



ಭಾ. ಕೃ. ಅನು. ಪ - ಭಾರತೀಯ ತೋಟಗಾರಿಕಾ ಸಂಶೋಧನಾ ಸಂಸ್ಥೆ
ಹೆಸರಗಟ್ಟ ಕೆರೆ ಅಂಚೆ, ಬೆಂಗಳೂರು-560 089

भा.कृ.अनु.प.- भारतीय बागवानी अनुसंधान संस्थान
हेसरघट्टा लेक पोस्ट, बेंगलूरु - 560 089

ICAR-Indian Institute of Horticultural Research
Hesaraghatta Lake Post, Bengaluru - 560 089

EPABX: 080-23086100 Extn: 218 & 217

FAX: 080-28466291 – Email: purchase.ihr@icar.gov.in



F.No.11-71/2024-25/VC/326053

Dated: 18.11.2024

NOTICE FOR INVITING TENDER THROUGH E-PROCUREMENT

Online Bids are invited from interested firms under **two bid system (Technical bid/financial bid)** for **Fully Automated IoT-Based Wireless Precision Irrigation system with auto Fertigation System for 18-acre block-8 experimental field at IIHR, Hesaraghatta, Bangalore**, Manual bids will not be entertained.

Tender documents may be downloaded from e-procurement website of CPPP <https://eprocure.gov.in/eprocure/app> as per the schedule given in CRITICAL DATE SHEET as under:

CRITICAL DATE SHEET

Tender No.	F.No. 11-71/2024-25/VC/326053
Name of Organization	ICAR-INDIAN INSTITUTE OF HORTICULTURAL RESEARCH, Hesaraghatta, Lake Post, Bangalore
Date and Time for Issue/Publishing	18.11.2024 at 05:00 PM
Document Download/Sale Start Date and Time	18.11.2024 at 05:00 PM
Bid Submission start Date and Time	18.11.2024 at 05:00 PM
Bid Submission End Date and Time	07.12.2024 at 03:00 PM
Date and Time for Opening of Technical Bids	09.12.2024 at 10:00 AM
Address for Communication	Senior Administrative Officer (Purchase), IIHR, Hesaraghatta Lake Post, Bangalore

Sd/-

CHIEF ADMINISTRATIVE OFFICER (SG)

INSTRUCTIONS FOR ONLINE BID SUBMISSION

1. The Tender form/bidder documents may be downloaded from the <https://eprocure.gov.in/eprocure/app>. **Online submission of Bids through Central Public Procurement Portal (<https://eprocure.gov.in/eprocure/app>) is mandatory.** Manual/Offline bids shall not be accepted under any circumstances.
2. Tenderers/bidders are requested to visit the website <https://eprocure.gov.in/eprocure/app> regularly. Any changes/modifications in tender enquiry will be intimated by corrigendum through this website only.
3. In case, any holiday is declared by the Government on the day of opening, the tenders will be opened on the next working day at the same time. The Council reserves the right to accept or reject any or all the tenders.
4. The Firms are required to deposit (in original) **EMD of Rs. 75,000/-** in the shape of Demand Draft in favour of **THE DIRECTOR, ICAR, UNIT-IIHR payable at Bangalore** may be addressed to **Senior Administrative Officer (Purchase), IIHR, Hesaraghatta Lake Post, Bangalore-560089** on or before **07.12.2024 by 3:00 PM.**
5. **Please note that only online Bids will be accepted.**
6. Bidders need not to come at the time of Technical as well as Financial bid opening at IIHR. They can view live bid opening after login on CPPP e-procurement portal at their remote end. If any dispute arises, Within Bengaluru Jurisdiction only.
7. The firms are also required to upload copies of the following documents for Technical eligibility and Evaluation:-

Technical Bid

1. No EMD exemption is given for MSME/ Udyog Aadhar or NSIC and other firms , The Firms are required to deposit (in original) an Earnest Money Deposit of Rs.75,000/- as indicated in the terms and condition below
2. PAN Card copy
3. GST Number with Registration Certificate
4. Bank details of the firm.
5. Income Tax Returns for the last three years (2021-22,2022-23,2023-24).
6. Turnover of the business should be Rs.75,00,000/- per year (2021-22, 2022-23, 2023-24) (Average will be considered). And Chartered Accountant certified profit and Loss account; Balance sheet to this effect to be enclosed.
7. Latest copies of the GST return for six months (Jan to June 2024)
8. Tender acceptance letter (Annexure-V) duly signed.
9. User List with contact details of similar products under taken (similar products is IoT based,

- sensor based, wireless irrigation system combined with auto fertigation unit).
10. Purchase Orders and satisfactory installation certificate of similar product for last 3 years.
 11. Details on Make and model of all systems, sub systems and additional items should be provided and complete technical details should be provided in the form of Brochures wherever available or in the form of write-ups.
 12. Warranty 1 year.
 13. **Tender acceptance letter (Annexure-V) is mandatory.**

□ **Financial Bid: -**

- a) Price Bid as BOQ XXX.xls
- b) **Evaluation criteria: Tender will be awarded to the lowest quoted Firm among those firms qualified in the Technical Bid. In case, two or more firms quote the same amount in r/o all the items work together as a whole, then the tender will be awarded to the Firm which has got more average turnover in the last 3 years, based on IT returns/Profit & Loss account/Turnover duly certified by the CA and uploaded along with Tender through CPP.**

S/d
CHIEF ADMINISTRATIVE OFFICER (SG)

Annexure-II

Terms & Conditions

1. The tenderer shall quote rates, which will include the supply, installation & other incidental charges. GST, if any, should be indicated separately.
2. The rates should be quoted as per the BOQ uploaded on the CPP Portal (reference may be obtained from Annexure-III). GST, if any, should be indicated separately. It must be noted that the contract shall be awarded to the firm which fulfils all the required terms and conditions and remains L-I for **Total cost**.
3. The firm must also possess valid PAN No. & GST registration number and a copy of the same must also be enclosed with the tender document.
4. **Latest copies of the GST return for six months (Jan to June, 2024)**
5. Copy of Income Tax Return Statement may be furnished for the Financial year 2021-22,2022-23,2023-24.
6. Profit and loss account & Balance Sheet which are audited & duly certified by the Chartered Accountant for the last three years (2021-22,2022-23,2023-24).
7. **Turnover of the business should be Rs.75.00 Lakhs per year (2021-22,2022-23,2023-24). And Chartered Accountant certified profit and Loss account; Balance sheet to this effect may be enclosed.** (Average will be considered).
8. Modification in the tender documents after the closing date is not permissible.
9. The successful firm shall **commence work** within 10 days from the date of confirmed **work order** and if the work not completed in time then EMD shall be forfeited. The rates quoted shall be valid for one year from the date of opening of tender.
10. The contractor/bidder or his representative may contact the undersigned at **Tel. No. 080-23086100 Extn: 217 & 211** for any further clarification. No variation in terms and quality of the items/specifications shall be entertained or else EMD/Security deposit shall be forfeited.
11. The bidder is advised to visit the site of works at his own expenses and obtain all information that may be necessary for preparing the quotation. Submission of quotation is acceptance by the tenderer that he has inspected the site or he is aware of all conditions.
12. The Director, ICAR-IIHR, shall have the right to reject all or any of the offers, accept more than one offer, and assign part of the job without assigning any reason.
13. Merely quoting of lowest rates does not mean that order shall be given to that firm. The competent authority will finally decide on the basis of quality & performance of past installations.
14. The Firms are required to deposit (in original) an **Earnest Money Deposit of Rs. 75,000/-** amount mentioned against item in the form of Demand Draft from any of the Commercial Bank in favour of **THE DIRECTOR, ICAR, UNIT-IIHR payable at Bangalore** may be address to **Senior Administrative Officer (Purchase), IIHR, Hesaraghatta Lake Post, Bangalore-560089 on or before 07.12.2024**. No quotation shall be considered without the earnest money deposit. Demand draft drawn in favour of any officer other than 'THE DIRECTOR, ICAR UNIT-IIHR payable at Bangalore' will not be accepted and the tender will be rejected. The earnest money will be refunded only after the finalization of the procurement and no interest will be paid on earnest money. The request letter for refund of EMD & performance security is to be submitted by the firm.
15. Rates once finalized will not be enhanced/reduced during the currency of the contract.
16. In case, the successful bidder shows inability at any stage, after the contract is finalized and awarded, for whatsoever reason(s), to honour the contract, the earnest money /performance security deposited would be forfeited.

17. The Director, ICAR-IIHR reserves the right to cancel the contract at any time during the currency period of the contract without giving any reason.
18. The firm, to whom the tender will be awarded, will have to deposit the **performance security equal to 3% of the total quoted amount at which the Tender will be awarded within 21 days from the date of receipt of work order and the same will be retained during the Defect liability period(warranty) of One year. In the sense, for any material and execution defects, the firm has to set right the defects within 10 working days and maintain the said work.** If the services are not found to be satisfactory, the performance security is liable to be forfeited. No interest will be paid on performance security.
19. If any dispute(s) arises between IIHR and the firm with reference to the contract, IIHR will decide it and its decision will be binding on the firms.
20. Bid Validity: 90 days
21. Payment:- No advance or part payment will be given. The payment will be released after satisfactory completion of the work and certificate from the Indentor/Engineer.
22. **The supplier/firm has to submit the GST return for having remitted the GST amount paid by the institute to the concerned authority within 30 days from receipt of payment from IIHR, otherwise their EMD and SD/PS will not be released and such firms shall be blocklisted.**
- 23. No EMD exemption is given for MSME/ Udyog Aadhar or NSIC and other firms**
24. GST extra as applicable should be indicated separately in the column provided. Otherwise such quotes will be rejected.

Payment Terms: In order to facilitate for speedy settlement of payment you are requested to Furnish the following details as below:

1. **Name of the firm:**
2. **Name of the Bank:**
3. **IFSC Code of Bank:**
4. **Name of the Account & Account No.:**
5. **Branch Code:**
6. **Amount to be paid:**
7. **E-mail address of the party:**
8. **GST No. and Pan No. Copies**

‘Terms & Conditions are acceptable’

Dated

(Authorized signatory of the firm)

Annexure-III

(Reference for BOQ) (To be quoted in format provided on CPP Portal)

Price bid for: **Fully Automated IoT-Based Wireless Precision Irrigation system with auto Fertigation System for 18-acre block-8 experimental field @ IIHR, Hesaraghatta, Bangalore.**

Sl. No.	Name of item	Quantity	Per unit price* (in figures/words) (as per BOQ)
01	Fully Automated IoT-Based Wireless Precision Irrigation system with auto Fertigation System for 18-acre block-8 experimental field @ IIHR, Hesaraghatta, Bangalore.	01 Unit	

*Annexure-VIII

- Items should be of reputed make and suitable for high end elite users
- GST extra as applicable should be indicated separately in the column provided. Otherwise such quotes will be rejected.**
- **ICAR-IIHR , Bangalore.**

Note: The above mentioned Financial Proposal/Commercial bid format is provided as BoQ_XXXX/xls along with this tender document at <https://eprocure.gov.in/eprocure/app>. Bidders are advised to download this BoQ_XXXX.xls as it is and quote their offer/rates in the permitted column and upload the same in the Financial bid. **Bidder shall not tamper/modify downloaded price bid template in any manner.** In case if the same is found to be tempered/modified in any manner, tender will be completely rejected and EMD would be forfeited and tenderer is liable to be banned from doing business with IIHR.

Annexure-IV

EPABX: 080-23086100 Extn: 218 & 217
FAX: 080-28466291 - Email: purchase.iihr@icar.gov.in



ICAR-INDIAN INSTITUTE OF HORTICULTURAL RESEARCH

HESSARAGHATTA LAKE POST, BANGALORE-560 089

Name of the Firm _____

Registered/Postal Address _____

1	Permanent Account Number (PAN)	
2	GST Registration No.	
3	Bank Details	
a	Bank Name	
b	Branch Address	
c	Account Number	
d	Type of account (current/saving) MICR No.	
e	IFSC Code	

Date:

Name of the Authorized Signatory

Place:

Stamp & Signature

TENDER ACCEPTANCE LETTER
(To be given on Company Letter Head)

Date:

To,
The Director,
ICAR-IIHR,
Hesaraghatta Lake Post,
Bangalore-560089.

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No. _____

Name of Tender/Work:

Dear Sir,

1. I/ We have downloaded/obtained the tender document(s) for the above mentioned 'Tender/work' from the web site(s) namely:

As per your advertisement, given in the above mentioned website(s).

2. I/We hereby certify that I/We have read the entire terms and conditions of the tender documents from Page No. _____ to _____ (including all documents lime annexure(s), schedule(s), etc...) which form part of the contract agreement and I/We shall abide hereby the terms/conditions/clauses contained therein.
3. The corrigendum(s) issued from time to time by your department/organization too have also been taken into consideration, while submitting this acceptance letter.
4. I/we hereby unconditionally accept the tender conditions of above mentioned tender documents/corrigendum(s) in its totality/entirely.
5. I/we do hereby declare that our Firm has not been black-listed/debarred by any Govt. Department/Public sector undertaking.
6. I/we certify that all information furnished by our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/organization shall without giving any notice or reason therefore or summarily reject that bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

Yours Faithfully,

(Signature of the Bidder, with Official Seal)

INSTRUCTIONS FOR ONLINE BID SUBMISSION

The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

More information useful for submitting online bids on the CPP Portal may be obtained at <https://eprocure.gov.in/eprocure/app>.

REGISTRATION

- Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL <https://eprocure.gov.in/eprocure/app>.) by clicking on the link '**Online bidder Enrollment**' on the CPP Portal which is free of charge.
- As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (class II or Class III certificates with signing key usage) issued by any certifying authority recognized by CCA India (e.g. Sify/nCode/eMudhra etc.) with their profile.
- Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
- Bidder then logs in to the site through the secured log-in by entering their users ID/password and the password of the DSC/e-Token.

SEARCHING FOR TENDER DOCUMENTS

- There are various search options built in the CPP Portal. To facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.
- Once the bidders have selected the tenders they are interested in, they may download the required documents/tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS/e-mail in case there is any corrigendum issued to the tender document.
- The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification/help from the Helpdesk.

PREPARATION OF BIDS

- **Bidder are requested to visit the site at the Institute ICAR-IIHR, Bangalore, Karnataka and discuss with Dr. Anil Kumar Nair, Principal Scientist & Dr. Shanakara hebbar, Principal Scientist, ICAR-IIHR, Bangalore before preparing the bid clarify the doubts and understand the requirements.**

- Bidder should take into account any corrigendum published on the tender document before submitting their bids.
- Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents- including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
- Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document/schedule and generally, they can be in PDF/XLS/RAR/DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.
- To avoid the time and effort required I uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use 'My Space' or 'Other important Documents' area available to them to upload such documents. These documents may be directly submitted from the 'My Space' area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

- Bidder should log into the site will in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other technical issues.
- The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
- Bidder has to select the payment option as 'offline' to pay the tender fee/EMD as applicable and enter details of the instrument.
- Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the concerned official, latest by the last date of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.
- Bidders are requested to note that they should necessarily submit their financial bids in the Format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the white coloured (unprotected) cell with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.
- The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
- All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric, encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers public keys. Overall, the uploaded tender documents become readable only after the tender opening by the

authorized bid openers.

- The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- Upon the successful and timely submission of bids (i.e. after clicking 'Freeze Bid Submission' in the portal), the portal will give a successful bid submission message and a bid summary will be displayed with the bid no. and the date and time of submission of the bid with all other relevant details.
- The bid summary has to printed and kept as an acknowledgement of the submission of the bid.

ASSISSTANCE TO BIDDERS

- Any queries relating to the tender documents and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contract person indicated in the tender.
- Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

Annexure-VII

Details of Works & EMD

Sl. No.	Purchase of item	Qty	Earnest Money in INR	File. No. for reference
01	Fully Automated IoT-Based Wireless Precision Irrigation system with auto Fertigation System for 18-acre block-8 experimental field @ IIHR, Hesaraghatta, Bangalore	01 UNIT	Rs.75,000/-	F.No.11-71/2024-25/VC-326053

Note:

- 1) EMD defined on to the Portal is MINIMUM. Bidder has to submit the EMD as per item for which quoting for.
- 2) **No EMD exemption is given for MSME/ Udyog Aadhar or NSIC and other firms**

* ICAR-IIHR, Bangalore, Karnataka.

TECHNICAL SPECIFICATION FOR: Fully Automated IoT-Based Wireless Precision Irrigation system with auto Fertigation System for 18-acre block-8 experimental field @ IIHR, Hesaraghatta, Bangalore

SI No.	Particulars	No. of Units
1	<p>Wireless Automation Requirements: Automated Wireless Irrigation System: Zones and Valves: There will be 48 zones, and each will be equipped with one 2” solenoid valve. The system should support precise control of water flow to each zone. Ten Numbers of Portable standalone soil moisture sensor units is to be installed to do soil moisture-based precision irrigation, which should be able to control nearby valves assigned to it. Automated fertigation (non-nutrient sensor based) and back flush arrangement is to be integrated with the auto irrigation system</p>	
1.1	<p>Supply and installation of Centralised Control Gateway: Centralized Control Gateway should be a high-performance embedded computing system serving as the central management hub for agricultural automation. Specification and Services required is as follows:</p> <ol style="list-style-type: none"> 1. Minimum Hardware Specifications <ul style="list-style-type: none"> ○ RAM - 512MB ○ Processor - Quadcore 1.2 GHz 64Bit ○ Extended GPIO pins ○ Ethernet and Wi-Fi ports ○ Integrated connections to all required peripherals 2. Local Communication Modes: <ul style="list-style-type: none"> ○ A device with multiple communication channels in the sub-GHz frequency range, supporting long-range, low-power wireless communication for remote applications. ○ At Least Two wired communication ports for local device integration. 3. Device Power: <ul style="list-style-type: none"> ○ Should be Powered by AC mains supply with optional solar panel backup. ○ Should be provided with an Internal 24-hour Li-ion battery for uninterrupted operation during power outages. 4. Internet Connectivity: <ul style="list-style-type: none"> ○ LTE modem and Wi-Fi support for Internet connectivity to Gateway. ○ Must Include a High-gain LTE antenna and High-gain sub-gigahertz antennas. 5. Data Storage: <ul style="list-style-type: none"> ○ At Least 32 GB internal storage, accommodating local data storage for up to 6 months. 6. Control Features: <ul style="list-style-type: none"> ○ Manages multiple farm zones for automation. ○ Supports cyclic timers, manual set timers, and automatic threshold-based irrigation schedules. 7. Dependent Device Capacity: <ul style="list-style-type: none"> ○ Should Support a minimum of 100 sensor and actuator devices integration. 8. Control System 	1 No

	<ul style="list-style-type: none"> ○ The Gateway must include a completely automatic and wireless control system to manage the Irrigation, Fertigation, and backwash process, and monitor performance. ○ The system should support wireless control via smartphone through a dedicated app or secured Web page, allowing remote access to control, manage, monitor, and system diagnostics. 	
1.2	<p>Supply and installation of Soil moisture sensor/device: Provides comprehensive soil parameter monitoring for optimizing crop growth and irrigation schedules from a wireless device. Specifications are mentioned below:</p> <p>Device Power: Solar-powered with battery backup lasting up to a minimum of 1 month.</p> <p>1. Soil Parameters Sensors Specification:</p> <ul style="list-style-type: none"> ○ Soil Temperature: <ul style="list-style-type: none"> i. Type: Digital Soil Temperature Sensor ii. Range: -55°C to 125°C iii. Resolution: 0.5°C iv. Accuracy: ±0.5°C v. Wire length: 15 Feet ○ Soil Moisture: <ul style="list-style-type: none"> i. Type: Granular Matrix Soil Moisture Sensor, reading Soil Water Tension ii. Range: 0 to 200 centibars (CB) iii. Resolution: 0.1 cb iv. Accuracy: ±5% v. Wire length: 15 Feet <p>2. Device Connectivity:</p> <ul style="list-style-type: none"> ○ Device operating in the sub-GHz frequency range, supporting long-range, low-power wireless communication for remote applications ○ High Gain External Antenna 	10 Set
1.3	<p>Supply and installation of Solenoid Valve Control Node: Deliver a precise irrigation control system for managing multiple zones with efficient solar-powered operation. The system must interface with latching solenoid valves and offer manual override capabilities while ensuring wireless communication technology.</p> <p>1. Irrigation Control:</p> <ul style="list-style-type: none"> ○ The system must support 2-zone irrigation configuration, allowing flexible management of irrigation areas. There should be 24 zones and each zone should have two solenoid vales (totally 48 solenoide valves to be provided and installed and connected to the system) ○ It should interface with solenoid valves to control water flow in each zone. <p>2. Solenoid Valve Specifications:</p> <ul style="list-style-type: none"> ○ The minimum working pressure for solenoid valves must be between 0.75 to 1 bar. ○ The operating voltage for solenoid valves should be DC 12V or below. ○ Ensure a minimalist wire length from the control device to the solenoid valves to reduce installation complexity. ○ 2” solenoid valve <p>3. Power Supply:</p> <ul style="list-style-type: none"> ○ The system must be solar-powered, and capable of operating efficiently. 	24 Set

	<ul style="list-style-type: none"> ○ Include a 3-day battery backup to maintain functionality during periods of low sunlight locations. <p>4. Manual Override:</p> <ul style="list-style-type: none"> ○ The system should include a manual override capability for immediate control of the solenoid valves in case of emergencies or system malfunctions. <p>5. Connectivity:</p> <ul style="list-style-type: none"> ○ Device operating in the sub-GHz frequency range, supporting long-range, low-power wireless communication for remote applications, allowing remote monitoring and control of the irrigation zones. ○ The system should include a high-gain external antenna to ensure reliable long-distance communication between the control node and the centralized Gateway. Ensure a minimalist wire length from the control device to the solenoid valves to reduce installation complexity. <p>The system must ensure efficient and reliable irrigation control, providing automation while maintaining manual control options for emergencies. Wireless connectivity and solar-powered operation are key to ensuring operational flexibility and sustainability in remote agricultural settings.</p>	
1.4	<p>Pump Controller Device: Deliver a comprehensive pump control system that manages and protects irrigation pumps, ensuring long-term reliability and optimized performance. The system should monitor phase voltages, current, water pressure and water volume (upto 500LPM) while providing automated protection features and connectivity with the central management gateway. This include the supply of gadget required for the monitoring, measuring, controlling and recording of following parameter.</p> <p>1. Pump Control and Monitoring:</p> <ul style="list-style-type: none"> ○ The system must be compatible with existing automatic pump starters. ○ It should monitor and manage the 3-phase power supply, including voltage and current readings. ○ Provide automatic cut-off functionality in case of phase failure to prevent damage to the pump. <p>2. Water Pressure and water Flow measurement:</p> <ul style="list-style-type: none"> ○ Irrigation Pressure Sensor: <ul style="list-style-type: none"> ■ Range: 0 to 10 bars ■ Resolution: 0.1 bars ■ Accuracy: ± 0.2 bars ○ Pressure Release Valve: <ul style="list-style-type: none"> ■ Range: 2 to 5 bars ■ Resolution: 0.1 bars ■ Accuracy: ± 0.2 bars ○ Water Flow Meter: <ul style="list-style-type: none"> ■ Discharge rate: 0 to 500 Liters per minute ■ Resolution: 1 Liter per minute ■ Accuracy: ± 1 Liter per minute <p>3. Phase Monitoring:</p> <ul style="list-style-type: none"> ○ Phase Voltages (Red, Yellow, Blue): <ul style="list-style-type: none"> ■ Range: 0 to 550 VAC ■ Accuracy: ± 1 VAC ○ Phase Current: <ul style="list-style-type: none"> ■ Range: 0 to 30 A ■ Accuracy: ± 0.1 A 	1 Nos

	<p>4. Protection Features:</p> <ul style="list-style-type: none"> ○ Implement dry run protection to prevent pump damage in the absence of water. ○ Auto-scheduling functionality during power cuts to ensure uninterrupted operation. ○ Integrate a cooldown period for aquifer recharge before reactivating the pump, ensuring sustainable water extraction. <p>5. Irrigation Scheduling:</p> <ul style="list-style-type: none"> ○ The system must manage timers for irrigation scheduling, allowing flexible and efficient water distribution. ○ Automated scheduling based on real-time power conditions and water requirements. <p>6. Connectivity:</p> <ul style="list-style-type: none"> ○ Device operating in the sub-GHz frequency range, supporting long-range, low-power wireless communication for remote applications for real-time monitoring and control via the centralized Gateway. ○ Provide optional LTE connectivity for independent remote access, allowing monitoring and control without reliance on local network infrastructure. <p>7. Automation and Control:</p> <ul style="list-style-type: none"> ○ The system should allow centralized control of irrigation pumps, water pressure, and flow rate. ○ All control functions must be accessible through the Centralised Gateway for seamless remote management. <p>The system must ensure safe, reliable, and automated pump operation, enhancing both pump life and irrigation efficiency.</p>	
1.5	<p>Supply and installation of Automated Fertigation System: Deliver a fully automated fertigation system capable of precise nutrient distribution, integrating real-time sensor data for pH and EC to ensure optimal crop health and productivity. The system will control four tanks, each of 500L capacity, with centralized management through the Centralised Gateway.</p> <p>1. Fertilizer Integration:</p> <ul style="list-style-type: none"> ○ The system must support a minimum of 4 different types of fertilizers across 4 channels. ○ Each channel should precisely control the discharge rates of nutrients. <p>2. Tank Setup:</p> <ul style="list-style-type: none"> ○ Provide 4 tanks, each with a capacity of 500 Liters. ○ Ensure all tanks have at least 600 LPH (Liters Per Hour) discharge rate. ○ The inlet and outlet pipe for each tank must be 3 inches in diameter, connected to an automated pump for seamless nutrient supply. ○ Should integrate automated agitators for all tanks while irrigating from fertigation systems. <p>3. Sensor Integration:</p> <ul style="list-style-type: none"> ○ pH sensor with the following specifications: <ul style="list-style-type: none"> ■ Range: 0 to 14 pH ■ Accuracy: ±0.1 pH ○ EC sensor with the following specifications: <ul style="list-style-type: none"> ■ Range: 0 to 20 mS/cm ■ Accuracy: ±0.1 mS/cm ○ The system should automatically adjust the nutrient distribution based on real-time readings of pH and EC levels in the discharge line. 	1 Set

	<p>4. Control System:</p> <ul style="list-style-type: none"> ○ The fertigation system should include an inline injector that operates without pressure loss. ○ Provide precise control over discharge rates for each channel. ○ The system must be capable of centralized control through the Centralised Gateway for remote management and scheduling of fertigation cycles. <p>5. Automation:</p> <ul style="list-style-type: none"> ○ Full automation of the nutrient mixing and delivery process, allowing for remote control and monitoring via the centralized gateway. ○ Integration with the existing pump control system for automated pump operation based on fertigation schedules. <p>6. Connectivity:</p> <ul style="list-style-type: none"> ○ The fertigation system should be connected to the Centralised Gateway via wireless communication, enabling real-time monitoring and control. <p>The system must ensure consistent and accurate nutrient delivery while maintaining flexibility for adjustment based on real-time environmental conditions. Necessary booster pumps, its starters etc have to be provided if required.</p>	
1.6	<p>Automated Weather Monitoring System: Deliver an automatic recording weather station capable of capturing and updating comprehensive weather parameters, including rainfall measurement. The system should provide reliable, solar-powered operation and accurate data management, with robust connectivity for remote monitoring.</p> <p>1. Power Supply:</p> <ul style="list-style-type: none"> ○ Solar-Powered: <ul style="list-style-type: none"> ■ The weather station must be solar-powered to ensure sustain ○ Battery Backup: <ul style="list-style-type: none"> ■ Include a battery backup to maintain operation during periods of low sunlight or power interruptions. <p>2. Data Management:</p> <ul style="list-style-type: none"> ○ Historical Data Storage: <ul style="list-style-type: none"> ■ The system must store 24 hours of historical data to allow for real-time and trend analysis of weather parameters. <p>3. Weather Parameters:</p> <ul style="list-style-type: none"> ○ Air Temperature: <ul style="list-style-type: none"> ■ Range: -40°C to 85°C ■ Resolution: 0.01°C to 0.1°C ■ Accuracy: ±0.2°C to ±1°C ○ Air Pressure: <ul style="list-style-type: none"> ■ Range: 300 to 1100 hPa ■ Resolution: 0.18 hPa ■ Accuracy: ±1 to 3 hPa ○ Air Humidity: <ul style="list-style-type: none"> ■ Range: 0 to 100% RH ■ Resolution: 0.008 to 1% RH ■ Accuracy: ±3% ○ Wind Speed: <ul style="list-style-type: none"> ■ Range: 0 to 300 km/h ■ Resolution: 0.2 km/h ■ Accuracy: ±1% 	1 Set

	<ul style="list-style-type: none"> ○ Wind Direction: <ul style="list-style-type: none"> ■ Range: 0° to 360° ■ Resolution: 1° ■ Accuracy: ±1° ○ Rainfall: <ul style="list-style-type: none"> ■ Range: 0 to 250,000 mm ■ Resolution: 0.20 mm ■ Accuracy: ±0.20 mm ○ Leaf Wetness: <ul style="list-style-type: none"> ■ Range: 0 to 100% ■ Resolution: 1% ■ Accuracy: ±1% ○ Light Sensor: <ul style="list-style-type: none"> ■ Range: 0 to 1000 W/m² ■ Resolution: 0.6 W/m² ■ Accuracy: ±1% 4. Connectivity: <ul style="list-style-type: none"> ○ The weather station must feature LTE wireless communication to enable remote data transmission and monitoring. <p>The weather station should provide accurate and reliable weather data collection and management, with efficient solar power operation and connectivity for seamless integration into agricultural automation systems.</p>	
2.	Filter units Requirements	
2.1	<p>Supply and installation of Automated Primary Filter (sand filter)</p> <ol style="list-style-type: none"> 1. Inlet and Outlet Size <ul style="list-style-type: none"> ○ The filter must have a 3-inch diameter for the inlet and outlet connections. 2. Filtration Capacity <ul style="list-style-type: none"> ○ The filter should support a cleaning capacity of up to 50 cubic meters per hour (50 m³/hr). 3. Filtration Process <ul style="list-style-type: none"> ○ The system must feature a fully automatic self-cleaning mechanism capable of efficiently filtering water to prevent blockages and ensure uninterrupted flow. ○ A single-cylinder filtration system is required, designed to handle a flow rate of 50 m³/hr. ○ The filter should be effective for removing fine particles from the water supply. 4. Operational Conditions <ul style="list-style-type: none"> ○ The cleaning process should be automatically initiated based on pressure differential, time intervals, or manual activation. ○ The pressure differential should trigger the cleaning cycle when the pressure difference reaches a predefined threshold (e.g., 0.5 bar). 5. Construction <ul style="list-style-type: none"> ○ The filter must be constructed from high-quality materials that provide durability and resistance to corrosion. The design should be compact and easy to maintain. 6. Water Flow and Pressure Requirements <ul style="list-style-type: none"> ○ The system should maintain a low-pressure drop during operation to ensure efficient water flow. 	1 Set

	<ul style="list-style-type: none"> ○ It must operate at a minimum backwash pressure of 2 bar to effectively clean the filter without compromising the water supply. 7. Backwash Water Handling <ul style="list-style-type: none"> ○ The backwash water from the cleaning cycle must be automatically redirected to the tank to ensure minimal wastage and optimize water use efficiency. 8. Installation <ul style="list-style-type: none"> ○ The filter should be suitable for both horizontal and vertical installation configurations, providing flexibility in system setup. 9. Control System <ul style="list-style-type: none"> ○ The filter must include a fully automatic control system capable of managing the flushing cycles. ○ The control system should allow wireless operation via a smartphone app, enabling remote monitoring and adjustment of cleaning cycles and system performance. 10. Power Supply <ul style="list-style-type: none"> ○ The system must be compatible with a 24V DC power supply and offer solar power options for off-grid operation. 	
2.2	<p>Supply and installation of Automated Secondary Filter (screen/disc filter)</p> <ol style="list-style-type: none"> 1. Inlet and Outlet Size <ul style="list-style-type: none"> ○ The filter must have a 3-inch diameter for the inlet and outlet connections. 2. Filtration Capacity <ul style="list-style-type: none"> ○ The filter should support a cleaning capacity of up to 50 cubic meters per hour (50 m³/hr). 3. Filtration Process <ul style="list-style-type: none"> ○ The filter must operate using a completely automatic self-cleaning mechanism, ensuring efficient removal of fine impurities from water without interrupting the flow. ○ It should be capable of filtering particles sized between 80-130 microns. 4. Operational Conditions <ul style="list-style-type: none"> ○ The system should initiate the cleaning cycle based on either pressure differential, time intervals, or manual activation. ○ A pressure differential switch will activate the cleaning when the pressure difference reaches a predefined threshold (e.g., 0.5 bar). 5. Construction <ul style="list-style-type: none"> ○ The filter should be constructed from high-quality materials ensuring durability, corrosion resistance, and ease of maintenance. 6. Water Flow and Pressure Requirements <ul style="list-style-type: none"> ○ The filter must maintain a low-pressure drop during operation to avoid excessive pressure losses in the system. ○ It should operate at a minimum backwash pressure of 2 bar to ensure effective cleaning. 7. Backwash Water Handling <ul style="list-style-type: none"> ○ The filter must be designed so the backwash water is redirected back to the tank for reuse, ensuring minimal water wastage and efficient operation. 8. Installation <ul style="list-style-type: none"> ○ The filter should be adaptable for both horizontal and vertical installation. 9. Control System <ul style="list-style-type: none"> ○ The filter must include a complete automatic and wireless control system to manage the flushing process and monitor performance. 	1 Set

	<p>○ The system should support wireless control via smartphone through a dedicated app with Bluetooth connectivity, allowing remote access to cleaning cycles, pressure monitoring, and system diagnostics.</p> <p>10. Power Supply</p> <p>The system must be compatible with a 24V DC power supply and offer solar power options.</p>	
3.	Electrical and plumbing Setup Requirements for Fertigation, Filters and Solenoid valves	
	<p>Phase Electrical Setup</p> <p>○ Install a 3-phase electrical system with the following components:</p> <ul style="list-style-type: none"> ■ 60A fuse set up to protect the entire electrical circuit. ■ 3-phase main switch or changeover switch to control and manage the power supply efficiently between different sources (e.g., utility or backup). ■ 4-pole MCB unit for cutting off power to the motor starter in case of overload or faults. <p>Single-Phase Power Setup</p> <p>○ Provision for single-phase power supply for the following equipment, each with individual MCBs for protection:</p> <ul style="list-style-type: none"> ■ Fertigation pump and unit: Ensure an individual MCB is installed to protect the fertigation equipment. ■ Agitator unit: Install a separate MCB for the agitator unit to prevent electrical overload or short circuits. <p>Panel Board</p> <p>○ Install a dedicated panel board to house all the electrical components, including fuses, switches, MCBs, and motor starters.</p> <p>○ The panel should be designed for easy access and maintenance, with proper labelling of each circuit.</p> <p>Motor Starter and Pump Setup</p> <p>○ Install a 10 HP motor starter for the open well submersible star-delta pump with automatic starting features for efficient operation.</p> <p>○ The motor starter must have provisions for automatic control and protection of the pump.</p> <p>○ Extend dual 3-core wiring from the motor to the starter setup to ensure safe and reliable connections.</p> <p>Power Indicators</p> <p>○ Include power indicators in the panel board to monitor the status of the electrical system.</p> <p>○ Indicators should display when the 3-phase power is active, and if any issues arise with the system.</p> <p>Light and Socket Provisions</p> <p>○ Install provisions for lighting inside the shed to ensure adequate illumination.</p> <p>○ Provide additional sockets for auxiliary equipment or future use, ensuring they are compatible with the installed electrical systems.</p> <p>Safety and Standards</p> <p>○ Ensure that the power setup complies with safety standards and provides reliable operation.</p>	1 Set

	<p>Extended Mainline Setup</p> <ul style="list-style-type: none"> ○ Extend the main water supply line from the existing water tank to the automatic filter units. ○ The mainline extension must be carefully routed to ensure efficient water flow without significant pressure loss. ○ The piping material must be durable and suitable for irrigation and filtration systems, capable of handling the flow rate and pressure. <p>Earthwork for Mainline Setup</p> <ul style="list-style-type: none"> ○ Perform all necessary earthwork to accommodate the new mainline, including trenching, excavation, and backfilling. ○ Ensure that the new mainline is connected back to the existing mainline to complete the water circulation system. ○ Earthwork must be executed with proper slope and depth to protect the piping and ensure smooth water flow. <p>Valve Replacement/Extension</p> <ul style="list-style-type: none"> ○ Rework and replace or extend along with the existing manual valve with a solenoid valve for automated control of the water flow. ○ The solenoid valve must be compatible with the automated control system, ensuring smooth switching between open and closed states based on pressure or timer settings. <p>Fittings and Attachments</p> <ul style="list-style-type: none"> ○ Supply and install all necessary fittings and attachments required for the valves and the mainline connection, including: <ul style="list-style-type: none"> ○ Pipe elbows, T-joints, connectors, and couplers as per the system’s requirements. ○ Flanges, unions, and brackets to secure the plumbing network and ensure leak-proof connections. ○ All fittings must be corrosion-resistant and suitable for outdoor use. <p>Wireless Controller Pole Installation</p> <ul style="list-style-type: none"> ○ Install 10-foot poles for mounting the wireless controller unit. ○ The poles must be firmly embedded into the ground with proper foundations to withstand weather conditions and provide a stable base for the controller. <p>Position the poles in such a way that the wireless controller has clear communication access to the filter and fertigation units.</p>	
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