**Project Title:**

**"SalineSmart Oasis: Transforming Saline Water into Nutritive Micro-Food Farms"**

**Specific Problem Statement:**

Khulna faces severe challenges from saline water intrusion, which compromises agriculture, potable water availability, and food security. Traditional aquaponics and floating farms primarily focus on large-scale farming but neglect **small, efficient, and accessible solutions** for individual households or marginalized communities.  
Key challenges include:

1. **Lack of Micronutrient-Rich Foods:** Many solutions don’t address micronutrient deficiencies that disproportionately affect vulnerable populations.
2. **Saline Resource Utilization Gap:** The saline water itself remains an untapped resource for producing high-value, nutritious food.
3. **Household-Level Solutions:** Most existing models cater to community-level operations, leaving individual households without direct access or control.

**Innovative Solution:**

**"SalineSmart Oasis"** introduces **household-scale, modular micro-farms** that use saline water to grow **nutritive microalgae** (like spirulina) and halophytes (salt-tolerant plants) while creating a byproduct of purified water. This compact solution integrates **solar desalination, biofiltration, and small-scale algae farming** into a user-friendly system.

**Key Innovations:**

**1. Solar-Powered Micro-Farm Units:**

* A compact, solar-powered desalination system purifies saline water into freshwater while retaining concentrated brine for algae or halophyte cultivation.
* The system is designed for household use, enabling families to grow their own microalgae (e.g., spirulina) and salt-tolerant vegetables like samphire or purslane.

**2. Nutritive Microalgae Cultivation:**

* Microalgae such as spirulina are nutrient powerhouses, rich in protein, iron, and vitamins. These farms produce algae for family consumption or small-scale sale, addressing malnutrition.

**3. Halophyte Gardens:**

* Families can grow halophytes—salt-tolerant plants like samphire, which thrive in brackish water and are rich in nutrients. Halophytes can be consumed, sold, or used as animal feed.

**4. Biomimicry for Sustainability:**

* The design mimics **mangrove ecosystems**, naturally filtering saline water while creating a mini wetland effect to sustain biodiversity around the system.

**5. Community Hubs for Knowledge Sharing:**

* Establish "SalineSmart Hubs" where users can share knowledge, exchange crops, and explore markets for surplus products like dried spirulina, samphire pickles, and more.

**How It Works:**

1. **Desalination for Multi-Use:**
   * Saline water is passed through a solar-powered distillation unit. Freshwater is used for drinking and halophyte irrigation, while brine feeds the microalgae tanks.
2. **Nutrient Recycling:**
   * Wastewater from the desalination process is biofiltered to support microalgae growth, creating a zero-waste loop.
3. **Modular and Scalable Design:**
   * Each unit is compact enough to fit in a backyard or rooftop and can be scaled up for community use.
4. **Market Linkages:**
   * Users can sell high-value products like spirulina powders or halophyte-based snacks to local and urban markets.

**Why This Idea is Unique:**

* **Hyperlocal Focus:** Designed for **household-level adoption** in saline-prone regions, empowering families directly.
* **Circular Resource Use:** Uses every part of the saline water ecosystem—freshwater for drinking, brine for algae, and nutrients for plants.
* **Micronutrient Prioritization:** Targets malnutrition, a specific and overlooked issue, by providing micronutrient-dense foods.
* **Low-Tech Accessibility:** Uses affordable, solar-powered, and easily replicable systems for sustainability in low-income communities.