



BUST LL MVPs

Locally adapted floating rafts



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1. Overview

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Innovation Actor: BUST LL

Location: BAMENDA-CAMEROON

Keywords: floating rafts, local adaptation, cost effectiveness, Cameroon

1.1. Abstract

The locally adapted floating rafts technology enhances the indoor aquaponic system by utilizing waste materials such as Styrofoam, bamboo, and open PVC pipes as sustainable grow beds. This innovative approach promotes the recycling of waste, reduces costs, and utilizes readily available materials, making it accessible for local farmers and communities. By supporting both deep water culture and media beds methods, the technology maximizes resource efficiency and contributes to a circular economy in sustainable agriculture.

2. Locally Adapted Floating Rafts in the DWC

2.1. Photos



Figure 1: Different locally adapted floating rafts at BUST LL (Bamboo, Styrofoam and plastic pipes)

Value proposition of MVP

By using locally sourced materials like Styrofoam, bamboo and PVC pipes, the technology effectively recycles waste and reduces environmental impact. The approach minimizes reliance on conventional growing substrates and promotes a circular economy within the aquaponic system. Utilizing locally available and inexpensive materials lowers the overall setup costs, making the system accessible to a wider audience, including small-scale farmers and community initiatives. The lightweight nature of floating rafts reduces the need for heavy infrastructure, leading to savings in construction and maintenance. The floating rafts provide a stable platform for plants, ensuring that roots are adequately submerged in nutrient-rich water while benefiting from oxygen exchange at the water surface. By repurposing materials that might otherwise contribute to landfills, the technology promotes environmental stewardship and awareness. The system can enhance urban biodiversity by enabling plant cultivation in areas where soil quality is poor or limited.

2.2. Motivation and challenges addressed

Problems addressed by the locally adapted floating rafts MVP

Many regions struggle with waste disposal, particularly of materials like Styrofoam and plastic, which contribute to environmental pollution. The MVP repurposes these waste materials as floating rafts, effectively recycling them and reducing landfill contributions while creating a functional component of the aquaponic system. Many sustainable farming technologies can be prohibitively expensive, limiting accessibility for small-scale farmers and urban gardeners. Utilizing locally sourced and low-cost materials for the floating rafts lowers initial investment barriers, making the technology more accessible and attractive to diverse users.

Concept of the idea

Awareness of rising waste management issues in local communities highlighted the need for innovative solutions that could repurpose waste materials effectively. Growing interest in sustainable agriculture practices and aquaponics prompted exploration of new methods that could enhance food production while minimizing environmental impacts. Initial experiments with various materials led to the discovery that lightweight and buoyant materials, such as Styrofoam and bamboo, could serve as effective floating rafts. This experimentation underscores their feasibility in aquaponics. Community feedback: Discussions with local farmers and community members revealed a demand for accessible and cost-effective farming solutions that could empower individuals to grow their own food.

2.3. Feedback process

Interactions between the LL and the innovation actors

The LL provides a space for the innovation actors (e.g. researchers, entrepreneurs or organizations) to collaborate with community members, stakeholders and experts. Together, they develop and refine ideas, ensuring that innovations are practical and relevant to real-world needs. Regular feedback from end-users in the LL helps the innovation actor understand user experiences, leading to iterative improvements in products or solutions. The LL serves as a testing ground for prototypes developed by the innovation actor. This allows for real-world experimentation and assessment of functionality, usability and impact. Interactions facilitate the collection of valuable data on system performance, user impacts, which the innovation actor can analyze to inform further development.

3. Implementation

3.1. MVP Design

Key components of the locally adapted floating rafts

Floating material (Styrofoam, bamboo and PVC pipes), grow cups, treated sawdust, nutrient rich water, aeration system and suitable crops.

Major design decisions of the floating rafts MVP

Prioritizing locally available, sustainable materials to reduce costs and environmental impact while enhancing community involvement. Ensuring materials can withstand environmental conditions, such as UV exposure and water saturation. Balancing the buoyancy of the floating rafts to ensure they can support the weight of the plants and growing medium while remaining stable in water. Deciding on the dimensions and shape of the rafts to optimize space utilization and ease of handling.

3.2. Operation of the locally adapted floating rafts technology

- Collect locally sourced materials such as Styrofoam, bamboo and PVC pipes.
- Treat sawdust for use in grow cups.
- Construct the floating rafts using the selected materials.
- Cut Styrofoam or bamboo to the desired dimensions and secure them into a stable structure. Insert grow cups filled with treated sawdust into the raft structure, ensuring they are evenly spaced for optimal plant growth.
- Connect the floating rafts to the aquaponic system, ensuring that they are positioned above the fish tank to receive nutrient-rich water.
- Set up a water pump to circulate water from the fish tank to the rafts.
- Ensure that the pump is capable of maintaining adequate flow to keep the rafts submerged and the plants hydrated.

3.3. Bill of materials and required tools

Table 1: Bill of materials

Item	Quantity	Unit cost (FCFA)	Total cost (FCFA)
Styrofoam	Waste cartons	Undetermined	Undetermined
Bamboos	20	150	3,000
PVC pipes	3	3500	10,500
Sawdust	5 kg	200	1,000
Disposable gloves	5 pairs	150	750
Grow cups	50	25	1,250
		Total	16,500

Table 2: Tools required

Item	Quantity	Unit cost (FCFA)	Total cost (FCFA)
Hammer	1	2500	2,500
Hand saw	1	1500	1,500
Knife	1	1000	1,000
Tape measure	1	1500	1,500
Level	1	1500	1,500
Scissors	1	500	500
		Total	6,000

4. Future Improvements

4.1. SWOT analysis of the MVP

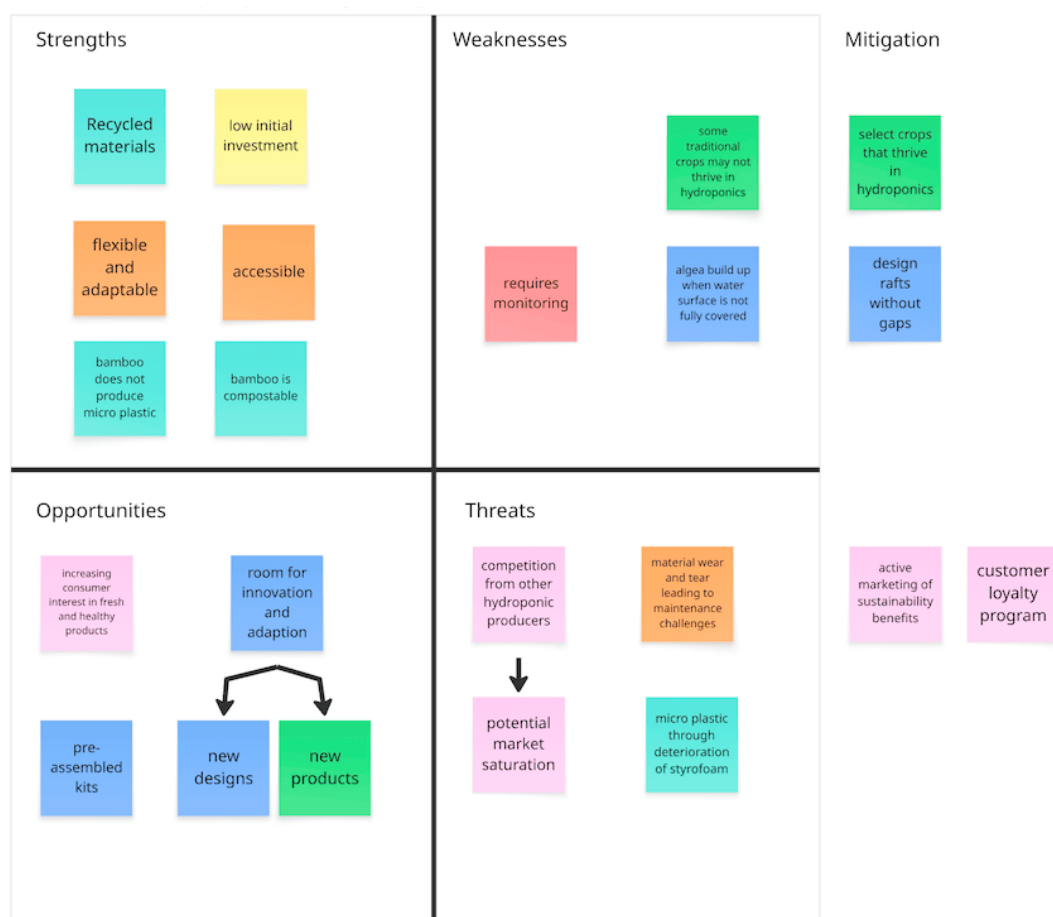


Figure 2: SWOT – BUST LL –Locally adapted floating rafts (Styrofoam, Bamboo, etc.)

Strengths

- Utilizes recycled materials, reducing waste and promoting environmental responsibility.
- Low initial investment due to the use of locally sourced materials, making it accessible for small-scale farmers and urban gardeners.
- Flexible and adaptable system that can be scaled up or down based on available space and resources.

Weaknesses

- Successful operation requires some level of expertise in aquaponics, which may deter potential users.
- Regular monitoring and maintenance are essential to ensure system health, which may require consistent effort.
- Some crops may not thrive in aquaponics systems compared to traditional farming methods

Opportunities

- Increasing consumer interest in fresh, locally sourced and sustainable food products.
- Room for innovation in system design and crop selection, potentially leading to new products and techniques.

Threats

- Potential competition from other farms or aquaponics operations that may offer similar products.
- Changes in climate or water availability could affect the viability of aquaponics systems.
- As more urban farms and aquaponics systems are established, the market could become saturated, affecting profitability.
- Deteriorating Styrofoam rafts might introduce microplastics into the system

4.2. Optimization

Approaches to improve weaknesses of the MVP

- Develop comprehensive training workshops and online resources to educate users about aquaponics principles, system operation and maintenance.
- Pair novice users with experienced practitioners who can provide guidance and support in the initial stages of operation.
- Offer pre-assembled or easy-to-assemble kits that reduce the time and complexity involved in setting up the system.
- Provide instructional videos or on-site assistance for new users to ensure a smoother setup process.

4.3. Threat mitigation

Ideas to mitigate identified threats of the MVP

- Clearly define and communicate the unique benefits of the floating rafts system, such as sustainability, local engagement and quality.
- Implement customer loyalty programs or subscription services to encourage repeat customers and build a devoted customer base.
- Focus on growing crops that are more resilient to environmental changes and climate variations.
- Implement water-saving practices and technologies, such as rainwater harvesting and efficient irrigation system.