Terre des hommes, India

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Keyhole Gardening Practices in Sundarbans, India

[COMPILATION OF EVIDENCE FROM PILOTS AND STUDIES CONDUCTED BETWEEN 2019 AND 2021]

PREPARED AND PRESENTED BY

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1. Introduction

1.1 Context:

Location – Canning II block in South 24 Parganas (West Bengal), part of the Sundarbans delta.

Climate related problems – frequent cyclones, high soil salinity, tidal flooding, and limited livelihood opportunities.

Livelihood – Most families rely on daily-wage labor or marginal agriculture

Nutrition – of mothers and under-five children are a concern. They often lack access to affordable, fresh vegetables throughout the year due to salinity, waterlogging, and limited cultivable space.

1.2 Rationale for Keyhole Gardens:

Nutrition Security – Providing a consistent supply of diverse vegetables to improve diet quality, especially for under-five children.

Climate Resilience – Raised-bed structures help withstand waterlogging and partially mitigate soil salinity issues.

Low-Cost, Low-Input – Use of locally available organic materials (kitchen waste, livestock manure, water hyacinth, etc.) to build and maintain soil fertility.

2.The Keyhole Garden Model

2.1 Definition and Structure

A keyhole garden typically measures about 9 feet in diameter, with a small wedge-shaped cutout leading to a central compost basket. The garden bed is raised, which helps in areas with flood risk or high soil salinity. Organic matter—including kitchen scraps, grass, leaves, and manure—is added continuously to the central compost basket to feed and enrich the bed.

2.2 Core Features and Advantages

Year-Round Productivity – Retains moisture and nutrients; vegetables can be grown in multiple seasons (winter, monsoon, and summer).

Space and Water Efficiency – Compact design requires relatively little space and can be watered via the compost basket.

Flood and Salinity Resilience – The raised bed provides a protective buffer against moderate flooding and reduces direct contact with saline soil.

Nutritional Impact – By growing a variety of vegetables (legumes, leafy greens, orange-yellow vegetables, tubers), households achieve better dietary diversity.

2.3 Suitability in This Climate

While drought and salinity can hamper typical ground-level gardens, the keyhole method helps:

- Maintain root-zone moisture more efficiently through the compost leachate.
- Elevate the planting bed above waterlogged or highly saline soil layers.
- Reduce reliance on chemical fertilizers by focusing on organic composting.

3. Piloting and Implementation

3.1 Geographic Focus and Target Households

The pilot primarily took place in several villages of Canning II block, chosen for their high vulnerability to flooding and salinity. Households with under-five children and limited economic resources were prioritized so that the gardens could directly improve child and maternal nutrition.

3.2 Training and Community Engagement

Orientation and Demonstrations – Project teams conducted participatory sessions to show how to build raised beds, install central compost baskets, and select diverse seeds for planting.

Focus on Women Gardeners – Mothers or female caregivers often managed day-to-day garden maintenance, though in some villages men were actively involved as well.

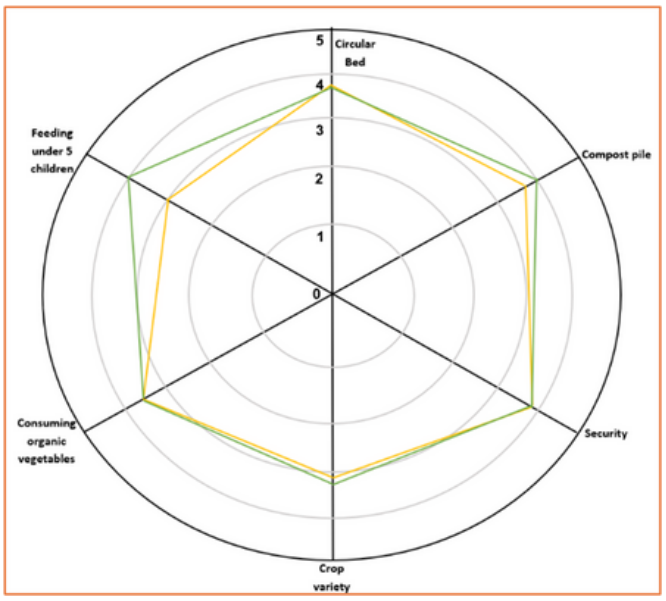
Ongoing Support – Field staff visited periodically to advise on organic pest control (e.g., bio-pesticides from neem, marigold), watering schedules, and composting methods.

3.3 Documentation Methods

Two assessments were conducted –

1. Wheel Studies (2019 & 2020) – A participatory tool wherein community members rated key indicators (e.g., composting, fencing, crop variety, and child feeding) on a scale of 0 to 5. The baseline wheel in 2019 was followed by a one-year follow-up in 2020, indicating progress and challenges.

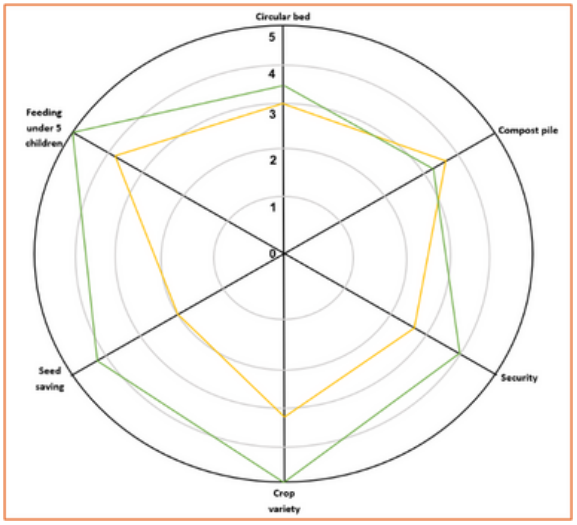
2. Seasonal Surveys (2021) – Quantitative tracking of produce harvested, household consumption, and variety of crops grown in different seasons (winter, monsoon, summer). Comparisons were made with traditional gardens in the same villages.



4. Results and Evidence

4.1 Production and Consumption

Increased Yield – In one set of surveys, keyhole gardens produced an average of 46.5 kg of vegetables across multiple seasons—a 76.6% increase over traditional homestead gardens in comparable areas.



Dietary Diversity – Households reported that 90.9% of the produce from these gardens was consumed by family members, indicating a broader variety of vegetables (leafy greens, root crops, legumes, gourds, etc.).

Reduced Market Dependence – Several households noted reduced expenditure on buying vegetables. Some even sold small surpluses locally, thus earning in addition to household consumption.

4.2 Community Perspectives (Wheel Analysis)

Adoption and Acceptance – Most participants quickly grasped the basic technical details—circular bed preparation, composting structures, and seed saving. The average rating of these indicators in follow-up exercises ranged from 3 to 4 on a 5-point scale, signifying medium to strong progress.

Child Feeding Gaps – While many caregivers reported giving garden vegetables to their children, a gap emerged. Some did not explicitly connect keyhole gardens to improved child nutrition or had not integrated vegetables into children's daily meals as consistently as possible.

Seed-Saving Practices – Some households saved seeds for the next season, although this practice varied widely. Those that did reported more consistent replanting with little or no extra cost.

4.3 Climate and Disaster Resilience

Flood and Cyclone Events – Cyclones Amphan (2020) and Yaas (2021) caused widespread destruction. Nonetheless, many keyhole gardens survived better than traditional plots, thanks to the raised design. Families commented that having even partial produce was critical during extended lockdowns and disrupted supply chains.

Salinity Mitigation – Although not a perfect solution for severe saline incursion, raising the bed and continuously adding organic matter helped buffer crops from the worst soil conditions.

4.4 Observed Benefits

Year-round harvest potential in conditions that normally restrict or damage conventional homestead gardens.

Steady supply of fresh, organic vegetables, leading to enhanced dietary intake for families.

Economic relief via reduced spending on vegetables—and, in a few cases, small-scale sales.

5. Identified Gaps & Challenges

5.1 Understanding the Technology

Child Nutrition Link – While most households saw the value of more vegetables, formal education on how these vegetables specifically improve child health was not always fully absorbed.

Seed-Saving Techniques – Some participants lacked skills for systematic seed saving, affecting the continuity of crops.

5.2 Suitability in Extreme Conditions

Water Scarcity (Drought-Like Conditions) – Keyhole gardens do reduce water requirements overall, but prolonged dry spells can still be problematic if compost baskets are not watered consistently.

Severe Flooding – In cases of very high storm surges or extended floods, even raised beds can be damaged, calling for additional elevation or more robust barriers.

5.3 Community Awareness and Adoption

Scaling Beyond Pilot Households – Although pilot families expressed satisfaction, broader community uptake depends on sustained outreach. Some families remain hesitant to invest initial labor and resources.

Sustainability of Promotion – Regular follow-ups, refresher training, and peer-sharing sessions are key so that knowledge is not lost over time.

5.4 Data and Evidence Gaps

Long-Term Productivity Tracking – Existing data are mostly from one-year or seasonal snapshots. Multi-year monitoring would clarify how productivity and soil fertility evolve over time.

Nutritional Outcomes – While improved diet is reported, more quantitative measures (e.g., child growth data) could strengthen the link between gardens and nutrition status.

6.Recommendations & Way Forward

6.1 Strengthening the Initiative

Enhanced Nutrition Education – Combine keyhole gardening promotion with regular sessions on feeding practices for under-five children. Emphasize including garden vegetables in daily meals.

Seed-Saving and Compost Training – Deliver focused workshops on saving and storing local seed varieties. Ensure families know how to prepare bio-pesticides and effectively manage their compost baskets for optimal soil health.

6.2 Scaling and Community Ownership

Peer-Led Demonstrations – Encourage successful gardeners to mentor new adopters. This can help spread acceptance without requiring large external resources.

Integration with Local Government Schemes – Engage panchayats or state horticulture departments to align keyhole gardening with rural development or climate-resilience programs. If possible, link construction costs or partial labor to MGNREGA or similar schemes.

Micro-Enterprise Potential – In some villages, surplus produce was sold for income. Support entrepreneurial families with basic marketing and storage tips so they can expand this avenue.

6.3 Proposal-Building Considerations

When drafting a new proposal –

Evidence of Success – Cite the yield increases, household testimonies, and resilience to cyclones from existing data.

Focus on Measurable Outcomes – Propose tracking a small set of nutritional (e.g., maternal diet diversity) and livelihood indicators (e.g., household vegetable expenditure or income) to demonstrate impact.

Staged Budgeting – Outline costs in phases (e.g., training, materials, follow-up) while emphasizing community cost-sharing or free local materials (like water hyacinth or bamboo).

7. Conclusion

Keyhole gardens have shown clear promise in Canning II, where salinity, floods, and limited land challenge traditional cultivation. Despite cyclones and lockdown disruptions, households with keyhole gardens noted higher vegetable intake, resilience to seasonal shocks, and reduced market dependence. The participatory assessments (Wheel analyses, seasonal surveys) confirm that technical understanding among the pilot group is fairly high, though nutritional awareness—especially for children—could be reinforced further

Building on these experiences, a renewed initiative can scale up this technology across more households and villages. Coupling garden establishment with stronger behavior-change messaging, integrated training (composting, pest control, seed saving), and supportive local partnerships can ensure that keyhole gardening becomes a sustainable, community-owned solution for nutrition security in the Sundarbans and beyond.

ANNEX 1 - Locations

Villages and Gram Panchayats

1. Sarengabad Gram Panchayat (villages include 5 No. Para, Gangacheri – Sk. Para, Gangacheri – Sardar Para, Ishwaripur)
2. Kalikatala Gram Panchayat (villages include Harindaha, Raghumara)
3. Deuli I Gram Panchayat (villages include Kalugachi – Dolui Para, Kalugachi – Majher Para)
4. Deuli II Gram Panchayat (village includes Hatiyamari)

Additional villages

Gheekhali, Kalugachi, Hediya, Gangacheri.

All these locations are under Canning II block, South 24 Parganas district, West Bengal.

ANNEX 2 - Number of Gardens Installed

Overall Installations

1. **The Wheel Study Report mentions "80+ households having children below the age of 5 years" had keyhole gardens installed as part of the program.**
2. **The Seasonal Survey Report – 2021 states the project has "250 keyhole gardens" overall in the intervention area. Elsewhere, it also mentions "284 households of the Keyhole gardeners."**

By Village (Samples in Wheel Study) (48)

5 No. Para (Sarengabad GP) - 4 keyhole gardens total in that village.
Gangacheri – Sk. Para (Sarengabad GP) - 6 gardens.
Gangacheri – Sardar Para - 3 gardens.
Ishwaripur (Sarengabad GP) - 4 keyhole gardens.
Harindaha (Kalikatala GP) - 10 gardens.
Raghumara (Kalikatala GP) - 6 gardens.
Kalugachi – Dolui Para (Deuli I GP) - 5 gardens.
Kalugachi – Majher Para (Deuli I GP) - 4 gardens.
Hatiyamari (Deuli II GP) - 6 gardens.

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