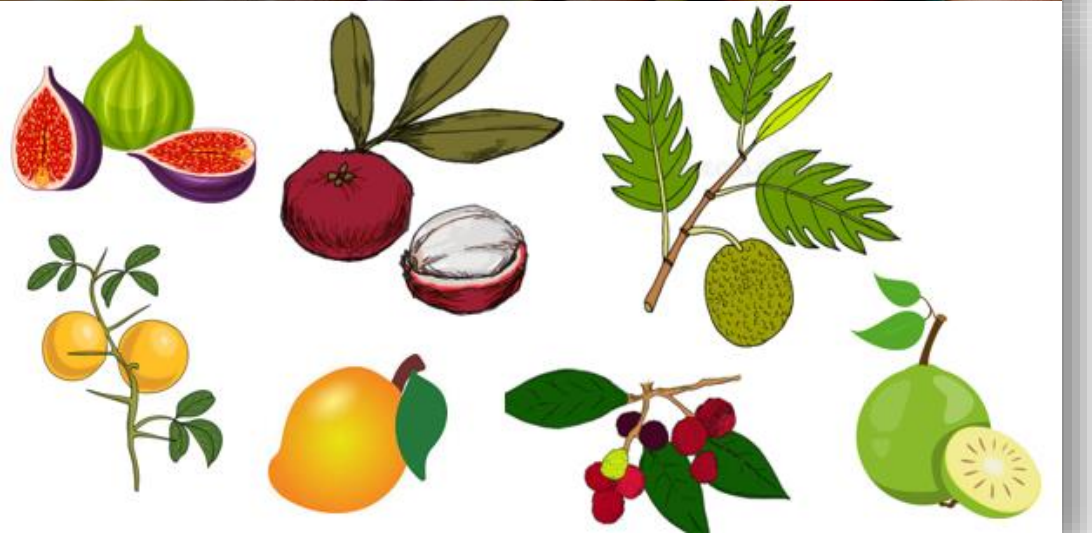

Develop New cultivation methods through community participation to improve Nutritious fruit access for Landless and Marginalised Communities

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1. Introduction to project:

Target Area: Northeastern Zone of Tamil Nadu (Kancheepuram, Tiruvallur, Vellore, etc.)

Problem Statement:

- Improving access to nutritious food(watermelon) for landless, marginalized communities in rural, peri-urban, and urban areas by introducing a low-cost, climate-resilient cultivation model like Furrow Feed System(FFS).
- Integrated compost-based furrow beds, microbial enrichment, drip irrigation, poly mulching, and multicycle fruit production using locally available organic waste.
- FFS improves soil health by increasing organic carbon, ensuring a continuous, nutritious supply, improving water-use efficiency, and reducing dependence on synthetic inputs.
- FFS reduces ecological footprint, minimises plastic waste, and enhances carbon sequestration.
- FFS includes marginalised farmers, empowers women through income and leadership roles, strengthens community engagement through shared cultivation and cooperative models, and provides better scalability.
- FFS is tested for watermelon on 18 acres of land. We could achieve a good profit with low investment by introducing multiple crop cycles. So it is evident that it could be achieved on a larger scale.

2. Project Objectives:

1. To adapt the integrated and low-cost, climate-smart model FFS for watermelon and muskmelon.

2. To provide an adaptable method to diverse contexts, rural, peri-urban, and urban rooftops, and school/ college yards, which encourages shared ownership and fosters circular agriculture.

3. The project emphasises community engagement, capacity building and empowerment for women and youth through training in composting, irrigation setup, pest management and post-harvest handling.

4. AI provides support in automatic irrigation, pest control, and disease detection in a phased approach, such as Phase I and Phase II, respectively.

5. This project promotes circular economy principles while reducing environmental burden and input cost, and supports multiple crop cycles cultivation over 3 to 4.

3. Methodology and implementation approach(1):

- Process begins with the construction of compost-enriched furrow beds using locally available bio-degradable waste, layered with mature compost inoculated with available microbial nutrients and soil structure.
- Beds are covered with poly mulch to conserve moisture and suppress weeds, while drip irrigation delivers precise water, supporting continuous cultivation for up to 3 to 4 crop cycles with minimal reapplication.
- The project begins with community mobilisation and identification of cultivation spaces, including unused land, rooftops and school/college yards.
- Conducting initial training sessions to build local capacity in composting, furrow bed preparation, microbial inoculation, drip irrigation and poly mulching techniques.
- The members will be engaged in the collection and processing of organic waste to create nutrient-rich compost.

4. Methodology and implementation approach(2):

- Furrow beds will be established using a layered compost method enriched with effective microorganisms, followed by installation of drip systems and mulch covering.
- Continuous support and technical guidance will be provided to ensure successful watermelon cultivation over 3 to 4 crop cycles.
- Demonstration plots will serve as a learning hub where knowledge-sharing events and peer learning sessions.
- Monitoring and evaluation activities will assess crop performance, community participation, soil health and overall impact on nutrition and livelihoods.
- The integrative approach blends scientific techniques with local knowledge, aiming not only to boost fruit availability but also to build long-term climate resilience, sustainable livelihoods in vulnerable communities.
- AI is employed for leaf disease detection, pest prediction and automatic irrigation.




5.Social and nutrition impact pathway – Project outcomes/Impact:

- The project addresses key challenges: declining soil fertility, water scarcity, high input cost, poor waste management and exclusion of small holders and women.
- Inputs include enriched compost, drip systems, mulching, training and community platforms.
- Outputs include functional demo plots, trained farmers, composting adoption and women's participation.
- Short to medium term outcomes improve soil fertility, reduce cost, higher yield and strengthen farmer networking.
- Long-term impacts include regenerated soils, carbon sequestration, empowered communities, scalable and replicable model for sustainable agriculture.
- We can have an agreement with the government bodies(Anganwadis, mid-day meal kitchens, or community nutrition initiatives, if possible)for better utilisation.

6. Environmental and climate advantages

- Inadequate irrigation leads to issues like fruit cracking, and improper fertilisation results in poor yield quality.
- Pest and disease outbreaks caused by fruit flies and viruses require chemical control raises cost and environmental risks.
- Through FFS, the soil is enriched with the required nutrients, and soil moisture will be preserved with the help of an automatic irrigation system.
- With the support of AI prediction of pest outbreaks based on weather will be done. Also, it recommends bio pesticides/ chemical rotation.
- With the support of AI, identification of diseases caused by fungal/ viral/ bacterial will be sensed at an early stage and treatment will be recommended, which avoids financial loss.

7. Scaling, sustainability and cost efficiency:

- The model has a potential for replication in adjacent villages without modification, as we are addressing different types of lands, such as empty land, rooftops, in rural, peri-urban, and urban areas.
- Scaling via local NGO's, Panchayats, link with agri extension.
- The model is modular while adapting compost recipes, mulch types, and irrigation scheduling to local climate and soil. A pilot run can be made before full scaling.
- Regular or aperiodic visits can be made to the site to ensure operations' sustainability, and clarification sessions can be conducted in case required.
- Water saving from drip, poly mulch disposal sustainably, and reductions in chemical fertilisers and pesticide usage incur low cost.
- An increase in soil organic carbon via added compost increases sequestration. Reduced synthetic fertiliser use lowers N20 emissions.
- The proposal aligns with SDG2 (Zero hunger), SDG5(Gender Equality), SDG 6/12/13: Water efficient irrigation, waste management, and Climate resilience.

8.Budget summary

Budget Head Description	Year 1 (₹)
Land preparation - Land Ploughing, harrowing, bund formation, leveling 10 ha	300000
Soil testing and mapping 10 Ha	50000
Subtotal A	350000
Community meetings & awareness drives | Farmer group formation, SHG engagement	200000
Training & exposure visits | Best practices, drip/furrow demo fields	100000
Field staff and extension worker honorarium | Local facilitators	200000
IEC Materials (Posters, Booklets, Videos)	50000
Subtotal B	550000
High-quality seeds | Certified hybrid watermelon varieties	600000
Manure and compost | FYM, vermicompost	400000
Fertilizers and micronutrients | NPK, micronutrient mixes	300000
Pesticides & bio-inputs,IPM, neem oil, bio-pesticides	250000
Mulching sheets	350000
Subtotal C	1900000
Drip irrigation system installation	250000
Furrow system layout and bunding | Manual or machine layout	200000
Subtotal D	450000
Sowing/labour charges	120000
Intercultural operations	120000
Harvesting & handling	120000
Subtotal E	360000
Sorting, grading & packaging	200000
Transportation to market	100000
Subtotal F	300000
Field monitoring visits	50000
Documentation & reports	50000
Subtotal G	100000
Contingency & Miscellaneous	125000
Leaf disease detection	300000
Irrigation scheduling	100000
soil sensor integration	100000
Grand Total Year 1	4635000

Budget Head Description	Year 2 (₹)
Community meetings & awareness drives	50000
Training & exposure visits	50000
Field staff and extension worker honorarium	160000
Subtotal B	260000
High-quality seeds	200000
Fertilizers and micronutrients	200000
Subtotal C	400000
Sowing/labour charges	80000
Intercultural operations	90000
Harvesting & handling	80000
Subtotal E	250000
Sorting, grading & packaging	100000
Transportation to market	50000
Local market linkage support	100000
Subtotal F	250000
Data collection and impact tracking	50000
Subtotal G	50000
Contingency & Miscellaneous	125000
pest prediction	280000
Automated fertigation	150000
Grand Total Year 2	16,40,000

Risk and mitigation strategy:

Issue	Risk	Mitigation
Seedling Mortality	• Uneven water distribution leads to waterlogging in some furrows and drought in others.	• Maintain proper furrow length and slope to ensure uniform flow. • Use land levelling/laser levelling for even distribution. • Apply pre-irrigation before sowing to ensure uniform soil moisture. • Use mulching to reduce soil crusting and moisture loss.
Drought & Moisture Stress	• Water supply may be irregular due to canal rotations or borewell limitations. • Evaporation losses are high in open furrows, especially in summer.	• Apply soil moisture conservation techniques. • Adopt scheduled irrigation based on crop growth stage.
Grazing by Cattle/Goats	• Damage to seedlings and ridges caused by stray cattle. • Furrows may collapse due to animal movement.	• Install low-cost fencing (thorn fencing, solar fencing, live fencing with Agave/Gliricidia). • Appoint a field caretaker or rotate patrol responsibility among farmers.
Community Ownership & Maintenance Issues	• Disputes over water allocation. • Lack of coordination for canal cleaning or furrow repair.	• Create written rules on water turns, penalties, and maintenance responsibilities. • Conduct monthly community meetings for review and planning.
Pest & Disease Increase	• Standing water in furrows attracts pests or fungal diseases. • Mosquito breeding in poorly drained areas.	• Monitor and use IPM techniques (biocontrol, traps).

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Thanks