

Our Ref. : SDEC/PD/RFP/21-14

Date : 18 August 2021

Dear Sir/Madam,

REQUEST FOR PROPOSAL (RFP)

SUPPLY, DELIVERY, AND INSTALLATION OF EQUIPMENT FOR THE SMART AQUACULTURE SOLUTIONS (PROOF OF CONCEPT)

Sarawak Digital Economy Corporation (SDEC) Berhad is a company wholly owned by the Sarawak Government have been entrusted to lead the implementation of Sarawak's Digital Economy initiatives.

Therefore, we would like to invite your esteemed organization to participate in **'Request for Proposal (RFP) for the supply, delivery and installation of equipment for the Smart Aquaculture Solutions (Proof-of-Concept)**. The terms and conditions are as follows:

Objective	To provide a proposed solution for the Smart Aquaculture Solutions (Proof of Concept) project for Sarawak Digital Economy Corporation Berhad
Project Brief	The Smart Aquaculture Solutions (Proof of Concept) project aims at finding solutions which consists of automation, environmental sensors, machine learning and other technologies which would elevate the Aquaculture Industry to the Digital Economy.
Deliverables	Proposed solution and Cost Estimation based on the items stated in the Terms of Reference Attached. Participants can propose one (1) or more of the item from Term of Reference for Smart Aquaculture Solutions (Proof of Concept).
Scope of Work	a) Propose a solution based on the items selected which includes the technical designs, equipment to be used, and brand details specifications. b) Propose the cost of: i. Maintenance on a yearly basis,

	<ul style="list-style-type: none"> ii. Proposed equipment, iii. Installation (excluding delivery to project site) iv. and other costs related to the proposed solutions.
Submission of RFP	<p>17 September 2021 (Friday), by 12.00 noon</p> <p>Submission email to procurement@sdec.com.my</p> <p>*All proposals are to be marked as [RFP] Supply, Delivery, and Installation of Equipment for the Smart Aquaculture Solutions (Proof-of-Concept) on the email subject.</p>

The Vendor whose proposal is accepted shall be required to enter into a formal contract with SDEC for the execution of the Work. SDEC reserves the right to accept any proposal as a whole or in part and SDEC may, at its option, reject any Proposal or accept any Proposal, which in SDEC's sole judgement, is the most advantageous to SDEC. SDEC will be no obligation to explain the reasons thereof.

We look forward to receiving positive participation from your organisation. Should you wish to participate in the above execution of work, kindly indicate your interest by replying to the Participation Reply Form attached together with the company profile to us at **procurement@sdec.com.my by 27 August 2021 (Friday), by 12.00 noon.**

Thank you and warmest regards.

Yours sincerely,

for **SARAWAK DIGITAL ECONOMY CORPORATION BERHAD**



SUDARNOTO OSMAN
Chief Executive Officer

Encls.

REFERENCE NO.: SDEC/PD/RFP/21-14

To:	Procurement Secretariat Sarawak Digital Economy Corporation (SDEC) Berhad
Title of Project:	REQUEST FOR PROPOSAL (RFP) FOR SUPPLY, DELIVERY, AND INSTALLATION OF EQUIPMENT FOR THE SMART AQUACULTURE SOLUTIONS (PROOF OF CONCEPT)
Acknowledgement:	The undersigned hereby acknowledge receipt of the above letter (a copy of which has been retained) and having understood the content therein, do hereby agree to the above terms and conditions.
Authorised Signatory:	
Name:	
Designation:	
Date:	
Official Stamp:	

Note: Kindly indicate your interest by replying to the Participation Reply Form attached together with the company profile to us at **procurement@sdec.com.my** by **27 August 2021 (Friday), by 12.00 noon.**

1.0 OBJECTIVES

To provide a proposed solution for the **Smart Aquaculture (Proof of Concept)** project for Sarawak Digital Economy Corporation Berhad, **that aim towards usage of technology solutions** which consists of automation, environmental sensors, machine learning and other technologies which would **elevate the Aquaculture Industry to the Digital Economy**.

To propose a solution for the Aquaculture Proof of Concept. This document will include the following:

- a) Technical Requirements
- b) Scope of Work
- c) Project Timeline
- d) RFP Submission Closing Date

2.0 TECHNICAL REQUIREMENTS

For this project, there are 2 Phases:

1. Phase 1, Hatchery & Conditioning

Location: Ecofish Factory, Batang Ai

Below are the technical requirements for this phase:

- a. **Auto Fish Feeder**
- b. **Auto Oxygenator**
- c. **Auto Water Level**
- d. **Machine Learning Camera**

a. Auto Fish Feeder

- i. **Details:** Auto Fish Feeder equipment, with IoT-integration based prepared for autonomous integration (e.g. Arduino/Raspberry platform). This IoT integrated equipment will be for automated & trigger based, alert from other sensors/AI technology.
- ii. **Backend:** Data transmission, Internet connectivity (wireless/wired), IoT-AI Integrated ready, Data Collection Integration with Dashboard
- iii. **Requirement:**
 - For **Hatchery**, design, supply and installation for **Large-scale (~15 m) auto fish feeder with IoT-enabled features and automation including integration**
 - For **Conditioning**, require design, supply and installation for **Small-scale (~2m) auto fish feeder with IoT-enabled features and automation including integration**

b. Auto Oxygenator

- i. **Details:** Pond Auto Oxygenator is an airline pump machine for air bubbles in pond, with IoT-integration based prepared for autonomous integration (e.g. Arduino/Raspberry platform). This IoT integrated equipment will be for automated & trigger based, alert from other sensors/AI technology.

- ii. **Backend:** Data transmission, Internet connectivity (wireless/wired), IoT-AI Integrated ready, Data Collection Integration with Dashboard
- iii. **Requirement:**
 - For **Hatchery**, design, supply and installation for **auto oxygenator with IoT-enabled features and automation including integration**

c. Auto Water Level

- i. **Details:** Pond Water Dispenser for water pump machine in pond if have any changes of water level, with IoT-integration based prepared for autonomous integration (e.g. Arduino/Raspberry platform). This IoT integrated equipment will be for automated & trigger based, alert from other sensors/AI technology.
- ii. **Backend:** Data transmission, Internet connectivity (wireless/wired), IoT-AI Integrated ready, Data Collection Integration with Dashboard
- iii. **Requirement:**
 - For **Hatchery**, design, supply and installation for **auto water dispenser with IoT-enabled features and automation including integration**

d. Machine Learning Camera for Fish Sizing/Fish Count/Fish Density (AI Sizing)

- i. **Details:** Camera on-poles, with IoT & AI-integration prepared for execution of machine learning to determine sizing and growth of the fish that ready to be transferred its ecosystem (eg. Lake, river)
- ii. **Backend:** Machine learning enable (Image Processing – Sizing & Growth), data transmission, Internet connectivity (wireless/wired), IoT-AI Integrated ready
- iii. **Requirement:**
 - For **Conditioning**, design, supply & installation for **water surface camera on-poles with IoT & AI-enabled features and automation including integration**

2. Phase 2, Farming & Harvesting

Location: Ecofish Fish Cages, Batang Ai Lake

Below are the technical requirements for this phase:

- a. Auto Fish Feeder**
- b. Machine Learning Camera**
- c. Fish Sorting Mechanism**

a. Auto Fish Feeder

- i. **Details:** Auto Fish Feeder equipment, with IoT-integration based prepared for autonomous integration (e.g. Arduino/Raspberry platform). This IoT integrated equipment will be for automated & trigger based, alert from other sensors/AI technology.
- ii. **Backend:** Data transmission, Internet connectivity (wireless/wired), IoT-AI Integrated ready, Data Collection Integration with Dashboard
- iii. **Requirement:**
 - For **Farming**, design and concept, & installation for **Large-scale auto fish feeder with IoT-enabled features and automation including integration with other system**
 - Additional (if included from design and concept): Solar-powered

b. Machine Learning Camera for Fish Sizing/Fish Count/Fish Density (AI Sizing)

- i. **Details:** Camera on-poles @ Underwater camera, with IoT & AI -integration prepared for execution of machine learning to determine sizing and growth of the fish that ready to be harvest from their ecosystem (eg. Lake, river)
- ii. **Backend:** Machine learning enable (Image Processing – Sizing, Growth & Count/Density), data transmission, Internet connectivity (wireless/wired), IoT-AI Integrated ready
- iii. **Requirement:**
 - For **Farming**, design, supply & installation for **water surface camera on-poles OR Underwater camera with IoT & AI - enabled features including integration with other system**
 - Camera with High Resolution & capable to have panoramic view of at least 145 degrees.
 - Connectivity of the Camera (design and concept): via Internet/locally
 - Additional (design and concept): Solar-powered

c. Fish Sorting Mechanism

- i. **Details:** This technology is for sorting and indicate desired sizes, which will then be sorted out based on its respective sizes in their cages (below 13cm, 13-14cm, above 15cm)
- ii. **Requirement:**
 - For **Harvesting**, design, supply & installation for **Fish sorting mechanism/technology: Cage with size sorting mechanism**

3. There also one of the important components in this project which is, Data Visualisation & Analysis for Smart Aquaculture.

a. Details:

- i. Development of AI, Data Visualisation Dashboard that able to perform Data Analysis, Remote Control and integrate with any IoT technology sensors and different connectivity (eg. SigFox, LoRa, Arduino, Raspberry, Internet).
- ii. For this Smart Aquaculture, this dashboard able to integrate with all of the phases that has been implemented & able to get data visualization from each technology onsite.

b. Equipment Requirement:

- i. For IoT & AI Integration and callbacks from others IoT sensors
- ii. Data Collection & Analysis, Remote Access Control, & Integration with IoT and AI.

c. Specification Requirement:

- i. Consolidation & Unify dashboard for other IoT devices as well (unlimited/limited numbers of IoT devices/technology)
- ii. Support narrowband technology (SigFox & LoRa)
- iii. Support provision of entities to connected APIs and all IoT protocol (MQTT, DDS, AMQP)
- iv. Customizable interface (graph, visualization)
- v. Hosted in local server (SDEC Data Centre)
- vi. Easily manage (User friendly & simple execution)
- vii. Capable to perform database migration for any platform & format, such as cross-data transfer (locally – eg. Excel, server/cloud – eg. TXT)
- viii. Capable to setup new dashboard for specific area using existing features from unified IOT Dashboard, such as via activation by module.

- ix. Training program for dashboard administrator backend (SDEC staff)
- x. Provide life-time support service for dashboard issue & maintenance.
- xi. Simple architecture workflow to be manage (trigger, logic, data & output)

d. Dashboard Features Requirement:

- i. Image analysis through camera for either one or more of the following:
 - Fishing Sizing
 - Fish Count
 - Fish Density
- ii. Automatic trigger for devices & equipment based on image analysis:
 - Water sensors
 - Water level
 - Auto-feeder
 - Oxygenator
 - Fish Sizing/Fish Count/Fish Density
- iii. Data collection, analysis & access control:
 - Water sensors
 - Water level
 - Auto-feeder
 - Oxygenator
 - Fish Sizing/Fish Count/Fish Density
 - Harvest (Forecast & Actual)
 - Dashboarding for all relevant data

4. Below is the Technical Requirement overview for the project:

a. Auto-fish feeder

Details	Site Size	Equipment
Autonomous feeder from Arduino/Raspberry platform (automated & trigger based, alert)	18 m x 42 m Hatchery 36 m x 36 m Farming	Large scale auto-feeder machine: design, mechanism, IoT, functionality & installation
	Conditioning container (~ 1.6 m x 0.6 m)	Small scale auto-feeder machine: design, mechanism, IoT, functionality & installation

b. Auto Oxygenator

Details	Site Size	Equipment
Pond Oxygenator is an airline pump machine for air bubbles in pond (automated & trigger based, alert)	18 m x 42 m Hatchery	Oxygenator
		IoT integration, based on trigger (low oxygen)

c. Auto Water Level

Details	Site Size	Equipment
Pond Water Dispenser for water pump machine in pond if have any changes of water level (automated & trigger based, alert)	18 m x 42 m Hatchery	Water Dispenser
		IoT integration, based on trigger (low water level)

d. Machine Learning for Fish Sizing/Fish Count/Fish Density (AI Sizing)

Details	Site Size	Equipment
Camera sensors that can determine sizing and growth of the fish that ready to be transferred its ecosystem (eg. Lake, river)	18 m x 42 m Hatchery 36 m x 36 m Farming Conditioning container (~ 1.6 m x 0.6 m)	Water-surface camera
		Underwater camera
		Integration with AI
		Data Visualisation Dashboard development

e. Fish Sorting Mechanism (for Harvest)

Details	Site Size	Equipment
This technology is for sorting and indicate desired sizes, which will then be sorted out based on its respective sizes in their cages (below 13cm, 13-14cm, above 15cm)	36 m x 36 m Farming	Design & Concept: Fish sorting mechanism/ technology <ul style="list-style-type: none"> Cage with size sorting mechanism

f. Data Visualisation & Analysis

Details	Requirement	Equipment
Development of Data Visualisation Dashboard that able to perform Data Analysis, Remote Control and integrate with any IoT technology sensors and connectivity (eg. SigFox, LoRa, Arduino, Raspberry)	<ul style="list-style-type: none"> Data collection, analysis & access control for: <ul style="list-style-type: none"> Water sensors Water level Auto-feeder Oxygenator Fish Sizing/Fish Count/Fish Density Harvest (Forecast & Actual) Remote technology control & configuration: <ul style="list-style-type: none"> Water sensors Water level Auto-feeder Oxygenator 	IoT Integration and callbacks from others IoT sensors
		Data Collection & Analysis, Remote Access Control, Integration with AI

3.0 SCOPE OF WORK

The scope of works includes:

- a. Prepare Design and Concept of the proposed solution(s), based on the selection of **one (1) OR more items** from the following:

Phase 1: Harvesting & Conditioning

- i. **Auto Fish Feeder**
- ii. **Auto Oxygenator**
- iii. **Auto Water Level**
- iv. **Machine Learning Camera**

Phase 2: Farming & Harvesting

- i. **Auto Fish Feeder**
- ii. **Machine Learning Camera**
- iii. **Fish Sorting Mechanism**

Dashboard Visualisation & Analysis

- b. Propose the following based on the items selected in 3.1:
 - i. Technical Designs
 - ii. Equipment/solution(s)
 - iii. Brand Details Specifications
- c. Propose the cost for the following:
 - i. Proposed equipment/solution(s)
 - ii. Supply, Installation & Commissioning of equipment/solution(s)
 - iii. Maintenance on a yearly basis,
 - iv. and other costs related to the proposed solution(s).
- d. Deployment, operationalisation, and integration (if any) of the proposed solution(s).
- e. Support any issues or maintenance required for the proposed solution(s).

4.0 PROJECT TIMELINE

The project should be completed within three (3) months, after project being awarded.

5.0 RFP SUBMISSION CLOSING DATE

The closing date for RFP submission is on **Friday, 17 September 2021, by 12.00 noon.**

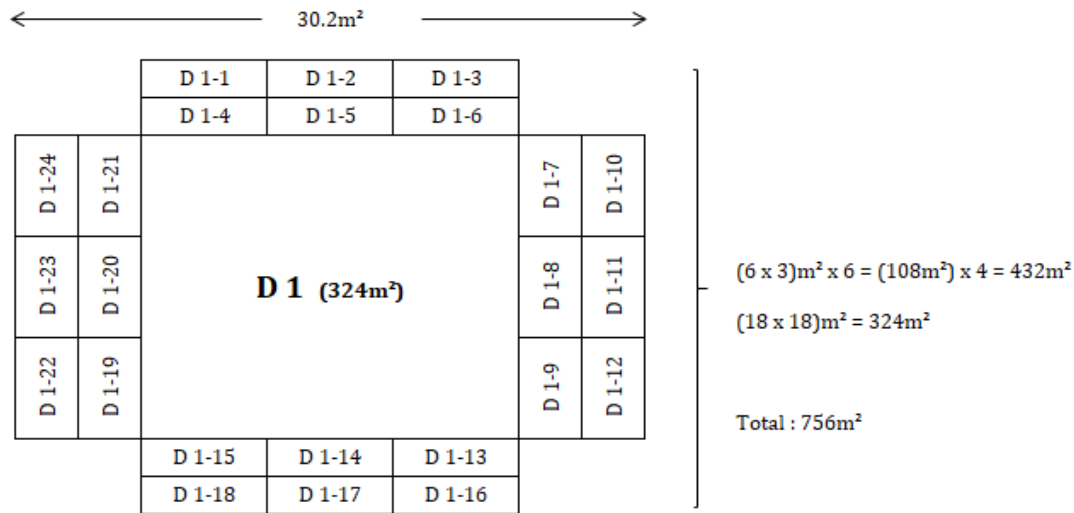
Attachment A

ECOFISH: THE POND SIZES FOR THE PROJECT

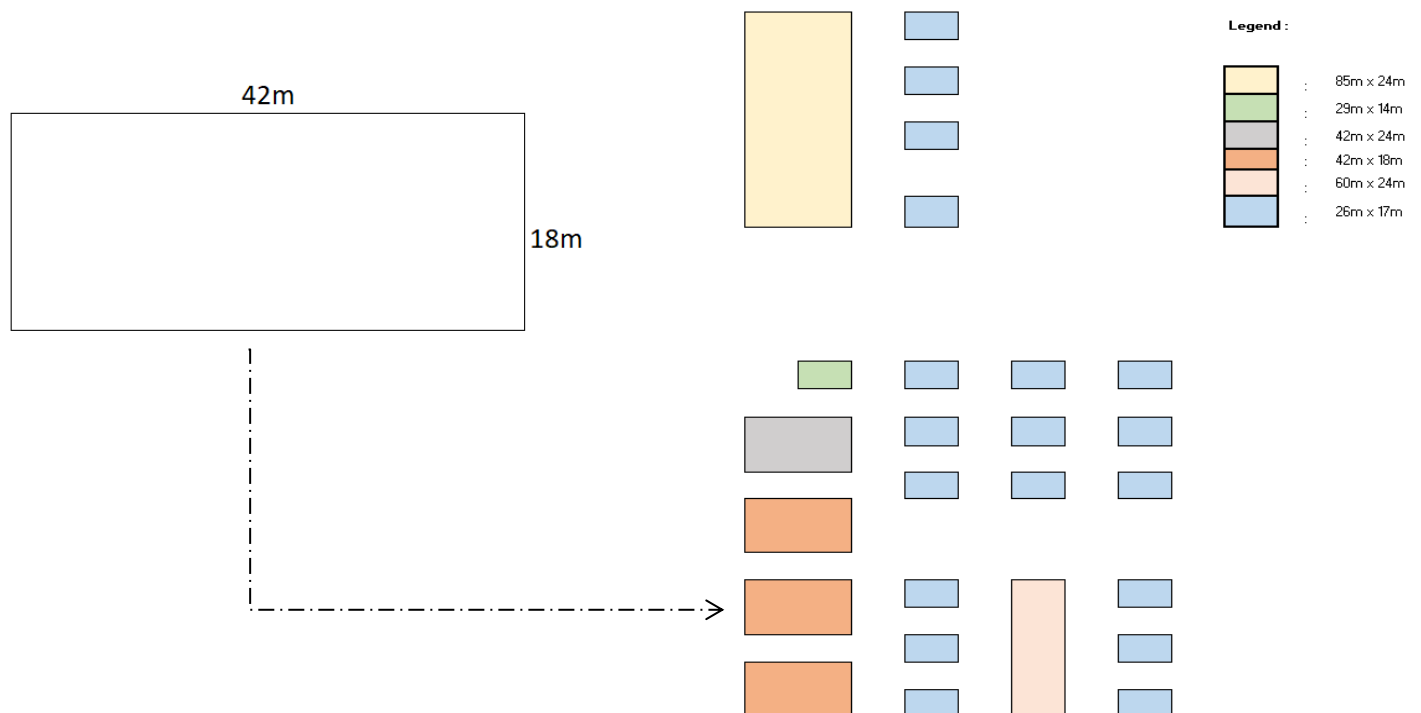
36 m x 36 m Farming Cage (Phase 2)

Jumlah Sangkar Besi (DOA Standard): 504 Unit (84 units x 6)

Jumlah Keluasan: 4536m² (756m² x 6)



18m x 42m Hatchery Pond (Phase 1)



~ 1.6m x 0.6m Conditioning Container (Phase 1)

