**MSME IDEA HACKATHON 4.0**

**PROJECT PROPOSAL**

**Part A – Project Details:**

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| 1. **Project Title:** | **Automated Eco-Friendly machine for recycling floral waste in to Zero-Carbon printing material** |
| 1. **Project Area:** | Sustainable development |
| 1. **Project Duration in Months:** | 12 months |
| 1. **Total Cost:** | 15 Lakhs |
| 1. **Problem Identification and Solution offered** | In India 80,00,000 tons of temple waste is dumped in river and lands. It may become harmful for fish and other living beings and creating chaos in the fragile atmosphere and then leading to pollution on land and water.  The production and use of ink present significant environmental challenges due to the chemical components involved. Organic solvents, such as alcohols and ketones, release volatile organic compounds (VOCs) that contribute to air pollution and respiratory issues. Preservatives like phenol can harm aquatic life if not disposed properly. Additionally, synthetic pigments may break down into microplastics, entering waterways and harming marine life. Overall, these factors highlight the urgent need for eco-friendly ink alternatives to mitigate pollution, waste, and resource depletion and the major product involved in dyeing process of making ink is carbon black  The main problem of decomposition of waste flowers from temple, agricultural practices and home plantations in water is to be solved by converting floral waste in to Zero-Carbon printing material so that it offers a dual advantage |
| 1. **Objective of the Project** | To design an automated Eco-Friendly machine to convert the waste flowers at temples, plantations and agricultural practices as zero-carbon printing materials for fabric and paper ink.  To produce Zero-carbon printing materials, flowers are separated as colors and by adding organic substance materials as an alternative printing material for carbon is created in various colors. |
| 1. **Novelty/Comparative Analysis** | The proposed automated Eco-friendly floral recycling machine is designed to produce a zero carbon printing materials as a sustainable product for an ECO solution.  Conventional inks pose significant environmental and health risks due to their reliance on chemical solvents like VOCs, which contribute to air pollution and respiratory problems, and preservatives like phenol, which can contaminate water and harm aquatic life.  Additionally, the production processes generate waste that leads to soil and water contamination, while synthetic pigments may break down into harmful microplastics. In contrast, flower-based inks offer an eco-friendly solution by utilizing waste flowers, reducing environmental pollution, and being non-toxic, biodegradable, and sustainable. This promotes a circular economy and mitigates the environmental impact of ink production, highlighting the need for more sustainable alternatives.  By comparing the existing printing materials, the proposed printing materials ensures the no charcoal or synthetic chemicals are used.  Also the proposed printing material is carbon neutral and environment friendly solution. |
| 1. **Project summary (maximum 250 words):**   Add drawings / Models / Illustrations/Prototype images | The proposed floral recycling machine is a sustainable and eco-friendly approach to printing materials production by converting waste flowers into high-quality ink. This automated system includes several modules designed for efficient processing, from flower collection and pigment extraction to filtration, binder integration, and packaging.  Each phase is optimized with sensors, temperature control, automated stirring, and real-time monitoring to ensure that pigments are extracted, concentrated, and refined smoothly. By utilizing natural binders like gum arabic or starch and eco-friendly solvents, the machine produces biodegradable ink that reduces the environmental footprint compared to traditional ink production.  Additionally, by-products such as leftover flower material can be composted, and water used in the process is recycled, minimizing waste further. |
| 1. **Work Plan**   a. Methodology  b. Time schedule of activities giving milestones (Gantt Chart) | This machine is designed not only to mitigate flower waste, especially from temples or agricultural runoff, but also to reduce the reliance on chemical-based inks that contribute to pollution.  First the waste flowers are collected by using a conveyor belt system from temples and plantations then the same-coloured flowers are segregated by using automated sensors. After splitting the flowers other dirt and contaminants are removed from those flowers and it is made ready to be converted into eco-friendly printing ink  Secondly, in the process of making ink the flowers are boiled or steeped in water to extract their natural pigments. Flowers like marigold, hibiscus, rose, and lotus contain vibrant natural colors that can be extracted. The boiling process helps release these pigments into the liquid. To ensure the pigment adheres well to paper, a natural binder like gum arabic or starch is added.  Then thickening agents are added to ensure the ink thickness and fluidity. Finally the ink The ink is filled into eco-friendly containers, such as glass bottles or biodegradable plastic cartridges, depending on the requirement.  The use of natural pigments offers a non-toxic, biodegradable alternative that aligns with sustainable production practices. With the integration of automated sorting, cleaning, and packaging, the machine can efficiently produce a variety of ink colors from different flower types, making it scalable for both small-scale and commercial applications. By addressing the challenges of ink production through innovation, this system promotes environmental conservation and waste reduction, offering a viable, eco-friendly solution to the printing and dyeing industries. |
| 1. **Present status – Prototype/Product/TRL** | TRL 3 Idea stage into Prototype stage. We have the proof of concept for converting the floral waste to printing fabric. |
| 1. **Any other relevant matter.** | The proposed system will be a perfect solution for the flower selling person to empower them self as a social innovation business.  The proposed product provides the business connection between B2, B2C and B2G.  The proposed system provides an eco-friendly products to supports female entrepreneurs, individuals and home makers. |

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| **Details of Activity** | **Year I (in Months)** | | | | | | | | | | | |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **Field Survey** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Project Requirement Analysis, Cost Analysis, and purchase**  **of required equipment** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Recruitment of**  **Research Associates** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Collection and segregation of flowers by colors using sensors** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Preprocessing by adding solvents, binders and pigment extraction** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Conversion of pigment into ink ensuring fluidity** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Project Development** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Training Phase** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Testing of Phase** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Feedback system**  **Design** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Activities and Co-**  **Design** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Implementation of the**  **Project** |  |  |  |  |  |  |  |  |  |  |  |  |