dependence on agricultural production for both food and cash needs.

Among households with additional income sources:



41% had small businesses



24% additionally relied on remittances



24% performed casual labour



11% earned livestock-related income

This high dependence on farming increases household livelihood vulnerability, particularly when crops fail or farmers lack the inputs needed to maintain production; two of the main challenges reported by farmers.

4.2. Land and cropping

In terms of farmland size:

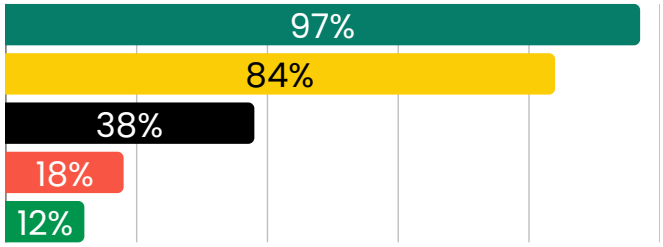
50% farm between 0.5 and 1 acre

6% farm less than 0.5 an acre

44% farm more than 1 acre

These figures are broadly consistent with the wider pattern of smallholder farming in Kitui County, where households typically cultivate small, fragmented plots.

Maize and beans dominate the cropping pattern:



- Maize (97%)
- Beans (84%)
- Have fruit frees present on their farms (38%)
- Pigeon peas (18%)
- cowpeas (12%)

The remaining crops, arrowroots and sugarcane were each grown by a smaller share of households (6 & 3 %). Only 9% grow dedicated vegetable plots, and leafy vegetables specifically are grown by just 41% of households (see Section 7).

only **41%** of households produce leafy vegetables

59% purchase them from the market

This heavy concentration on two staple crops, combined with limited dedicated vegetable production, points to a potential entry opportunity for interventions promoting vegetable production, including vertical gardens as a way to broaden both nutritional intake and income sources.

The dominance of maize and beans, both of which are relatively water-intensive and vulnerable to erratic rainfall, also suggests scope for introducing drought-resistant crops and grains better suited to Kitui's variable climate, diversifying households away from reliance on two staples.



4.3 Income challenges

Farmers reported several challenges affecting their access to income.

31% Lack of income/capital and inputs

13% Low crop yields

Lack of capital/income and lack of inputs were the most frequently cited constraints, together accounting for 31% of responses. This was followed by low crop yields (13%), while other factors including unfavourable weather, water scarcity, limited knowledge of best practices, soil fertility, pest management, low business sales, and old age were each cited by approximately 4–7% of households.

These patterns suggest that financial and material access, rather than on-farm agronomic factors, represent the primary bottleneck constraining household income generation; interventions targeting capital access and input availability are therefore likely to yield the greatest improvement in farm income outcomes.

4.4 Income control and priorities

38% of women would prioritize savings if additional farm income is available

72% of respondents control income from farm produce themselves, with a further 22% sharing control with another household member.

Where households were asked how they would prioritize increased income from farming, savings (38%) was the most common priority, closely followed by farm inputs (34%), school fees (19%), and food, business, and farm diversification (poultry & rabbits) at 9%, 9%, and 6% respectively.

38% savings

34% farm inputs

19% school fees

9% food

9% business

9% farm diversification (poultry & rabbits)

This suggests that any income gains from the project are likely to be reinvested in resilience (savings, inputs) and children's education rather than immediate consumption, a positive signal for project sustainability.

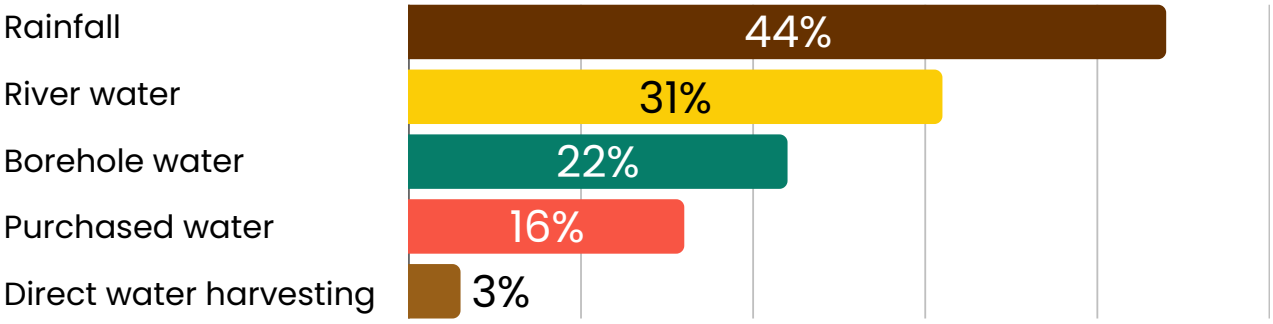


Image by Andrew Ogango

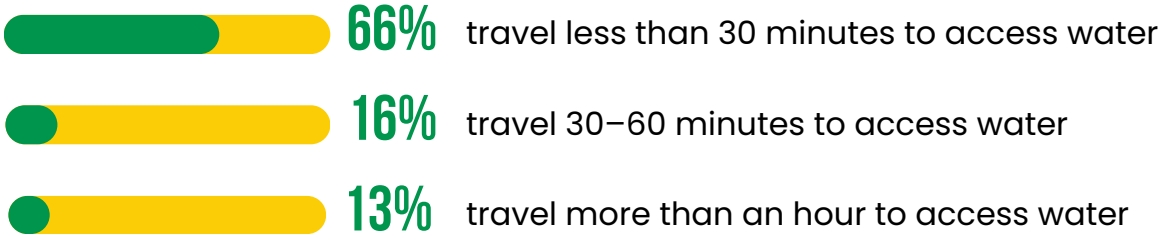
Image by Andrew Ogango

5. Water Access

Rainfall is the leading water source, used (alone or alongside another source) by 44% of households, followed by river water (31%), borehole water (22%), and purchased water (16%). A small number (3%) harvest water directly.



Most households are not far from their water source:



Further, 78% of households agreed and elucidated that having a water pan within their homesteads would be beneficial as it would increase farm productivity and growing vegetables would be possible.

Given that drought and lack of water are cited repeatedly as drivers of poor harvests and crop loss (Section 6). Water storage and harvesting is a clear complementary intervention area alongside the vertical garden component.

6. Harvest Performance, Crop Loss and Food Security

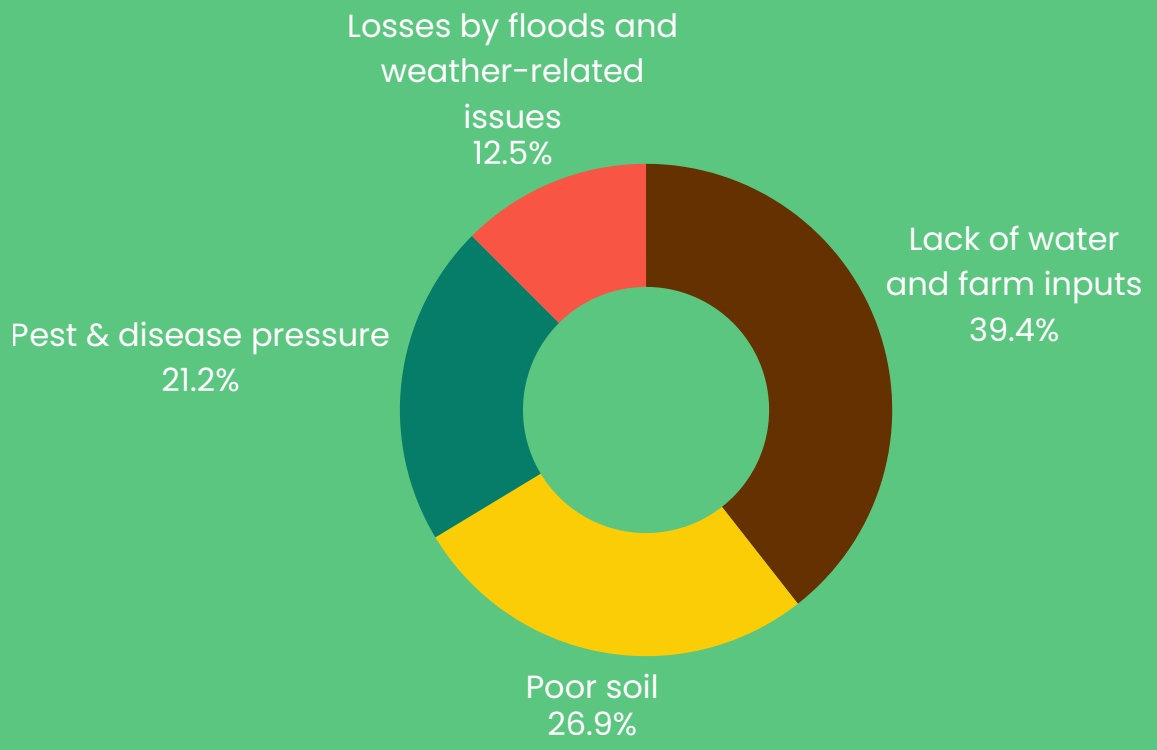
59% Households rating their last harvest as poor or very poor.

84% Households whose last harvest did not meet household food needs.

78% Households that have experienced crop loss.

62% Of those, loss occurring about every other planting season and every planting season.

Reasons causing a poor harvest as cited by households



When harvests fall short, the near-universal coping strategy is to rely on off-farm income to buy food, used by the large majority of households whose harvest was insufficient, with a smaller number relying on food from other sources such as friends, neighbors, or women's groups, or simply managing carefully with what little the farm produced.

Most households eat three meals a day (72%), but 28% manage only one or two, and this pattern tracks closely with reported harvest quality.

Life satisfaction scores (self-rated 1–10, reported by 30 of 32 respondents) averaged 7.1 with a wide spread: a third of respondents rated their life satisfaction at 10, while a meaningful minority (13%) rated it 3 or 4.

This indicates farmers' resilience and hope for the future; in addition, faith — particularly Christianity, appears to play a supporting role, with several respondents explaining that their faith strengthens them.



Image by Andrew Ogango

7. Leafy Vegetable Production and Consumption

44%
of households eat leafy veggies 2-3 times a week

47%
of households eat leafy veggies 4-5 times a week

71%
cannot afford to consume more leafy vegetables due to high costs.

Leafy vegetables are a regular part of the diet in this population: 44% of households consume them two to three times a week, and a further 47% eat them four to five times a week, together accounting for 91% of the sample.

However, consumption is overwhelmingly market-dependent rather than home-grown.

only
41%
of households grow any leafy veggies themselves

91%
of households source their leafy veggies from the market

Of those who grow their own leafy vegetables, they typically do so in an open field (8 households) or a small kitchen garden (5 households).

Cost is by far the leading barrier to more regular leafy vegetable consumption, cited by 71% of households, well ahead of availability (15%) or knowledge (6%).

This is a critical finding for the project: households already value and consume leafy vegetables, and the main obstacle to eating more is the price of buying them rather than a lack of appetite or awareness, exactly the gap that home-based production is designed to close through the Kitui Vertical Gardens Project

8. Knowledge, Attitudes and Readiness for Vertical Gardens and Regenerative Agriculture

8.1 Prior training and awareness

Exposure to structured agricultural training on good practices is generally low,

72% of respondents have never received GAP training

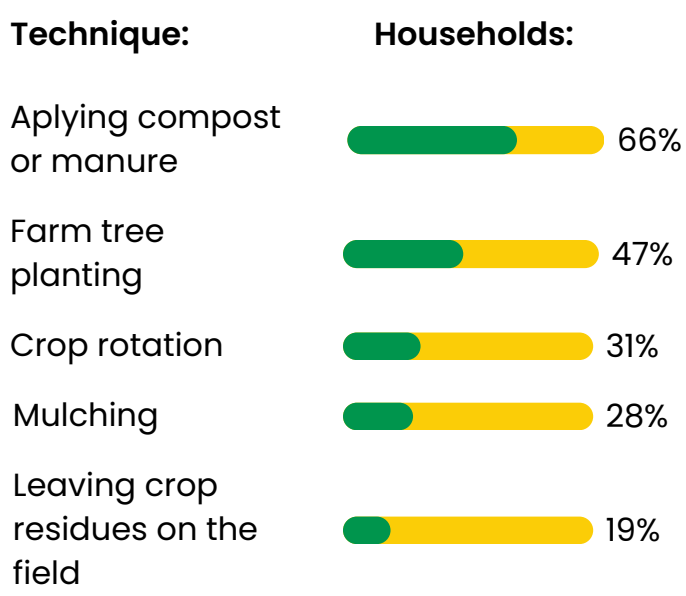
66% have never heard of regenerative ag

Awareness is strongly linked to training: among the 9 households that have received GAP training, 7 (78%) have also heard of regenerative agriculture, compared with only 4 of the 23 untrained households (17%).

Takeaway:

This indicates that formal training, rather than informal exposure, is the main channel through which farmers in this area currently learn about regenerative concepts, which supports investing in structured, hands-on training as a core project activity.

Among the practices households already use, applying compost or manure is by far the most common:



Only 16% currently practice polyculture and 16% grow cover crops between main crops, indicating room to build on an existing but partial base of good practice rather than starting from zero.

In addition, this pattern indicates that **despite most farmers not having heard the term "regenerative agriculture," the majority already practice one or more of its underlying techniques.**

8.2 Vertical garden readiness

78%

of respondents have never heard of vertical gardens.

Knowledge of vertical gardens is minimal: 78% of respondents have no prior knowledge of the concept, yet their interest in growing leafy vegetables near the home is almost universal, 31 of 32 respondents (97%) expressed interest.

This combination of low current knowledge and very high interest is a strong signal pointing to a receptive population of farmers who are open and willing to learn and implement sustainable technologies.

Respondents were also confident about their ability to improve farming outcomes using new practices: 53% described themselves as "confident" and 44% as "very confident."

This self-reported confidence, combined with high stated interest, suggests that the main constraints to adoption are practical, access to training, inputs, water, and materials, rather than attitudinal.

8.3 What farmers said they need to succeed

When asked what would make a vertical garden successful in their household, the most common responses clustered around three areas: reliable training and follow-up support, access to inputs (seeds, fertilizer), and reliable water.

Farmers most often described their hopes for the project in terms of knowledge and follow-up support, increased yields, and income and economic empowerment, while their main worries centered on lack of rain or heavy rains (floods), lack of inputs, and lack of labour, practical, resource-based concerns rather than skepticism about the approach itself.

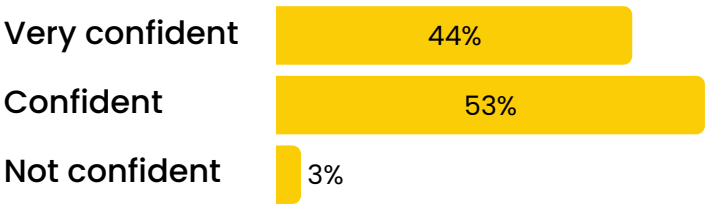




Image by Andrew Ogango

9. Soil Health Assessment

A simple visual soil assessment was carried out on each soil sample representative of the respondent's active farmland. Covering color, presence of earthworms, surface cover by plants or mulch, how quickly water is absorbed, and soil structure when squeezed. The results point clearly to biologically degraded soils in need of the organic-matter-building practices at the core of regenerative agriculture.



Image by Andrew Ogango

Indicator	Finding	Discussion
Soil color	Mixed distribution: 6% light/pale, 44% brown, 38% dark brown, 13% very dark. 50% of plots fall in the darker categories.	Soil color is a rough visual proxy for organic matter content; darker soils generally indicate higher organic matter accumulation. An even split suggests moderate, variable organic matter levels across the sample rather than uniformly depleted soils.
Earthworm presence	100% of plots (32/32) showed no visible earthworms.	Earthworms are a well-established bio-indicator of active, biologically healthy soil, contributing to aeration, nutrient cycling, and structure. Their complete absence even on darker, seemingly organic-rich plots, signals that soil biological activity may be compromised, independent of surface color. This is fully consistent with farmers' own reports of poor soil and low input use, and it makes a strong, independent case for the regenerative practices (composting, mulching, cover cropping, reduced tillage) the project intends to introduce, since these are precisely the practices known to rebuild soil biology over time.
Surface cover (plants/mulch)	25% bare, 41% partially covered, 22% mostly covered, 13% fully covered. Two-thirds of plots (66%) are bare or only partially covered.	Surface cover protects soil from erosion, moisture loss, and temperature extremes, while supporting organic matter build-up over time. With most plots left substantially exposed, soils are likely more vulnerable to water loss and erosion, directly relevant to the water scarcity and poor harvest challenges reported elsewhere in this baseline.

Indicator	Finding	Discussion
Water absorption / runoff	69% absorb well, 25% absorb very quickly (poor retention), 3% absorb very slowly (poor infiltration).	Water absorption reflects soil structure and porosity. On a positive note, soil structure is not uniformly poor: 56% of soil samples crumble in the hand, a sign of reasonable aggregate structure that regenerative practices can build on. However, the 25% of samples where water runs off very quickly point to compacted or structurally degraded soil with limited water retention capacity, a meaningful constraint given how central water access already is to households' reported farming challenge.



Image by Andrew Ogango

10. Summary of Key Findings and Implication

Theme	Baseline finding	Implication for the project
Demographics	Older population (53% aged 55+); limited formal education (56% primary level or below); most respondents are themselves the household's farming decision-maker (75%).	Design training around demonstration and hands-on practice rather than text-heavy materials; the people trained are typically the people who decide what happens on the farm.
Land & income	56% farm one acre or less; 41% have no income source beyond farming.	Vertical gardens, which need little land, are well matched to this group; food security is closely tied to farm output.
Harvest & food security	84% say the last harvest did not meet food needs; 78% have experienced crop loss, mostly recurring.	Baseline food insecurity is high; the project should track harvest adequacy as outcome indicators.
Water access	Rainfall is the leading source of water for farming (44%), others include river, or borehole. 78% affirmed that a water pan would be useful for crop production.	Consider pairing vertical garden training with low-cost water harvesting/storage guidance (water pans)
Training & awareness	72% have no GAP training; 66% have not heard of regenerative agriculture; awareness is strongly linked to prior training.	Structured training is the effective channel for this population in accessible methods.

Theme	Baseline finding	Implication for the project
Leafy vegetables	91% eat leafy vegetables regularly, and 91% buy them, and cost is the top barrier (71%).	Home production directly targets the stated barrier (cost) to a food farmers already value and eat.
Vertical garden readiness	78% have no prior knowledge of vertical gardens, yet 97% are interested; confidence in adopting new practices is high.	Focus resources on training, inputs, water, and materials access.
Soil health	No earthworms observed on any plot; two-thirds of plots bare or only partially covered.	Strong, independent evidence for prioritizing composting, mulching, and cover-cropping as first-phase regenerative activities.



Image by Andrew Ogango

11. Recommendations for Project Design

- Lead with hands-on, demonstration-based training rather than written materials, given the education profile of the group, and pair every vertical garden session with a short GAP/regenerative agriculture module.

- Priorities soil-building practices (composting/manure, mulching, ground cover, cover cropping) from the outset; the absence of earthworms and low surface cover across all plots indicates degraded soil biology that these practices directly address.

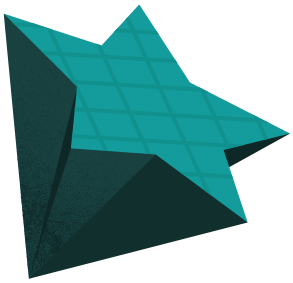
- Position vertical gardens explicitly as a way to reduce the cost of eating leafy vegetables and to increase general intake from the 4-5 days to 7 days.

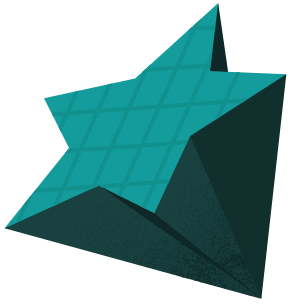
- Pair the vertical garden rollout with low-cost water access support (e.g., water pans, harvesting), since water scarcity underlies both crop loss and the current interest of a water pan.

- Budget for input support (seeds, basic materials) alongside training, since lack of inputs is the most-cited driver of poor harvests and a recurring concern farmers raised about the year ahead.

- Use the baseline indicators in this report, harvest adequacy, meal frequency, leafy vegetable consumption frequency and source, earthworm presence, and soil surface cover as the reference points for monitoring project outcomes at midline and endline.

- Given very high stated interest (97%) but very low prior knowledge (only 22% aware of vertical gardens), ensure early sessions include a clear, visual introduction to what a vertical garden is and how it works before moving to construction and planting.





12. Notes and Limitations

This baseline is based on 32 households and should be read as a detailed profile of the specific farmers enrolled in the Vertical Gardens Project rather than a representative sample of Kitui County.

Several survey questions allowed multiple responses, so percentages for those questions (e.g., income sources, GAP practices, reasons for crop loss) sum to more than 100%.

The soil assessment used a rapid, visual field method rather than laboratory testing; where budget allows, a subset of plots could be lab-tested at midline to validate and add precision to the organic matter and fertility signals identified here.

Findings are also subject to self-report bias, as data on income, crop yields, GAP practices, and challenges faced were provided by household members rather than independently verified.



Image by Andrew Ogango

Itanya Africa Group

We thank our partners and funders for their continued support in our efforts to dignify the livelihoods of Kenyan smallholder farmers.



Image by Andrew Ogango

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