Proposal for Licensing/Commercialization of

HYDROPONIC FODDER CULTIVATION/FARMING TECHNOLOGY

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BACKGROUND

- Global agriculture and livestock industry is facing unprecedented challenges. Climate change, water scarcity, and rising cost of traditional feed have driven the need for a sustainable, high-efficiency alternative that reduces reliance on land and resources. **Hydroponic fodder farming** is revolutionizing animal feed by offering a nutrient-rich, water-efficient, and space-saving solution.

- Livestock farming is under severe pressure as the shortage of fodder is leading to malnutrition and death among animals. According to the FAO (Food and Agriculture Organization), an estimated 9.6 million cattle died in India alone between 2018 and 2022 due to droughts and fodder scarcity. In East Africa, recurring droughts have resulted in the deaths of over 8 million livestock since 2021, severely impacting food security, dairy industries, and meat production. The ripple effect of this crisis extends beyond the animals themselves- rising costs of meat, dairy, and poultry products due to feed shortages are directly affecting consumers and agribusinesses worldwide. Without sustainable solutions, food prices will continue to rise, affecting millions globally.

- The livestock industry faces mounting challenges due to feed shortages, rising costs, and environmental pressures:
  - **Land Use**: The livestock sector consumes over 30% of global agricultural land (FAO, 2023).
  - **Feed Demand**: Global animal feed demand is projected to rise by 70% by 2050 (FAO, 2019).
  - **Climate Impact**: Droughts and climate change have reduced natural pasture availability. In India, 9.6 million cattle died between 2018–2022 due to fodder scarcity (FAO, 2022). In East Africa, over 8 million livestock perished since 2021 due to feed shortages (FAO, 2023).
  - **Economic Fallout**: Feed shortages have increased meat, dairy, and poultry prices globally, threatening food security (World Bank, 2022).
  - Traditional farming struggles to meet this demand, driving the need for innovative, resource-efficient solutions.Traditional farming struggles to meet this demand, driving the need for innovative, resource-efficient solutions.

- Addressing this crisis, **Ms. Tarannum Malik** has developed a proprietary hydroponic fodder cultivation know-how. This scalable method enables livestock farmers, commercial feed producers, and agribusinesses to produce high- quality, pesticide-free fodder in just **7 (seven) days** with **90% less water** than traditional farming. By eliminating reliance on fluctuating fodder prices and ensuring **a year-round, fresh, and high-protein feed supply,** this turnkey solution is a game-changer for agribusinesses looking to reduce costs, improve efficiency, and stay ahead in the rapidly growing sustainable feed market.

Market

Global hydroponic fodder market is projected to grow at over 10% CAGR, as livestock farmers worldwide seek alternatives to water-intensive and land-dependent conventional feed. With increasing demand for chemical-free food, there is an urgent need for a sustainable, cost-effective livestock feed solution that aligns with modern agricultural trends and global ESG (Environmental, Social, and Governance) standards.

Proposed technology provides a comprehensive know-how package giving exceptional opportunity for investors, feed manufacturers, livestock farm owners, and agri-tech businesses to establish a leadership position in this booming sector. By acquiring this proprietary methodology, businesses gain access to cutting-edge agricultural expertise that is proven, scalable, and commercially viable.

PROPOSED TECHNOLOGY

- The proposed technology focuses on a proprietary, chemical-free hydroponic system for rapid fodder production.
- The technology integrates atmospheric water generation (AWG) — enabling water extraction from ambient air and reducing dependence on traditional water sources — with a multi-tier vertical tray system designed for high-efficiency production, which allows for scalable mass production within a minimal footprint by fully utilizing vertical space. This results in consistent, high-yield fodder output, with a complete growth cycle achieved in just 6 days. The system is ideal for regions with limited water access and space, offering a commercially viable and environmentally sustainable solution. The proposed system is entirely chemical-free, eschewing synthetic fertilizers, pesticides, and external nutrient solutions in favor of harnessing the natural nutrient reserves in the seeds.
- Combined with precise control over environmental factors (lighting, temperature, and humidity), the proposed process minimizes resource usage while maximizing yield density and consistency.
- The proposed system/technology offers a modular and scalable design, further enhancing its adaptability to diverse geographic regions and varying market needs, making the know-how-based IP particularly robust for expansion into water-scarce and resource-challenged environments.
- Specific know-how details/samples of the output animal feed can be shared post NDA for evaluation and further testing.
- Independent laboratory testing has been conducted on multiple samples of the cultivated hydroponic fodder to validate its nutritional suitability for animal consumption. The results indicate that key nutritional parameters — including protein, Acid Detergent Fiber (ADF), Neutral Detergent Fiber (NDF), and other essential factors — fall within the optimal range required for maintaining animal health and supporting productivity. These values are consistent with the dietary standards for livestock, ensuring that the feed promotes healthy weight gain, efficient digestion, and overall well-being.

PROPOSED METHODOLOGY

1. Seed Selection and Preparation

- **Seed Selection:** Choose high-quality, disease-free seeds, such as barley, wheat, or oats.
- **Washing the seeds:** Wash them in clean water and soak them for a couple of hours.

2. Sowing the seeds

- Evenly spread the soaked seeds onto the growing trays

3. Growing Stage

- Move the trays to the growing area with controlled temperature and humidity.
- Water the seeds at timely intervals.

4. Harvesting

- The fodder will be ready for harvest on the 7^{th} day.
- Remove the entire fodder mat, including the root zone, from the trays.
- Feed the fresh, nutrient-rich fodder directly to the livestock.

KEY FEATURES OF OUR SUSTAINABLE HYDROPONIC FODDER SYSTEM

1. Smart Environmental Control & Process Automation

Our system is powered by Controlled Environment Agriculture (CEA) principles, allowing us to create **ideal microclimates for plant growth**. Every element — light, temperature, and airflow — is carefully regulated using automated systems that ensure consistency and precision.

- **Accelerated 6-day growth cycle**: From seed to fully mature fodder in just 6 days, enabling continuous, high-volume production and rapid turnover.

- **Climate resilience**: Unlike traditional farming or even some open hydroponic systems, our fully enclosed environment ensures that external weather, seasonal shifts, or climate fluctuations do not affect productivity.

- **No chemicals needed**: The stable and ideal conditions eliminate the need for growth hormones, pesticides, or fertilizers, allowing natural growth without external interventions.

- **Operational consistency**: Automation reduces labor dependency, increases accuracy, and ensures uniform quality across all production cycles.

KEY FEATURES OF OUR SUSTAINABLE HYDROPONIC FODDER SYSTEM

2. Natural, Chemical-Free Cultivation

Our growing process is centered on **purity, safety, and sustainability**. Unlike other hydroponic systems that often rely on nutrient solutions or synthetic inputs, we harness the **natural nutrient reserves within the seeds** themselves.

•**No synthetic fertilizers, pesticides, or additives**: Livestock are not exposed to chemical residues, resulting in healthier animals and safer end products (milk, meat, etc.).

•**Completely residue-free output**: The fodder is clean and fresh, aligning with increasing demand for chemical-free feed solutions.

•**Enhanced animal health**: Studies indicate animals exhibit better digestion, higher energy, and improved palatability when fed chemical-free hydroponic fodder.

•**Market differentiation**: This positions our product in a niche category of **premium, naturally-grown fodder**, opening access to export markets and health-conscious buyers.

KEY FEATURES OF OUR SUSTAINABLE HYDROPONIC FODDER SYSTEM

3. Atmospheric Water Generation (AWG) – Sustainable Irrigation

One of our key innovations is the use of **Atmospheric Water Generators** (AWGs), which extract water from humidity in the air.

•**Water from air**: AWGs condense and purify water from ambient air, offering an **independent and renewable water source**.

•**Off-grid and self-sufficient**: This enables operations in water-stressed or arid regions where traditional irrigation is either limited or unsustainable.

•**Reduced environmental burden**: By avoiding groundwater extraction or municipal water consumption, we **conserve critical freshwater resources** and reduce agricultural water footprints.

•**Reliability & scalability**: AWGs allow us to expand operations anywhere without worrying about water supply infrastructure — a major advantage in global scaling and crisis-resilient planning.

KEY FEATURES OF OUR SUSTAINABLE HYDROPONIC FODDER SYSTEM

4. High-Yield, Low-Footprint Vertical Farming System

To maximize output within a limited space, we utilize a **multi-tiered vertical tray system**.

•**Space optimization**: Each vertical tier increases usable growing area, producing **more fodder per square foot** than traditional systems.

•**Scalability**: The system is modular — trays and tiers can be easily added or removed based on demand, without disrupting the operation.

•**Consistent quality**: Each tray receives optimized light, air, and moisture, resulting in uniform crop growth and reduced rejection rates.

•**Urban and rural viability**: This design makes it suitable for **urban farming**, industrial zones, or rural areas with land limitations.

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KEY FEATURES OF OUR SUSTAINABLE HYDROPONIC FODDER SYSTEM

5. Closed-Loop, Low-Waste, Resource-Efficient Model

Our process is designed with sustainability at its core.

•**Closed-loop water systems**: Water used in one cycle is filtered and reused, reducing waste and conserving resources.

•**No runoff, no leaching**: Unlike soil-based or conventional hydroponic systems that can produce nutrient-rich waste, our setup contains and reuses all inputs.

•**Sterile and soil-free**: We eliminate pests, weeds, and diseases typically found in soil, which means **no crop loss due to contamination**.

•**Minimal energy input, maximum output**: Energy-efficient lighting and climate systems are used to maintain sustainability across production stages.

KEY FEATURES OF OUR SUSTAINABLE HYDROPONIC FODDER SYSTEM

6. Nutritional Superiority for Animal Health

Our fodder is **scientifically validated** to provide exceptional nutritional benefits:

•**High protein and fiber content**: Levels of protein, ADF (Acid Detergent Fiber), and NDF (Neutral Detergent Fiber) are all within optimal ranges to promote livestock growth, milk yield, and digestive health.

•**Palatability and digestibility**: Animals prefer our fresh, moist, green fodder over traditional dry feed, and exhibit better digestion and reduced bloating.

•**Faster weight gain & better immunity**: Studies indicate that livestock have reported better health outcomes, reduced feed-to-weight ratios, and improved animal vitality.

•**Better market performance**: Healthier animals fetch higher value in the livestock market, benefiting producers and end buyers.

KEY FEATURES OF OUR SUSTAINABLE HYDROPONIC FODDER SYSTEM

7. Scalable, Adaptable, and Future-Ready

Designed for growth, our hydroponic fodder system is **highly modular and versatile**.

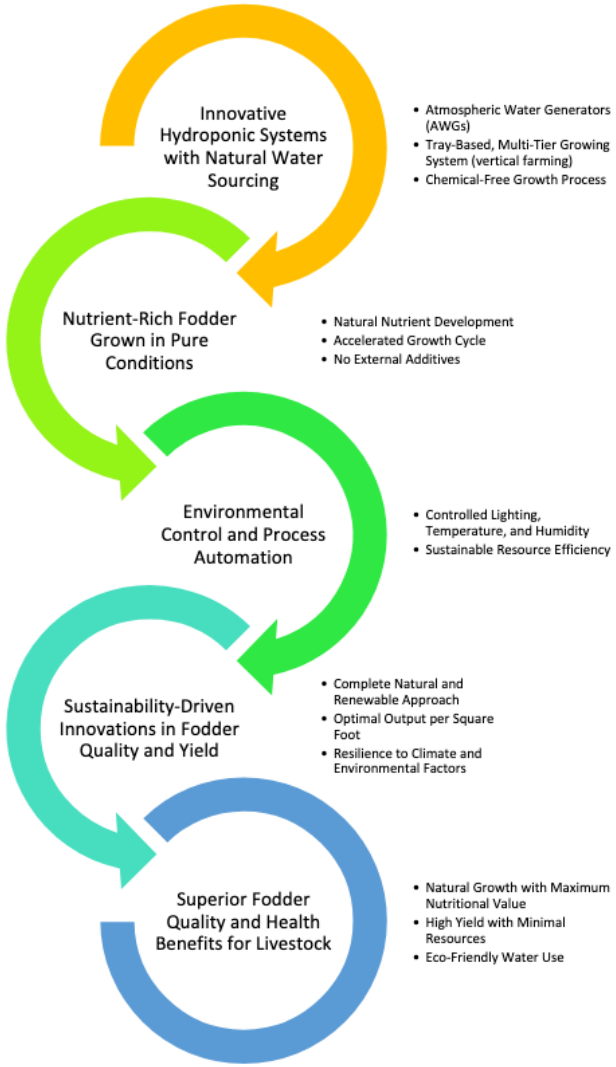
•**Modular design**: Additional units or tray sets can be installed without changing the base infrastructure — enabling **cost-effective scalability**.

•**Adaptable to any region**: Since we don't rely on soil, sunlight, or traditional irrigation, the system can be deployed **anywhere — deserts, urban rooftops, or climate-unstable zones**.

•**Aligned with global sustainability goals**: Our system directly supports multiple UNSDGs, including clean water, responsible production, zero hunger, and climate action.

•**Ready for global expansion**: The simplicity and repeatability of our process make it an attractive model for scaling across continents and industries (livestock, dairy, poultry, and more).

Proposed Technology



Proposed Technology

Aspect	Traditional Feed	Fodder grown using IP
Land Use	Requires extensive land for cultivation.	Requires minimal land use; grown vertically in controlled environments.
GHG Emissions	Higher GHG emissions due to land use, transportation, and fertilizer application.	Lower GHG emissions due to reduced land use and proprietary growing methods.
Water Usage	High water usage for crop irrigation.	Significantly lower water usage.
Fertilizer and Pesticides	Dependent on synthetic fertilizers and pesticides.	No need for synthetic fertilizers or pesticides; grown in a controlled, chemical-free environment.
Feed Production Time	Longer growth periods, impacting overall efficiency.	Rapid growth cycle; ready in about six days, enhancing efficiency.
Digestibility and Nutrient Absorption	Lower digestibility and less nutrient absorption, leading to more fermentation and methane production.	Higher digestibility and improved nutrient absorption, resulting in reduced fermentation inefficiencies and methane output.
Enteric Methane Emissions	Higher enteric methane emissions due to fermentation of fibrous feeds.	Lower enteric methane emissions due to better digestibility and nutrient profile.
Feed Quality	Often high in fiber, increasing methane emissions.	Superior quality with balanced nutrients, leading to better digestion and lower methane.

ADVANTAGES OF PROPOSED TECHNOLOGY

KEY BENEFITS OF HYDROPONIC FODDER FARMING

- **Rapid Growth Cycle**: Fodder is ready to harvest in just 7 days, compared to 60-90 days for field grown fodder, ensuring a constant and fresh supply.
- **High Nutritional Value**: Packed with essential vitamins, minerals, amino acids, and enzymes, improving digestion and overall health of livestock.
- **Massive Water Savings**: Uses 90% less water than traditional fodder farming, making it ideal for water-scarce regions.
- **Year-Round Production**: No seasonal dependency, ensuring a consistent and reliable feed supply.
- **Pesticide & Chemical-Free**: Contributes to clean farming practices.
- **Reduces Feed Costs**: Eliminates dependency on expensive and fluctuating traditional feed sources.
- **Scalable & Modular**: Suitable for large-scale commercial livestock operations, and urban farming setups.

This proprietary hydroponic fodder know-how is an essential asset for forward-thinking investors and agribusiness leaders who want to drive sustainable food production and animal farming efficiency while mitigating the impact of climate change and resource scarcity.

IMPACT OF PROPOSED TECHNOLOGY

Livestock Productivity	Dairy cattle fed hydroponic barley fodder showed an 8–14% increase in milk yield (Reddy et al., 1988; Naik et al., 2014).
	Beef cattle gained 200g more daily weight compared to maize diets (Leitch, 1939).
	Improved conception rates and herd longevity observed (Naik et al., 2015).
Economic Impact	Reduces feed costs by eliminating reliance on volatile traditional fodder prices (Malik, 2025).
	Increases farmer revenue through higher milk and meat yields (Yvonne Kamanga, 2016).
Environmental Impact	Cuts water usage by 90%, critical in arid regions (Malik, 2025).
	Reduces greenhouse gas emissions by minimizing land use (FAO, 2023).

APPLICATION OF THE PROPOSED TECHNOLOGY

Dairy & Beef Cattle: Increased milk yield, better meat quality, and improved digestion.

Goats & Sheep: Enhanced growth rates, reduced methane emissions, and higher milk output.

Pigs: Helps in muscle development and enhances digestion.

Camels: Ideal for the Middle Eastern market, improving milk yield and endurance.

Zoo and Wildlife Sanctuaries: Provides a consistent and nutrient-rich diet for herbivores.

Equestrian Centers: Offers high-quality, chemical-free forage for horses, improving digestion and endurance.

Poultry and Aviary Feed: Enhances egg production and meat quality for chickens, ducks, turkeys, and exotic birds.

Pet Food Industry: Can be incorporated into pet diets.

Rehabilitation Centers: Supports injured or malnourished animals in rescues and wildlife rehabilitation programs.

About the Inventor/IP Owner

TARANNUM MALIK: A VISIONARY IN SUSTAINABLE AGRICULTURE

Few individuals have contributed as profoundly to the transformation of modern sustainable agriculture as Tarannum Malik. Her work in livestock feed production has not only redefined conventional farming practices but also addressed one of the most critical challenges of our time — food and feed security. Recognized for her impact, Tarannum was honored by Forbes 30 Under 30, a prestigious accolade celebrating the world's most influential young leaders and disruptors.

Her journey into sustainable livestock nutrition began at the height of the COVID-19 pandemic, when global supply chains crumbled under the weight of lockdowns and transport restrictions. The ripple effect was devastating: a sharp rise in animal feed prices, widespread malnutrition in livestock, and crippling losses for farmers. This crisis exposed the deep interdependence between food and feed systems and sparked her mission to build a resilient, climate-independent, and scalable solution that could work across geographies, regardless of land availability or logistical constraints.

While hydroponics has ancient roots, dating back to the Hanging Gardens of Babylon, modern hydroponic fodder systems have long struggled with practicality and safety. Traditional models were plagued by mold, fungal contamination, and water stagnation, often requiring chemical intervention through pesticides and synthetic nutrients to keep the crops alive. The resulting fodder was not only unsafe for livestock but also unsustainable at scale. Moreover, these early systems were typically confined to small, container-based operations, limiting both output and accessibility. High operational costs and inefficiencies made it nearly impossible to deploy hydroponic fodder at a commercial level.

Tarannum Malik's breakthrough was in solving these limitations — engineering a chemical-free, high-yield hydroponic fodder system that is modular, water-efficient, and environmentally sustainable, capable of meeting the demands of both smallholder farmers and large-scale commercial operations.

PROPOSED OFFERING

1. Licensing Agreements

- Offer exclusive or non-exclusive licenses to farms and agribusinesses.
- Charge one-time licensing fees or recurring royalties based on production volume.

2. Commercial Hydroponic Fodder Farms

- Establish a dedicated hydroponic fodder farm and supply feed to dairy farms, poultry farms, equestrian centers, zoos, and conservation programs.
- Target high-demand markets such as GCC countries, Africa, and Asia-Pacific, where water scarcity and land constraints make traditional farming challenging.

3. Equipment & System Sales

- Manufacture and sell turnkey hydroponic systems to farmers and agri-tech companies.
- Develop scalable models

4. Consultancy & Training Services

- Offer consultation services for setting up hydroponic fodder farms.
- Provide training programs to ensure optimal efficiency and profitability.

For Interest on Licensing

Reach Out to

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