Float Funding Proposal Templates

Pilot Round

Basics + Summary

- **Project Team**
  - *SunriseLabs.io*
    - *Ian Tairea (Mauke, Cook Islands)*

- **Collaborating Projects/Organizations**
  - *SunriseLabs.io*

- **Project Title**

  Farmers IoT (Internet of Things) Toolkit

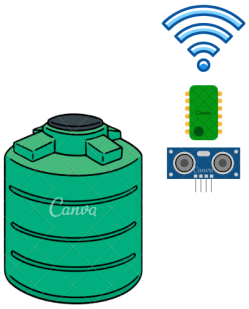
- **Problem Statement**
  - *Farmers are told technology can improve their work, but many don't want to rely on expensive companies to implement solutions for them. Some would prefer to build and manage these tools in-house, but it's not clear how to get started.*
  - *Most small-scale farmers have limited experience with electronics, programming, or IoT devices, making adoption difficult without support.*
  - *Existing ag-tech solutions are often expensive, overly complex, or not designed with small-scale farming contexts in mind.*
  - *Without practical, step-by-step guidance, many farmers miss out on the productivity, efficiency, and sustainability benefits that technology can deliver.*
  - *For farmers who aren't tech-savvy, this space also presents an opportunity to engage the younger, more tech-capable generation into farming.*

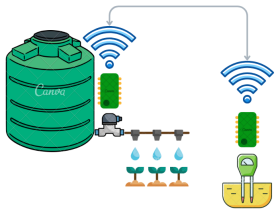
- **Project Statement**
  - *The **Farmers IoT Toolkit** will show farmers how to build and deploy their own IoT solutions using low-cost components and microcontrollers.*
  - *Each solution in the toolkit will include a bill of materials with links to purchase parts, plus easy-to-follow video tutorials on assembly, programming, and configuration.*
  - *By breaking complex technology into simple, repeatable steps, the project will give farmers the confidence and skills to adopt digital*

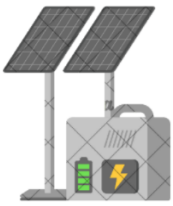
tools that improve efficiency, productivity, and decision-making.

- *The Toolkit will be a repository of many practical, real-world solutions that the community can add to over time. But for this project we will start the Toolkit with these solutions below (plus any others that Float collaborators might like to contribute to the project):*

Farmers IoT Toolkit

Water tank level sensor *(beginner)*	
	*Ultrasonic sensor detects how much water is in the water tank*

Soil Moisture Sensor to Drip irrigation valve *(advanced)*	
	*soil moisture sensor tells solenoid valve when to release water into drip irrigation*

IoT solar powerbank *(medium)*	
	*off-grid power supply consisting of 20w solar panel powering 8 x 18650 lithium batteries (4S2P)*

Mobile Wifi base station *(beginner)*	
	*IoT hub consisting of an Android phone configured to receive data from IoT nodes, over local Wifi hotspot, running Node-Red, with 3g/4g backhaul to the internet.*

Request or Add solution to Farmers IoT Toolkit	** please feel free to contribute any other solution ideas to the Toolkit **

- *We hope other Float members will contribute more ideas for practical/relevant IoT solutions to go into the **Farmers IoT Toolkit***

- **Theme Alignment**
  - *The **Farmers IoT Toolkit** bridges technology and food sovereignty by empowering farmers to design and deploy their own digital solutions using affordable, open-source tools. By demystifying IoT and making it accessible, the project supports local control over food systems, reduces dependence on external tech providers,*

and builds technical capacity within communities. It also helps attract and involve younger generations in agriculture, blending digital skills with traditional knowledge to strengthen intergenerational resilience and ensure that food production remains in local hands.

- **Alignment with Floats values and objective**
  - ***Openness & Transparency:*** *All toolkit designs, tutorials, and source code will be openly shared, allowing farmers, educators, and communities to freely adapt, improve, and build upon them.*
  - ***Community Sovereignty & Self-Determination:*** *By enabling farmers to design, build, and maintain their own IoT tools, the project reduces reliance on external tech companies and strengthens local control over food systems.*
  - ***Play, Experimentation & Learning:*** *The toolkit encourages a "safe to try" mindset, using small, low-cost projects as stepping stones for learning and innovation in farming contexts.*
  - ***Intergenerational Connection:*** *By integrating digital skills into agriculture, the project creates pathways for youth to engage with farming, fostering knowledge transfer and securing the next generation of food producers.*

- **Shared Learnings**
  - *The* ***Farmers IoT Toolkit*** *will generate practical, open-source knowledge on how low-cost, DIY technology can be applied to small-scale agriculture. The Float community will gain insights into effective approaches for farmer-led innovation, strategies for bridging technical and traditional knowledge, and methods for engaging younger generations in food production. We will openly document successes, challenges, and lessons learned — from design decisions to field deployment — providing replicable models and practical guides that others can adapt to support food sovereignty initiatives in diverse contexts.*
- **Future Goals of the Project**
  - *In the long term, the Farmers IoT Toolkit aims to grow into a living, community-driven repository of DIY IoT solutions for small-scale agriculture. We envision a space where farmers, makers, educators, and youth can share new projects, troubleshoot together, and continuously improve existing designs. Over time, the website could expand into a vibrant knowledge hub featuring community submissions, forums, field-tested adaptations, and region-specific innovations. The ultimate dream is a global, open-source ecosystem where farmers collectively build the tools they need to strengthen food sovereignty.*

Float Participation

- **Overall Involvement**
  - Ian has been active in the Float community joining most Zoom calls, but has struggled to join some of the recent ones due to the timezone difference not being ideal while traveling in NZ and Australia.
- **Peer Feedback Involvement**
  - *I was able to provide peer-feedback to Asu, Vic and Caroline's individual project proposals.*
- **Project Peer Feedback**
  - *Nick Tucker joined my self-hosted peer feedback session and provided some great feedback including:*
    - *Building one IoT device at a time with some farmers, to get ongoing feedback of the process as we go, so as to improve our processes for producing educational materials for the other devices. Essentially adding stakeholders and a feedback loop into the development and production stages will hopefully enhance the quality of the produced content.*
    - *Ideas around how we will get it to farmers once the content has been produced and what kind of follow up support would there be. This was a good discussion. We talked about how the scope of our proposal is to plan, develop and produce this repository of educational resources. But separate to this proposal we will be part of the community that supports and contributes to it. In our own work we will be doing outreach work taking this resource into communities and schools in our island communities.*
- **Openness to Collaboration**
  - *I would love to work with collaborators, especially those interested in building some of the IoT devices we are proposing, or others that are already building devices, or working on farms or with communities that would like to build some IoT devices. Mitra Ardron from Frugal IoT expressed a willingness to collaborate if we decide to use Frugal IoT as our firmware of choice (TBD).*

  - *During Peer-Feedback sessions I learned about other proposals that could be supportive collaboration opportunities if our proposal was successful:*
    - *Storytelling of our project from start to finish via Asu's Open Agroecological Technology Stories (OATS) Project*
    - *Help with documenting our project via Vic Spindler-Fox's Enabling Persistence Project*
    - *Our IoT resources being a part of a Curricula within Caroline Ledant's Digital Sovereignty Project*

  - *During a peer-feedback session Nick informed me of a Soil Knowledge project by Bonstein Sisa. I haven't made contact with Bonstein yet, but there could be some overlap in potential collaboration.*

Float Full Proposal Only

Project Details

- **Project Description**
  - *The **Farmers IoT Toolkit** is a practical, community-driven initiative designed to bridge the gap between technology and small-scale agriculture. While farmers are often told that digital tools can transform their work, many do not want to rely on expensive service providers and instead wish to build and manage technology in-house. However, limited experience with electronics, programming, and IoT devices makes it difficult to know where to begin. This project directly addresses that gap by creating an accessible, step-by-step toolkit that empowers farmers to design, build, and deploy their own solutions using affordable components and open-source software.*

    The toolkit will consist of a curated collection of IoT projects, each designed around a real-world agricultural challenge. For each solution, we will provide:
    - *A clear **bill of materials** with purchase links for affordable, off-the-shelf components.*
    - ***Video tutorials** demonstrating how to assemble, program, and configure the devices.*
    - ***Code examples** and templates to accelerate learning and adaptation.*
    - ***Deployment guides** showing how to integrate solutions into daily farm operations.*

    Initial IoT solutions in the Toolkit will include:

    - *A **water tank level sensor** using ultrasonic detection to monitor water levels (beginner level).*
    - *A **soil moisture sensor with an automated irrigation valve** that controls water flow into drip tape irrigation based on soil conditions (advanced).*
    - *A **solar-powered IoT powerbank** to provide reliable off-grid energy for sensors and microcontrollers (medium level).*
    - *A **mobile Wi-Fi base station** using a repurposed Android phone and Node-RED to connect microcontroller to the internet.*

*These four core modules can also be **combined into a single, fully operational IoT system** – demonstrating how individual components work together to automate water management, collect sensor data, and power devices in remote farm environments.*

*The **Farmers IoT Toolkit** will be built as an **online, open-access resource** – potentially hosted on the Float website or a similar platform – where the wider community can explore, replicate, and build upon the solutions. The scope of this project proposes to **develop that website and seed it with the initial four IoT solutions** (mentioned above), laying the foundation for a growing library of community-contributed IoT solutions over time.*

*Ultimately, the project aims to build **confidence, capability, and community ownership** around ag-tech – ensuring that the future of digital agriculture is open, locally driven, and deeply aligned with food sovereignty.*

- **Measurable Outputs**
  - Launch of the ***Farmers IoT Toolkit*** website as an open, accessible online resource (on Float or similar as decided by the community).
  - Publication of four fully documented IoT projects, each including:
    - A complete bill of materials with purchase links.
    - Step-by-step build and configuration instructions.
    - Source code and example programs.
    - Video tutorials demonstrating assembly and deployment.
  - Demonstration of how the four modules integrate into a fully operational IoT system.
  - Establishment of a community-ready framework that enables others to contribute and expand the toolkit with additional projects.
- **Anticipated Challenges**
  - *A key challenge may be hardware procurement delays, especially for specific sensors, microcontrollers, or power components that are not always readily available in small island contexts. To mitigate this, we will source multiple supplier options, identify widely available alternatives, and document substitute components in the toolkit so others can adapt if supply issues arise.*
  - *Another challenge may be hardware incompatibility or unexpected technical issues when integrating different modules. IoT projects often require problem-solving and iteration. We will address this*

by thoroughly testing each module, documenting troubleshooting steps, and clearly outlining known issues and solutions so users can avoid common pitfalls.

- *General unforeseen technical complexities—such as firmware quirks, power management issues, or unreliable network configurations—may extend development time. However, these challenges are an expected and valuable part of building DIY IoT tools. Any obstacles we encounter will be transparently documented, strengthening the toolkit and making the process easier for those who follow our guides.*

- *Overall, we are confident in our ability to overcome any issues that arise. By tackling these challenges upfront and sharing what we learn, the final resource will be more resilient, more accessible, and more useful for farmers and communities adopting IoT for the first time.*

- **Team Expertise**
  - Team member Ian Tairea is a technologist and educator and has built IoT solutions before. He has experience with microcontrollers, sensors, actuators, LoRa, and frontend and backend software development.

Project Impacts

- **Anticipated Impacts**

Individuals, Farmers, and Users	**Communities and Territories**
• *Builds confidence in using electronics, sensors, and digital tools.* • *Helps farmers make better, data-informed decisions about water, soil, and resources.* • *Provides hands-on learning pathways for youth who are tech-savvy but not currently interested in traditional farming.* • *Encourages skill development in coding, troubleshooting, and basic engineering.*	• *Strengthens local capacity to design, build, and maintain ag-tech without relying on external providers.* • *Creates a shared local repository of IoT solutions that communities can adapt and expand.* • *Encourages intergenerational collaboration between experienced farmers and young makers.* • *Particularly impactful for remote islands with limited access to technical support.*
Ecosystems	**Economies**
• *Promotes efficient water use through monitoring and automated irrigation.* • *Reduces environmental stress by*	• *Lowers the financial barriers to adopting agricultural technology by replacing costly commercial systems with DIY alternatives.*

preventing over-watering and minimising runoff. • *Supports regenerative and sustainable practices by giving farmers visibility into soil and water conditions.* • *Establishes the foundation for future community-led environmental monitoring projects (biodiversity, climate, etc.)*	• *Helps farmers improve yields and reduce losses through better resource management.* • *Opens new economic pathways for youth and community members in repair, maintenance, installation, and local tech support.* • *Seeds potential micro-enterprises based on assembling, deploying, or teaching IoT solutions.*
Interconnected Impact	
• *Strengthens food sovereignty by ensuring farmers control the tools that support their production.* • *Builds long-term resilience through open-source knowledge and community ownership.* • *Creates a model that others across the Pacific (and globally) can replicate and adapt.* • *Connects technology, culture, and agriculture in a way that supports vibrant, self-determined communities.*	

- **Key Beneficiaries**
    - **Small-scale farmers are the primary beneficiaries.** *They gain practical, low-cost IoT tools that help them monitor water, improve irrigation, reduce waste, and make more informed decisions. The toolkit lowers barriers to adopting technology by providing clear instructions, affordable components, and step-by-step guidance that farmers can follow at their own pace.*

    - **Younger generations also benefit.** *Many youth are tech-curious but not drawn to traditional farming. The toolkit connects digital skills—electronics, coding, problem-solving—with real agricultural challenges, creating new pathways for youth to participate meaningfully in food production and intergenerational knowledge exchange.*

    - **Rural and remote communities,** *especially outer island territories with limited access to technical support, benefit from increased local capability. The toolkit empowers communities to build and maintain their own ag-tech systems, reducing dependence on outside providers and strengthening food sovereignty.*

    - **The wider Float community** *benefits from shared learning, open-source designs, and a reusable framework that others can replicate, adapt, and expand with their own regional innovations.*

    - *Overall, the project supports individuals, communities, and territories by placing accessible technology directly in the hands of those who grow, manage, and sustain local food systems.*

- **Unintended Consequences**
    - *While the Farmers IoT Toolkit is designed to empower farmers, several risks could emerge if assumptions prove incorrect. If the technology is too complex or time-consuming, farmers may become frustrated or discouraged, potentially reinforcing the perception that "tech is too hard" or not suited to small-scale agriculture. Poorly assembled devices could malfunction, leading to wasted materials, damaged crops, or reduced trust in DIY solutions.*

    - *There is also a risk that increased reliance on digital tools could create new expectations or pressures within communities, or inadvertently shift focus away from traditional knowledge and observational skills if not balanced appropriately. Additionally, introducing electronics and batteries carries environmental considerations, particularly around disposal if devices fail or are not reused.*

    - *To mitigate these risks, the toolkit will emphasise simplicity, robustness, and clear troubleshooting guidance. We will encourage safe experimentation, promote responsible e-waste practices, and frame IoT as a complement—not a replacement—to local knowledge and agroecological practices. By documenting lessons learned, failures, and alternative approaches, we aim to ensure the toolkit supports farmers without creating new burdens or dependencies.*

Project Plan

- **Key Milestones and Deliverables**

Month / Date	***Milestones & Deliverables***
January 2026	*• Finalise technical specs for all four IoT projects.* *• Identify suppliers and alternate components.* *• Outline structure and features of the Farmers IoT Toolkit website.*
February 2026	*• Build the initial version of the website.* *• Add sections for documentation, videos, and code.* *• Publish a public "Coming Soon" overview of the toolkit.*

March 2026	*• Procure all hardware components.* *• Begin prototyping the four IoT modules.* *• Document early challenges and troubleshooting notes.* *• Prepare content for midterm report.*
April 3, 2026	*• **Midterm report due** — submit progress summary, findings, and adjustments.*
April–May 2026	*• Complete full prototypes of all four IoT solutions.* *• Produce build guides, diagrams, BOMs, and code examples.* *• Film and edit tutorial videos.* *• Validate interoperability as a combined IoT system.*
June 2026	*• Upload all project materials to the public website.* *• Launch the website for community access and contributions.* *• Publish lessons learned and recommended improvements.*
July 31, 2026	*• **Final report due** — submit outcomes, learnings, and next steps.*

- **Budget**

Category	Description	Cost (USD)
Hardware & Components	*All electronics for four IoT projects (x 2, for 2 location deployments): sensors, ESP32 microcontrollers, valves, solar panels, batteries, chargers, enclosures, cabling, spare components, multiple iterations for testing*	$6,000
Tools & Prototyping Equipment	*Soldering tools, testing gear, multimeter, consumables, 3D-printed parts, prototypes for demonstration kits*	$2,000
Website Development & Maintenance	*Design, UX, hosting, backend for community contributions, code repository setup, long-term support for the online toolkit*	$7,000
Video Production (Filming, Editing, Graphics)	*Professional-quality tutorials for each IoT project, including filming sessions, scripting, editing, voiceover, animations, and post-production*	$10,000
Documentation & Curriculum Development	*Writing guides, diagrams, build instructions, example code, troubleshooting documentation, lesson plans for youth engagement*	$6,000
Labour / Project Delivery	*Project management, prototyping, software development, integrations, testing, community engagement, platform seeding*	$11,000
Contingency (≈7%)	*Hardware delays, replacement components, web hosting expansions, unforeseen costs*	$3,000
TOTAL		**$45,000 USD**

- **Budget Narrative**
  - *The $45,000 USD budget enables the full development of the Farmers IoT Toolkit as a polished, high-quality public resource. Funds will cover multiple rounds of prototyping, thorough testing, and development of four IoT solutions—along with the creation of a robust website designed for community contributions. Higher-quality video production and professional documentation will ensure the toolkit is accessible to farmers of all skill levels. Labour funding supports project coordination, software development, content creation, and integration of the modules into a working system. A contingency buffer covers hardware delays and unexpected technical needs.*

- **Additional Resourcing**
    - *Beyond funding, the project would benefit from technical expertise in IoT hardware durability, off-grid power systems, and long-term deployments. Feedback from farmers, growers, and youth during prototyping would help refine the toolkit to real-world needs. Support from Float's network—such as mentorship in open-source community building and visibility across aligned initiatives—would strengthen long-term adoption. Connections to experts in documentation standards, environmental monitoring, and agroecological design would further enhance the toolkit's relevance and impact.*