



F. No: 9-1/(3-SCADA)/NICRA/SP/2018-19

NOTICE INVITING TENDER

On behalf of the Director, ICAR-CRIDA invites **E-Tenders** under Two Bid System (Technical and Financial bids separately) for **Pre AMC Repair and Undertaking of Annual Maintenance Contract of SCADA based rainfall simulator along with lysimeters facility.**

INSTRUCTIONS AND TERMS & CONDITIONS FOR ONLINE BID SUBMISSION

1. **Submission:** Only bids received on e-procurement portal will be considered for opening. Bids in any physical form sent through fax/email/courier/post/delivered personally will not be considered.
2. The Tenderers /bidders are requested to visit the website (<http://www.icar-crida.res.in/>) or the Government of India, Central Public Procurement Portal (<http://www.eprocure.gov.in>) 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 Director CRIDA, HYDERABAD reserves the right to accept or reject any or all the tenders.
4. **Tender ID:** Tender ID as published in CPPP shall be notified on the website (<http://www.icar-crida.res.in/>) along with tender document.
5. The firms who desire to participate in such tenders in future may bring it to the notice of Procuring Entity and may register in CPPP through DSC.
6. The bidders should have a valid registration of the firm issued by the concerned government.
7. This institute will not be responsible for any delay in enrollment or submission of the offer/uploading the offer on above mentioned e-procurement portal for any reason whatsoever. Hence vendors are advised to register in the e-procurement website <https://eprocure.gov.in> & enroll their Digital Signature Certificate (Class – II or above) and upload their quotations well in advance to avoid last minute problems.
8. **Bid Security:** Bid Security (also known as Earnest Money) is to be deposited by all the bidders except those firms which have **valid exemption** from submitting such security amount with a valid certificate, issued by Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or registered with the Central Purchase Organization or the concerned Ministry or Department. The bidders should furnish bid security of Rs. 100,000/- (one lakh rupees only) along with their bids or **bid declaration form as per the annexure 1.**
9. **Performance Security:** The successful bidder is required to pay an amount equal to 3% of successful bid amount of **"Pre AMC Repairs and Undertaking of Annual Maintenance Contract of SCADA based rainfall simulator along with lysimeters facility."** towards performance security deposit and the same will be released within one month from the date of expiry of all contractual Obligations. No interest shall be paid on such Performance security deposit. Performance Security should remain valid for a period of sixty days beyond the date of completion of all contractual obligations. The Performance Security Deposit should be in the form of Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks or payment online in an acceptable form and on which no interest will be paid.
10. The firm shall submit audited financial statements for any 3 years out of last 5 years duly attested by chartered accountant along with GST registration certificate.
11. The firm shall submit Income Tax Returns of any 3 years out of last 5 years.
12. The **make/model** of all the components quoted, like sensors etc., should clearly be quoted.

13. In case of any change of make/ model/specs of the spare part/component, complete compatibility details with relevant technical details with documentation should be attached.
14. The rates quoted in this tender shall remain valid for a period of 120 days from the date of opening of tender.
15. **Technical compliance:** The firm shall certify and enclose detailed technical compliance of each of the components/items quoted including detailed technical specifications/brochures/functional reports under Pre AMC Repair and Undertaking of Annual Maintenance Contract of SCADA facility.
16. The successful firm shall have to complete the pre AMC repair/replacement of component within **21** days from the date of acceptance.
17. **The AMC contract will start only after successful satisfactory completion of Pre AMC Repair/Replacement of Components and acceptance of the same by the indenter and technical committee.**
18. Further, although post repairs AMC is sought for 3 years, the contract will be initially awarded for a period of one year only and further year wise extension will be given only after satisfactory performance by the contractor and acceptance of the same by the indenter and technical committee
19. Only bids from firms that have a minimum of three years' experience in Annual maintenance of SCADA or any other such SCADA based advanced agricultural research facilities will be considered.
20. Rates once finalized will not be enhanced/reduced during the entire contract period.
21. 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 EMD/Performance Security deposited would be forfeited as applicable.
22. Tenders received from firms that have defaulted in providing contracted services at CRIDA in the past will not be considered.
23. The Director, CRIDA reserves the right to cancel the contract at any time during the currency period of the contract without assigning any reason.
24. The lowest Tender may be considered for acceptance keeping in view the overall reasonability of quoted rates
25. The tender document should invariably be filled in and duly signed by the authorized signatory by affixing the company/firm seal on every page of tender and the terms and conditions should strictly be followed before submitting the tender.
26. All repairs/supplies are subject to inspection and approval before acceptance.
27. This Institute is exempted from payment of Customs Charges Vide Govt. of India, Ministry of Science and Technology, Dept. of Scientific and Industrial Research, vide Letter No. TU/V/RG-CDE (372)/2016, dated 18-10-2016 (Valid up to 31-08-2021).
28. Bids not supported by any or all the essential documents/proofs for fulfilling the criteria as required in the tender document shall be rejected.
29. Any dispute relating to the enquiry shall be subject to the **jurisdiction of the court at Hyderabad** only.

CHECK LIST

**PLEASE NOTE THAT ALL RELATED SCANNED COPIES REQUIRED TO BE ENCLOSED WITH THE
TENDER DOCUMENT AS A PROOF**

S.No	List of the Documents to be enclosed with the Tender	Page No.	Enclosed
1	Tender acceptance letter		
2	Bid Security soft copy/ bid security declaration form as per annexure 1		
3	Registration of Firm's certificate issued by the appropriate government		
4	Documents showing Technical compliance as mentioned in tender instructions, terms and conditions sl no 15.		
5	Documents showing the firm/company's audited financial statements for any three years out of last five financial years duly attested by Chartered Accountant to be enclosed		
6	Self-attested copy of Certificate of registration for GST issued by Government.		
7	Self-attested Income Tax returns of any three years out of last five financial years to be enclosed.		
8	MSME/NSIC/SSI certificates registered with NSIC (if applicable) to be enclosed (for claiming exemption of Bid Security)		
9	Documents showing minimum of three years' experience in Annual maintenance of SCADA or any other such advanced SCADA based agricultural research facilities such as FATE, CTGC, lysimeter facilities, rainfall simulators etc. in any central/state govt. autonomous bodies/PSUs/agricultural universities etc.		
10	Undertaking and Technical compliance statement		
Total pages of your entire Tender Document including Enclosures		Total pages _____	

Certified that the above information is correct and the firm is willing to accept all the terms and conditions of the tender document.

Signature and Seal of the Bidder: _____

Business Address: _____

http://www.icar-crida.res.in/Email: store.crida@icar.gov.in Ph:(040)-24530161,Extn(306/223) 24532077,24530157 Fax No. 91-040-24531802

Tender Acceptance Letter
(To be filled by bidder on firm/Company Letter Head)

To
The Director
Central Research Institute for Dry Land Agriculture

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 like annexure(s), schedule(s), etc.), which will form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.
3. The corrigendum(s) issued from time to time by your department/ organizations related to this tender 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 document(s) / corrigendum(s) in its totality / entirety.
5. I / We do hereby declare that our firm/company has not been blacklisted /debarred by any Govt. Department/Public Sector undertaking.
6. I / We certify that all information furnished by our firm/company 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 the 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)

ADDITIONAL TERMS AND CONDITIONS:

1. Bidders should quote their rates of individual items and rebate offered in figures as well as in words. If the rates are not quoted in words in addition to figures, such tenders will be rejected. Incomplete quotation in any form shall be rejected.
2. Intending bidders can inspect and examine the site and its surroundings during office hours and satisfy themselves before submitting their tender as to the nature of the Site, the quantities and nature of works and material necessary for the completion of the Works and the means of access to the Site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect this contract.
3. **Participating Firms are requested to clearly understand the scope of work, location and details of work to be executed before participating in the tender Pre AMC Repair and Undertaking of Annual Maintenance Contract of SCADA based rainfall simulator along with lysimeters facility, services are to be provided for the facilities located at CRIDA-HAYATHNAGAR RESEARCH FARM, Hyderabad.**
4. The participating firms can visit the facility site on pre bid meeting date as indicated in the tender document posted on CPPP website. The transportation from CRIDA to HAYATHNAGAR RESEARCH FARM will be arranged by this institute on the day of pre bid meeting.
5. All participating bidders are requested to attend the **pre bid meeting** and access the site before bidding and get all the queries cleared. After pre bid meeting all the firms/tenderer shall quote clearly the quantity repairs and replacement of spares/ components/underground cables if any along with make and models of the required components. No deviations whatsoever may be the reason shall be entertained.
6. After the **pre bid meeting**, all revisions, clarification, corrigenda, addenda, etc. to the tenders (if required) shall also be hosted on the CPP Portal and hence Bidders are advised to regularly visit the said site and keep themselves updated. No further correspondence shall be entertained.
7. The office functions from 9.30 am to 4.30pm except second Saturday and closed holidays (the list of holidays is published in CRIDA website).
8. The firm executing the tendered work shall be responsible for adhering to all required safety norms including mandatory requirements for such work. As such none of the representatives of the firm shall work without proper safety gear as per the requirements.
9. All tools and tackles as required for executing the work will be at firm's responsibility.
10. In case any incident occurs with the deployed labour of the contractor/agency while working, it will be the responsibility of the firm/tenderer. This office shall not be liable for any claim.
11. Tenderers are advised to submit the tender strictly based on the terms and conditions and specifications contained in the Tender Documents and not to stipulate any deviations. Conditional tenders are liable to be rejected.
12. **In case of breach of any of terms and conditions mentioned above, the Competent Authority will have the right to cancel the work order or contract as a whole without assigning any reason thereof, and nothing will be payable by the Office in that event and the Bid Security/Performance Security will be forfeited as applicable.**
13. The contract will be non-transferable and hence the firm shall not be entitled to assign or sub-contract the work or any part of it to any other person or party failing which the contract will be cancelled immediately
14. The Bid security submitted by all the tenderers except the awarded tenderer will be refunded upon finalizing the bid. Bid security submitted by the awarded tenderer will be returned after acceptance of the contract and submission of the performance security.
15. If the tenderer withdraws his tender before expiry of the validity period, or before the issue of letter of acceptance, whichever is earlier, or makes any modification in the terms and conditions of the tender which are not acceptable to the office, the office shall, without prejudice to any other right or remedy, be at liberty to withhold the Bid Security.
16. The awarded firm is bound to accept the work order and execute/ perform the work as envisaged in the tender documents. In case of unwillingness to perform/ execute the work or withdrawal of quote offer due to any reason including incorrect/ wrong quoting, the firm will be debarred from participating in any future tender for a minimum duration of one year or period as decided by accepting authority in addition to forfeiting the Bid Security.

17. The payment will be made as per actual work/measurement duly certified by the indenter and recommendations of the committee. **The price escalation more than the quoted amount will not be allowed by the office.**
18. The replaced components shall cover a warranty period as per the OEM of the component and the required warrant/guarantee cards should be submitted by the awarded firm at the time of replacement.
19. All participating bidders are requested to attend the pre bid meeting and access the site before bidding and get all the queries cleared.

Functional Status

Functional Status and Requirement of Repairs of SCADA based Rainfall Simulator along with Lysimeters Facility before awarding AMC

SI No	Item	Make	Qty	Model / Specifications	Present Status of System		
					Working	Not-Working needs Replacement	Needs Repairing / Servicing
(i) SCADA based Rainfall Simulator							
1.	Rainfall shelter firmly Fabricated with 40mm GI square structural pipes of 24mx7mx5m dome shaped with both sides 2mm UV stabilized PVC sheet. Top roof is with 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side.	Fabricated	1		yes	Both sides 2mm UV stabilized PVC sheet	
2.	i) BIN-1 Soil bin with hinge and hook with slope up to 10% by hydraulic lift system. Fabricated soil bins (6mx3mx1m) with rugged structure of MS steel. MS screwed Jack Hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	1	size6mx3mx1m	yes	--	Painting / water Leak testing
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Duel cylinder arrangement connected to common hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.	Standard ISI	1	TwinCylinders each 15cms/ 10cms OD/ID with 60cms stroke	yes	--	Cleaning /oil Leak testing
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performan ce check needed
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific Inc US	1	CS650	--	Yes	do
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	do

	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	1	Fabricated	yes	--	do
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instruments Aus	1	Analika NEP 18030 KGPV2,	--	yes	do
	x) Tipping Bucket with limit switch JaiBalaji, Jalsa BC9T	Fabricated	1	Fabricated	yes	--	yes
3.	i) BIN-2 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins(6mx3mx1m) with rugged structure of MS steel. MS screwed Jack hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	1	size6mx3mx1m	yes	--	Painting / water Leak testing
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Dual cylinder arrangement connected to common hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.	Standard ISI	1	TwinCylinders each 15cms/ 10cms OD/ID with 60cms stroke	yes	--	Cleaning /oil Leak testing
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms,	Campbell scientific IncUSA	1	CS650	--	Yes	SCADA performance check needed
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific IncUSA	1	CS650	--	Yes	do
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific IncUSA	1	CS616	--	Yes	do
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific IncUSA	1	CS616	--	Yes	do
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific IncUSA	1	CS616	--	Yes	do
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	1	Fabricated	yes	--	do
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instruments Aus	1	Analika NEP 18030 KGPV2,	--	yes	do
	x) Tipping Bucket with limit switch JaiBalaji, Jalsa BC9T IS/ IEC 60947	Fabricated	1	Fabricated	yes	--	yes
4.	i) BIN-3 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins(6mx3mx1m) with rugged structure of MS steel. MS screwed Jack hold mechanism for holding the soil bin after lifting by the	Fabricated	1	size6mx3mx1m	yes	--	Painting / water Leak testing

	hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.						
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Dual cylinder arrangement connected to common hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.	Standard ISI	1	TwinCylinders each 15cms/ 10cms OD/ID with 60cms stroke	yes	--	Cleaning /oil Leak testing
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms,	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check needed
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific Inc US	1	CS650	--	Yes	do
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	1	Fabricated	yes	--	do
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instruments Aus	1	Analika NEP 18030 KGPV2,	--	yes	do
	x) Tipping Bucket with limit switch JaiBalaji, Jalsa BC9T IS/ IEC 60947	Fabricated	1	Fabricated	yes	--	yes
5.	Hydraulic Pumping Unit 5hp/3.7Kw ABB motor coupled with Hydraulic High-pressure pump model 3028,30303888 with six no's Eaton Vickers PTBA DGMFN 3YA2W2D solenoid release valves for interconnecting high pressure lines to cylinders, hoses etc. to all three bins. Hydraulic oil tank is about 100 liters capacity.	EFF2-ABB-Eaton Vickers-Yuken	1	3.7Kw/5.0HP 1425Rpm IP55, S1,	Yes	--	125Liter Oil change +Service
6.	MS Rainfall simulating Unit GI square structure pipe Consisting VFD drive NGEF motor 0.18Kw/0.25Hp 910Rpm with single stage gear coupled to Oscillating mechanism structure feeding six nozzles in 6m length. Inlet water hosepipe connected through Side festooning. Discharge selection from 0-150mm of rainfall is made through SCADA.	Fabricated /	1	0.37 kw / 0.5 Hp 1425 Rpm Geared Motor Brass Nozzles Discharge specific	VFD, Motor, Gear, Nozzles working.	--	Pipe Swing Repairs /Redesign Needed
7.	Trolley Traverse: Fabricated GI square pipe frame balanced trolley structure of 3.65mx4mx6m on Rail. Wheel mounted VFD drive motor 0.75Kw/1Hp	Fabricated	1	1 Hp/0.75 Kw geared motor	yes	--	Yes with tweaking

	gearbox coupled with sprocket chain arrangement. Movement position sensed and controlled through SCADA to traverse front/back on 24 meters track. Trolley has 4m wheelbase and height of 2.2m over and above each bin. Rainfall simulator central ceiling mounted to this Trolley with side festooning wire-pulley structure for water, electric supply cables.			Fabricated Side festooning for water, electricity lines.			of structure and base bush Wheels servicing.
8.	Position sensing Limit switches –Twelve numbers	Jai Balaji	12	Jalsa BC9T IS/IEC60947	--	12	--
9.	Data logger CR1000's module measures sensors, drives direct communications and telecommunications, reduces data, controls external devices, and stores data and programs in on-board, non-volatile storage.	Campbell	1	CR1000 with NL120	yes	--	Signal performance check needed
10.	2.2KW/3Hp 415V50Hz2800RPM Monoblock submersible pump set – for 0-150mm Rainfall simulation, redesigned pump set for required pressure/ required discharge needed.	KEC	1	KEC		yes	Redesign for pressure/ Discharge Needed
ii) The Lysimeter with drainage systems, a supervisory control and data acquisition system, a soil and temperature moisture monitoring system, a control sump well for all the four lysimeters. Three of the lysimeters are in Open Top chambers. One lysimeter in ambient.							
11.	i) Lysimeter-1 Control /Ambient Fabricated Stainless-steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. It include necessary trenching, civil work for mounting the Load cell, common soil Service well, with surface cover on Lysimeter tank.	Fabricated	1	Fabricated	yes	--	The present way of measuring percolation/leeching from 4 lysimeters need to be modified and redesigned so that stagnation at the bottom of the lysimeter is avoided

	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		yes	--	--
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check needed
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	do
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	viii) Ambient Weather Air temperature Class A sensor IP68, 3 or 4-wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount	--	1	--	--	Yes	performance check needed
	ix) Infrared Temperature Sensor	Raycmltj3m, 24v 20ma cat-ii	1	Rayteck fluke company	--	Yes	SCADA performance check needed
12.	i) Lysimeter-2 e-Temp Fabricated Stainless-steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated infrared temperature over and above ambient temperature selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	1	Fabricated			
	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		Yes	--	--
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check needed
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	do
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc	1	CS616	--	Yes	do

		US					
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	do
	viii) Ceramic IR Heaters in SS Enclosure twelve numbers with power controller and cabling. Needs to maintain a temperature selected through SCADA (generally ambient +3°C).	Elstein FSR	12	FSR1000, 230 V 1000Watt	--	12	Service needed
	ix) Infrared Temperature Sensor	Raycmltj3m, 24v 20ma cat-ii	1	Rayteck fluke company	--	Yes	performance check needed
	x) Ambient Weather Air temperature Class A sensor IP68, 3- or 4-wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount	--	1	--	--	Yes	SCADA performance check needed
	xi) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. IR heaters mounting arrangements	Fabricated	1	Fabricated	Yes	--	--
	Xii) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.)	Lexon	1	LEXAN make XL102UV Clear model or similar certified	Yes	--	--
13.	i) Lysimeter-3 e-Co2 Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated CO2 concentration over and above ambient concentration selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	1	Fabricated	Yes	--	--
	ii) Load cell Precession weighing system 6T with 10 g digital resolution-three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		Yes	--	--
	iii)Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check Needed
	iv)Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	Do
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	Do
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	Do
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc	1	CS616	--	Yes	Do

		US					
	viii)CO2 Piped arrangement with flexible SS connector release valve	Fabricated	1		Yes	--	Yes
	ix) CO2 PU distribution tube in open top chamber all sides Size-8X12 A*U27 *574112 (Appox 17 meters)	LEGRIS	1	PU CALIBRATED 98 SHORE	--	Yes	Service Needed
	x) Replacement needed with Fuji CO2 NDIR model ZPA-1 in Enclosure with sample suction gas pump and gas conditioner, moisture removal filters.	Sense air USA Fuji	1		--	Yes	SCADA integration and performance check Needed
	xi) Electrically operated solenoid valve release through SCADA control to maintain 550PPM	Fluid Control	1	Rotex automation	--	Yes	performance check Needed
	xii) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. Co2 distribution arrangements	Fabricated	1	Fabricated	Yes	--	--
	xiii) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.) LEXAN Clear model or similar certified	Lexan	1	LEXAN make XL102UV Clear model or similar certified	Yes	--	--
	xiv) Ambient Weather Air temperature Class A sensor IP68, 3- or 4-wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount	--	1	--	--	Yes	performance check needed
	xv) Infrared Temperature Sensor	Raycmltj3m, 24v 20ma cat-ii	1	Rayteck fluke company	--	Yes	performance check needed
14.	i) Lysimeter-4 e-Temp+Co2 Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated CO2 concentration over and above ambient concentration selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	1	Fabricated	Yes	--	--
	ii) Load cell Precession weighing system 6T with 10 g digital resolution-three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		Yes	--	--
	iii)Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	--
	iv)Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	--

	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	--
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	--
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	--
	viii) Ceramic IR Heaters in SS Enclosure with cabling. Needs to maintain a temperature selected through SCADA (generally ambient +3°C).	Elstein FSR	12	FSR1000, 230 V 1000Watt	--	12	Service Needed
	ix) Ambient Weather Air temperature Class A sensor IP68, 3- or 4-wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount	--	1	--	--	Yes	performance check needed
	x) Infrared Temperature Sensor	RAYCMLTJ3M, 24V 20ma CAT-II	1	Rayteck fluke company	--	Yes	SCADA integration and performance check Needed
	xi) CO2 Piped arrangement with flexible SS connector release valve	Fabricated	1		Yes	--	--
	xii) CO2 PU distribution tube in open top chamber all sides Size-8X12 98 SHORE A*U27 *574112 (Appox 20 meters)	LEGRIS	1	PU CALIBRATED 98 SHORE	--	Yes	--
	xiii) Replacement Needed with Fuji CO2 NDIR model ZPA-1 in Enclosure with sample suction gas pump and gas conditioner, moisture removal filters.	Sense air USA Fuji	1		--	Yes	SCADA integration and performance check Needed
	xiv) Electrically operated solenoid valve release through SCADA control to maintain 550PPM	Fluid control system	1	Rotex automation	--	Yes	--
	xv) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. IR heaters mounting and Co2 distribution arrangements	Fabricated	1		Yes	--	--
	xvi) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.) LEXAN make XL102UV Clear model or similar certified	Lexan	1	LEXAN make XL102UV Clear model or similar certified	Yes	--	--
15.	Portable soil Moisture Meter – with all accessories	FieldScot	1	TDR300	Yes	--	--

16.	Data logger CR1000's module measures sensors, drives direct communications and telecommunications, reduces data, controls external devices, and stores data and programs in on-board, non-volatile storage. Mounted in lysimetric sump control box-1.	Campbell	1	CR1000 with NL120	Yes	--	performance check Needed
17.	Load cell Data module PCB 4nos for each lysimeter. Load cell sensors drives direct communication with PCB, converts it to suitable RS232/RS485 data for connecting to control room Omron modules. Mounted in lysimetric sump control box-2.	Fabricated	1	Load Cell Manufacturer's Proprietary part	Yes	--	--
18.	Outdoor Electrical panel IP65 in SS enclosure comprising of self-standing with all Voltages, frequencies, Temp local indication selection, manual control and SCADA control for temperature. i) 3ph 415v80A BTH SCR power controller with 4-20ma, 1-5V-DC, 0-10V-DC connectivity -2nos ii) 3ph 415v100A DU100 MCCB -1no iii) 3p TP MCB - C32-2nos iv) 3p TP MCB - C-6-1no, v) SP MCB - C-4-1no	Fabricated	1		--	i) Yes-2Nos (SCR power controller with 4-20ma)	Service And SCADA integration and performance check Needed
19.	All interconnecting electrical, Standard signal cable connecting sensors data logger and power cabling. (Control & RJ45 Cable At point 17 terminals Rat Damaged at one or two other places too)	Standard ISI	1		Yes	--	Repairs & Service needed
20.	Flex PVC LDPE pipe 40mm Dia, 3phase 440V pump 2-5 LPS discharge etc. The 3phase 440V KEC submersible pump set 2-5 LPS discharge pump set. (Needs re-calibration/redesign for 0-150 mm RF in entire working range)		1		--	Yes	Conformance needed
21.	Digital Pan Evaporimeter Kaizen Imperial with standard Evaporimeter pan and probe, Solar Panel Charging for 2x7.2Ah SMF batteries, RS232 Data Link, with EEPROM memory and data saved in Ms-Excel files.	Kaizen Imperial	1	Kaizen Imperial DER 59	Yes	--	--
22.	Digital Recording Rain gauge for rain fall times and duration as well as momentary contact events stored in memory. Ms-Excel based tabulated data form retrieved through USB port of PC/laptop. Standard tipping bucket type Catch area 330CM ² Collector.	Kaizen Imperial	1	Kaizen Imperial Product Code 80	Yes	--	--
23.	HP workstation Intel XeonE-5 1603 2.8 10M 1066 4C CPU, C602, 64Gb RAM, SATA500GB 7200RPM, AMD FirePro V3900 1GB GFX, 16xDVD RW-SATA, 600W SMPS-90%Effcy, USB-KBD, USB-Mouse, Monitor 21.5" 32Bit-Windows 7 Prof Licensed, Image Recovery.	HP	1	Z420	Yes	--	System became slow. Restoration needed.
24.	OMRON SCADA System with Data Management- FA communications software licensed CX-Supervisor Run Plus V3 Tweaking of few points absolutely needed.	Omron	1	licensed CX-Compolet / Sysmac gateway	Yes	--	PLC / SCADA Tweaking of few points absolutely needed.
25.	HP LaserJet pro 200 Colour Printer	HP	1	M251N	Yes	Yes Cartridges	--

26.	Online UPS 10KVA, 3phase i/p 3phase o/p, 12v 26ah-30nos SMF batteries with Batteries replaced in 2019 May. Ii) 3phase servo stabilizer for UPS connection	AB Power make	1		Yes	One of three servo stabilizer transformer	--
27.	Electric Control Panel for VFD IP55 in SS enclosure wall mounted with all Voltages, frequencies, local indication selection, SCADA control for Variable frequency drives		1		Yes	--	--
	i) VFD drive for water pump flow adjustment operated by SCADA-Pump, I/P-3Ph,380-480V,50Hz, O/P-3Ph,0-480Volts,5A,0.1-400Hz, 3.8KVA, 3Hp	DELTA	1	VFD O 22 M43B 2.2Kw460v3 ph	Yes	--	--
	ii) VFD drive for Trolley traverses operated by SCADA. -Trolley I/P-3Ph,380-480V, 50Hz, O/P -3Ph,0-480Volts,4A, 0.1-400Hz, 3.1KVA, 2Hp	DELTA	1	VFD O 15 M43B 1.5Kw 460v3ph	Yes	--	--
	iii) 3ph MCB 16A-Pump	Schneider	1	C16	Yes	--	--
	iv) 3ph MCB 10A-Trolley	Schneider	1	C10	Yes	--	--
	v) Thermal Protector with cut-off/reset-Trolley 1.0A--1.5A	Schneider	1	LAD7B106/L RD06	--	Yes	--
	vi) Thermal Protector with cut-off/reset-Pump 2.5A-4.0A	Schneider	1	LAD7B106/L RD06	--	Yes	--
28.	Electric Control Panel for PLC and Controls IP55 in SS enclosure wall mounted with all Voltages, frequencies, local indication, selection, SCADA control for PLC, VFD, other sensors.		1		Yes	--	--
	i)Omron Interactive Display source -rs232c/rs485/rs422 Lot No:14513M, 24V DC 7W	Omron Corporation	1	NB7W-TW00B	Yes	--	--
	ii)Omron Programmable Controller with Modules ID232, OD211, OD211, AD081, DA041, Input Card-40pin Cable,	Omron Corporation	1	OmranSysM ac CJ1M CPU11-ETN	Yes	--	Conformance & performance check Needed
	iii) Relay unit Isolated/driver R-12, 8881113-\$relay, R-13-8Relay, R-11 6Relay, R-14 8 Relay, Isolated 29 Relay Units	Omron Corporation	1	Omron Corporation	Yes	--	--
	iv) VFD drive for oscillating RF simulator I/P-3Ph,380-480V,50Hz,7.1A,O/P-3Ph,0-480Volts,5.5A,0.1-600Hz, 4.4KVA, 3Hp	DELTA	1	VFD O 22EL43A 2.2Kw3hp	Yes	--	--
	v) Thermal Protector with cut-off/reset- oscillating RF simulator 4A-6A	Schneider	1	LAD7B106/LRD10	--	Yes	--
	vi) motor starter Thermal Protector with cut-off/reset for hydraulic power pack 7A-10A	Schneider	1	TC LC1D173 / TC LR1 D09314	--	Yes	--
	vii)3ph MCB TPN-1	Siemens	1	C32	Yes	--	--
	viii)3ph MCB TP -2 Main, Logger	Schneider	1	C32, C6A	Yes	--	--

	ix) DP MCB -1 no Control	Schneider	1	C6	Yes	--	--
	x) Mains Power on sensor	Seltzer	1	MKP28	Yes	--	--
	Xi) 3phase Protector and Phase Sequence	Minilec	1	VSP-D2	Yes	--	--
	xii) Control Power transformers, Switching Power supply 24v DC sources, 29 Relay Units Misc etc		1		Yes	--	--

PRICE BID

Part A : Total One Time Repair Charges for SCADA based Rainfall Simulator along with Lysimeters Facility.

SI No	Item	Make	Qty.	Model/ Specifications	Present Status of System			One Time Repair Charges		
					Working	Not-Working needs Replacement	Needs Repairing /Servicing	Service Charges if any	Charges for replacement	Charges for Repairs
	(i) SCADA based Rainfall Simulator									
1.	Rainfall shelter firmly Fabricated with 40mm GI square structural pipes of 24mx7mx5m dome shaped with both sides 2mm UV stabilized PVC sheet. Top roof is with 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side.	Fabricated	1		yes	Both sides 2mm UV stabilized PVC sheet.	--			
2.	i) BIN-1 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins (6mx3mx1m) with rugged structure of MS steel. MS screwed Jack Hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	1	size6mx3mx1m	yes	--	Painting / water Leak testing			
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Dual cylinder arrangement connected to common hydraulic power	Standard ISI	1	Twin Cylinders each 15cms/10cms	yes	--	Cleaning /oil Leak testing			

	pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.			OD/ID with 60cms stroke						
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check needed			
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific Inc US	1	CS650	--	Yes	do			
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	1	Fabricated	yes	--	do			
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instrument s Aus	1	Analika NEP 18030 KGPV2,	--	Yes	do			
	x) Tipping Bucket with tipp limit switch JaiBalaji, Jalsa BC9T	Fabricated	1	Fabricated	yes	--	yes			
	BIN-1 One Time Repair Charges Total									
3.	i) BIN-2 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins(6mx3mx1m) with rugged structure of MS steel. MS screwed Jack hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	1	size6mx3mx1m	yes	--	Painting / water Leak testing			
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Dual cylinder arrangement connected to common hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.	Standard ISI	1	Twin Cylinders each 15cms/10cms OD/ID with 60cms stroke	yes	--	Cleaning /oil Leak testing			

	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms,	Campbell scientific IncUSA	1	CS650	--	Yes	SCADA performance check needed			
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific IncUSA	1	CS650	--	Yes	do			
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific IncUSA	1	CS616	--	Yes	do			
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific IncUSA	1	CS616	--	Yes	do			
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific IncUSA	1	CS616	--	Yes	do			
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	1	Fabricated	yes	--	do			
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instrument s Aus	1	Analika NEP 18030 KGPV2,	--	yes	do			
	x) Tipping Bucket with tipp limit switch JaiBalaji, Jalsa BC9T IS/ IEC 60947	Fabricated	1	Fabricated	yes	--	yes			
BIN-2 One Time Repair Charges Total										
4.	i) BIN-3 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins(6mx3mx1m) with rugged structure of MS steel. MS screwed Jack hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	1	size6mx3mx1m	yes	--	Painting / water Leak testing			
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Dual cylinder arrangement connected to common hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.	Standard ISI	1	Twin Cylinders each 15cms/10cms OD/ID with 60cms stroke	yes	--	Cleaning /oil Leak testing			
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms,	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check needed			

	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific Inc US	1	CS650	--	Yes	do			
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	1	Fabricated	yes	--	do			
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instrument s Aus	1	Analika NEP 18030 KGPV2,	--	yes	do			
	x) Tipping Bucket with tipp limit switch JaiBalaji, Jalsa BC9T IS/ IEC 60947	Fabricated	1	Fabricated	yes	--	yes			
	BIN-3 One Time Repair Charges Total									
5.	Hydraulic Pumping Unit 5hp/3.7Kw ABB motor coupled with Hydraulic High pressure pump model 3028,30303888 with six nos Eaton Vickers PTBA DGMFN 3YA2W2D solenoid release valves for interconnecting high pressure lines to cylinders, hoses etc. to all three bins. Hydraulic oil tank is about 100 litres capacity.	EFF2-ABB-Eaton Vickers-Yuken	1	3.7Kw/5.0HP 1425Rpm IP55, S1,	Yes	--	125Liter Oil change +Service			
6.	MS Rainfall simulating Unit GI square structure pipe Consisting VFD drive NGEF motor 0.18Kw/0.25Hp 910Rpm with single stage gear coupled to Oscillating mechanism structure feeding six nozzles in 6m length. Inlet water hose pipe connected through Side festooning. Discharge selection from 0-150mm of rainfall is made through SCADA.	Fabricated /	1	0.37 kw / 0.5 Hp 1425 Rpm Geared Motor Brass nozzles Discharge specific	VFD, Motor, Gear, Nozzles working.	--	Pipe Swing Repairs /Redesign Needed			
7.	Trolley Traverse: Fabricated GI square pipe frame balanced trolley structure of 3.65mx4mx6m on Rail. Wheel mounted VFD drive motor 0.75Kw/1Hp gearbox coupled with sprocket chain arrangement. Movement position sensed and controlled through SCADA to traverse front/back on 24 meters track. Trolley has 4m wheel base and height of 2.2m over and above each bin. Rainfall simulator central ceiling	Fabricated	1	1 Hp/0.75 Kw geared motor. Fabricated. Side festooning for water, electricity lines.	yes	--	Yes with tweaking of structure and base bus h Wheels servicing.			

	mounted to this Trolley with side festooning wire-pulley structure for water, electric supply cables.									
8.	Position sensing Limit switches –Twelve numbers	Jai Balaji	12	Jalsa BC9T IS/IEC60947	--	12	--			
9.	Data logger CR1000's module measures sensors, drives direct communications and telecommunications, reduces data, controls external devices, and stores data and programs in on-board, non-volatile storage.	Campbell	1	CR1000 with NL120	yes	--	Signal Conformance check needed			
10.	2.2KW/3Hp 415V50Hz2800RPM Monoblock submersible pump motor – for 0-150mm Rainfall simulation, redesigned pump for required pressure/ required discharge needed.	KEC	1	KEC		Yes	Redesign for pressure/ Discharge Needed			
(ii) The Lysimeter with automatic pumping and drainage systems, a supervisory control and data acquisition system, a soil and temperature moisture monitoring system, a control sump well for all the four lysimeters. Three of the lysimeters are in Open Top chambers. One lysimeter in ambient.			1							
11.	i) Lysimeter-1 Control /Ambient Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. It include necessary trenching, civil work for mounting the Load cell, common soil Service well, with surface cover on Lysimeter tank.	Fabricated	1	Fabricated	yes	--	The present way of measuring percolation/leaching from 4 lysimeters need to be modified and redesigned so that stagnation at the bottom of the lysimeter is avoided			
	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		yes	--	--			
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check needed			

	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	do			
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	do			
	viii) Ambient Weather Air temperature sensor with Protection Shield & Mount	--	1	--	--	Yes	performance check needed			
	ix) Infrared Temperature Sensor	Raycmltj3m, 24v 20ma cat-ii	1	Rayteck fluke company	--	Yes	SCADA performance check needed			
Lysimeter-1 Control /Ambient One Time Repair Charges Total										
12.	i) Lysimeter-2 e-Temp Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated infrared temperature over and above ambient temperature selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	1	Fabricated						
	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		Yes	--	--			
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA performance check needed			
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	Do			
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	Do			
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	Do			

	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	Do			
	viii) Ceramic IR Heaters in SS Enclosure twelve numbers with power controller and cabling. Needs to maintain a temperature selected through SCADA (generally ambient +3°C).	Elstein FSR	12	FSR1000, 230 V 1000Watt	--	12	Service needed			
	ix) Infrared Temperature Sensor	Raycmltj3 m, 24v 20ma cat-ii	1	Rayteck fluke company	--	Yes	performance check needed			
	x) Ambient Weather Air temperature sensor with Protection Shield & Mount	--	1	--	--	Yes	SCADA performance check needed			
	xi) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. IR heaters mounting arrangements	Fabricated	1	Fabricated	Yes	--	--			
	Xii) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.)	Lexon	1	LEXAN make XL102UV Clear model or similar certified	Yes	--	--			
	Lysimeter-2 e-Temp: One Time Repair Charges Total									
13.	i) Lysimeter-3 e-Co2 Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated CO2 concentration over and above ambient concentration selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	1	Fabricated	Yes	--	--			
	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		Yes	--	--			
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	SCADA integration and performance check Needed			
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	Do			

	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	Do			
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	Do			
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	Do			
	viii) Co2 Piped arrangement with flexible SS connector release valve	Fabricated	1		Yes	--	Yes			
	ix) CO2 PU distribution tube in open top chamber all sides Size-8X12 A*U27 *574112 (Approx 17 meters)	LEGRIS	1	PU CALIBRATED 98 SHORE	--	Yes	Service Needed			
	x) Replacement Needed with Fuji CO2 NDIR model ZPA-1 in Enclosure with sample suction gas pump and gas conditioner, moisture removal filters.	Sense air USA Fuji	1		--	Yes	SCADA integration and performance check Needed			
	xi) Electrically operated solenoid valve release through SCADA control to maintain 550PPM	Fluid Control	1	Rotex automation	--	Yes	performance check Needed			
	xii) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. Co2 distribution arrangements	Fabricated	1	Fabricated	Yes	--	--			
	xiii) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.) LEXAN Clear model or similar certified	Lexon	1	LEXAN make XL102UV Clear model or similar certified	Yes	--	--			
	xiv) Ambient Weather Air temperature sensor with Protection Shield & Mount	--	1	--	--	Yes	performance check needed			
	xv) Infrared Temperature Sensor	Raycmltj3m, 24v 20ma cat-ii	1	Rayteck fluke company	--	Yes	performance check needed			
	Lysimeter-3 e- Co2 : One Time Repair Charges Total									
14.	i) Lysimeter-4 e-Temp+Co2 Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with	Fabricated	1	Fabricated	Yes	--	--			

drain tubes. Elevated CO2 concentration over and above ambient concentration selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.										
ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar.	JJ Chennai	1		Yes	--	--				
iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	--				
iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	1	CS650	--	Yes	--				
v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	1	CS616	--	Yes	--				
vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	1	CS616	--	Yes	--				
vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	1	CS616	--	Yes	--				
viii) Ceramic IR Heaters in SS Enclosure twelve numbers with power controller and cabling. Needs to maintain a temperature selected through SCADA (generally ambient +3°C).	Elstein FSR	12	FSR1000, 230 V 1000Watt	--	12	Service Needed				
ix) Ambient Weather Air temperature sensor with Protection Shield & Mount	--	1	--	--	Yes	performance check needed				
x) Infrared Temperature Sensor	RAYCMLTJ3 M, 24V 20ma CAT-II	1	Rayteck fluke company	--	Yes	SCADA integration and performance check Needed				
xi) Co2 Piped arrangement with flexible SS connector release valve	Fabricated	1		Yes	--	--				
xii) CO2 PU distribution tube in open top chamber all sides Size-8X12	LEGRIS	1	PU CALIBRATED 98 SHORE	--	Yes	--				

	98 SHORE A*U27 *574112 (Appox 20 meters)									
	xiii)-Replacement Needed with Fuji CO2 NDIR model ZPA-1 in Enclosure with sample suction gas pump and gas conditioner, moisture removal filters.	Sense-air USA Fuji	1		--	Yes	SCADA integration and performance check Needed			
	xiv) Electrically operated solenoid valve release through SCADA control to maintain 550PPM	Fluid control system	1	Rotex automation	--	Yes	--			
	xv) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. IR heaters mounting and Co2 distribution arrangements	Fabricated	1		Yes	--	--			
	xvi) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.) LEXAN make XL102UV Clear model or similar certified	Lexon	1	LEXAN make XL102UV Clear model or similar certified	Yes	--	--			
	Lysimeter-4 e- Temp + e- Co2 : One Time Repair Charges Total									
15.	Portable soil Moisture Meter – with all accessories	FieldScot	1	TDR300	yes	--	--			
16.	Data logger CR1000's module measures sensors, drives direct communications and telecommunications, reduces data, controls external devices, and stores data and programs in on-board, non-volatile storage. Mounted in lysimetric sump control box-1.	Campbell	1	CR1000 with NL120	Yes	--	performance check Needed			
17.	Load cell Data module PCB 4nos for each lysimeter. Load cell sensors drives direct communication with PCB, converts it to suitable RS232/RS485 data for connecting to control room Omron modules. Mounted in lysimetric sump control box-2.	Fabricated	1	Load Cell Manufacturer's Proprietary part	Yes	--	--			
18.	self-standing Outdoor Electrical panel IP65 in SS enclosure comprising of with all Voltages, frequencies, Temp local indication selection, manual control and SCADA control for temperature. i)3ph 415v80A BTH SCR power controller with4-20ma,1-5V-DC,0-10V-DC connectivity -2nos ii) 3ph 415v100A DU100 MCCB -1no iii) 3p TP MCB - C32-2nos iv) 3p TP MCB - C-6-1no,	Fabricated	1		--	i) Yes- 2Nos (SCR power contro ller with4- 20ma)	Service And SCADA integration and performance check Needed			

	v) SP MCB - C-4-1no									
	Self-standing Outdoor Electrical panel IP65 in SS enclosure : One Time Repair Charges Total									
19.	All interconnecting electrical, Standard signal cable connecting sensors data logger and power cabling. (Control & RJ45 Cable At point 17 terminals Rat Damaged at one or two other places too)	Standard ISI	1		Yes	--	Repairs & Service needed			
20.	Flex PVC LDPE pipe 40mm Dia, 3phase 440V pump 2-5 LPS discharge etc. The 3phase 440V KEC submersible pump set 2-5 LPS discharge pump set.		1		--	Yes	Conformance needed			
21.	Digital Pan Evaporimeter Kaizen Imperial with standard Evaporimeter pan and probe, Solar Panel Charging for 2x7.2Ah SMF batteries, RS232 Data Link, with EEPROM memory and data saved in Ms-Excel files.	Kaizen Imperial	1	Kaizen Imperial DER 59	Yes	--	--			
22.	Digital Recording Rain gauge for rain fall times and duration as well as momentary contact events stored in memory. Ms-Excel based tabulated data form retrieved through USB port of PC/laptop. Standard tipping bucket type Catch area 330CM ² Collector.	Kaizen Imperial	1	Kaizen Imperial Product Code 80	Yes	--	--			
23.	HP workstation Intel XeonE-5 1603 2.8 10M 1066 4C CPU, C602, 64Gb RAM, SATA500GB 7200RPM, AMD FirePro V3900 1GB GFX, 16xDVD RW-SATA,600W SMPS-90%Effcy, USB-KBD, USB-Mouse, Monitor 21.5" 32Bit-Windows 7 Prof Licensed, Image Recovery.	HP	1	Z420	Yes	--	System became slow. Restoration needed.			
24.	OMRON SCADA System with Data Management- FA communications software licenced CX-Supervisor Run Plus V3 Tweaking of few points absolutely needed.	Omron	1	licenced CX-Compolet / Sysmac gateway	Yes	--	PLC/SCADA Tweaking of few points absolutely needed.			
25.	HP LaserJet pro 200 Colour Printer	HP	1	M251N	Yes	Yes Cartridges	--			
26.	Online UPS 10KVA, 3phase i/p 3phase o/p, 12v 26ah-30nos SMF batteries with Batteries replaced in 2019 May. Ii) 3phase servo stabilizer for UPS	AB Power make	1		Yes	One of three servo stabilizer	--			

						transformer				
27.	Electric Control Panel for VFD IP55 in SS enclosure wall mounted with all Voltages, frequencies, local indication selection, SCADA control for Variable frequency drives		1		Yes	--	--			
	i) VFD drive for water pump flow adjustment operated by SCADA-Pump, I/P-3Ph,380-480V,50Hz,O/P-3Ph,0-480Volts,5A,0.1-400Hz, 3.8KVA, 3Hp	DELTA	1	VFD O 22 M43B 2.2Kw460v3ph	Yes	--	--			
	ii) VFD drive for Trolley traverses operated by SCADA.-Trolley I/P- 3Ph,380-480V, 50Hz, O/P - 3Ph,0-480Volts,4A, 0.1-400Hz, 3.1KVA, 2Hp	DELTA	1	VFD O 15 M43B 1.5Kw460v3ph	Yes	--	--			
	iii) 3ph MCB 16A-Pump	Schneider	1	C16	Yes	--	--			
	iv) 3ph MCB 10A-Trolley	Schneider	1	C10	Yes	--	--			
	v) Thermal Protector with cut-off/reset-Trolley 1.0A--1.5A	Schneider	1	LAD7B106/LR D06	--	Yes	--			
	vi) Thermal Protector with cut-off/reset-Pump 2.5A-4.0A	Schneider	1	LAD7B106/LR D06	--	Yes	--			
Electric Control Panel for VFD IP55 in SS enclosure wall mounted : One Time Repair Charges Total										
28	Electric Control Panel for PLC and Controls IP55 in SS enclosure wall mounted with all Voltages, frequencies, local indication, selection, SCADA control for PLC, VFD, other sensors.		1		Yes	--	--			
	i)Omron Interactive Display source - rs232c/rs485/rs422 Lot No:14513M, 24V DC 7W	Omron Corporation	1	NB7W-TW00B	Yes	--	--			
	ii)Omron Programmable Controller with Modules ID232, OD211, OD211, AD081, DA041, Input Card-40pin Cable, ,	Omron Corporation	1	OmranSysMac CJ1M CPU11-ETN	Yes	--	Conformance & performance check Needed			
	iii) Relay unit Isolated/driver R-12, 8881113-\$relay, R-13-8Relay, R-11 6Relay, R-14 8 Relay, Isolated 29 Relay Units	Omron Corporation	1	Omron Corporation	Yes	--	--			
	iv) VFD drive for oscillating RF simulator I/P-3Ph,380-480V,50Hz,7.1A,O/P-3Ph,0-480Volts,5.5A,0.1-600Hz, 4.4KVA, 3Hp	DELTA	1	VFD O 22EL43A 2.2Kw3hp	Yes	--	--			
	v) Thermal Protector with cut-off/reset- oscillating RF simulator 4A-6A	Schneider	1	LAD7B106/LRD10	--	Yes	--			

vi) motor starter Thermal Protector with cut-off/reset for hydraulic power pack 7A-10A	Schneider	1	TC LC1D173 / TC LR1 D09314	--	Yes	--			
vii)3ph MCB TPN-1	Siemens	1	C32	Yes	--	--			
viii)3ph MCB TP -2 Main, Logger	Schneider	1	C32, C6A	Yes	--	--			
ix) DP MCB -1 no Control	Schneider	1	C6	Yes	--	--			
x) Mains Power on sensor	Seltzer	1	MKP28	Yes	--	--			
Xi) 3phase Protector and Phase Sequence	Minilec	1	VSP-D2	Yes	--	--			
xii) Control Power transformers, Switching Power supply 24v DC sources, 29 Relay Units Misc etc		1		Yes	--	--			

SUMAMRY OF TOTAL ONE TIME REPAIR CHARGES

Sl no	Chamber Type	Service Charges for working components, if any	Charges for replacement	Charges for Repairs	Total Amount in Rs.
1	BIN-1 One Time Repair Charges Total				
2	BIN-2 One Time Repair Charges Total				
3	BIN-3 One Time Repair Charges Total				
4	Lysimeter-1 Control /Ambient One Time Repair Charges Total				
5	Lysimeter-2 e-Temp: One Time Repair Charges Total				
6	Lysimeter-3 e- Co2 : One Time Repair Charges Total				
7	Lysimeter-4 e- Temp + e- Co2 : One Time Repair Charges Total				
8	Self-standing Outdoor Electrical panel IP65 in SS enclosure : One Time Repair Charges Total				
9	Electric Control Panel for VFD IP55 in SS enclosure wall mounted : One Time Repair Charges Total				
10	One Time Repair Charges of SCADA based Rainfall Simulator along with Lysimeters Facility				
Total One Time Repair Charges in Rs.					

Note: The spares replaced under One Time Repairs shall carry the warranty from OEM for the period specified by OEM. Warranty services rendered by the OEM shall be managed during that period by firm under AMC. Prices are to be quoted accordingly under AMC.

Part B: AMC Charges for SCADA based Rainfall Simulator along with Lysimeters Facility

AMC will come in to effect after Initial one time paid repairs, replacement, SCADA-calibrations and successful demonstration of all parameters.

Part B (i): Component charges applicable as and when if any of the parts need replacement during AMC period. (on requirement basis)

Sl No	Item	Make	Model /Specification s	Per unit Rate	Amount
1.	(i) SCADA based Rainfall Simulator along with Lysimeters Facility. Rainfall shelter firmly Fabricated with 40mm GI square structural pipes of 24mx7mx5m dome shaped with both sides 2mm UV stabilized PVC sheet. Top roof is with 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side.	Fabricated	Fabricated	--	--
	i) 2mm UV stabilized PVC sheet supply and fixing per square meter				
	ii) 6mm Thick multi wall UV Stabilized Polycarbonate sheet supply and fixing per square meter				
2.	i) BIN-1 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins (6mx3mx1m) with rugged structure of MS steel. MS screwed Jack Hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	size6mx3mx1m	--	--
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Duel cylinder arrangement connected to common	Standard ISI	Twin Cylinders each 15cms/10cms		

	hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.		OD/ID with 60cms stroke		
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific Inc US	CS650		
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	CS616		
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	CS616		
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	CS616		
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	Fabricated		
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instruments Aus	Analika NEP 18030 KGPV2,		
	x) Tipping Bucket with tipp limit switch JaiBalaji, Jalsa BC9T	Fabricated	Fabricated		
3.	i) BIN-2 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins(6mx3mx1m) with rugged structure of MS steel. MS screwed Jack hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	size6mx3mx1m	--	--
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Duel cylinder arrangement connected to common hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.	Standard ISI	Twin Cylinders each 15cms/10cms OD/ID with 60cms stroke		

	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms,	Campbell scientific IncUSA	CS650		
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific IncUSA	CS650		
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific IncUSA	CS616		
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific IncUSA	CS616		
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific IncUSA	CS616		
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	Fabricated		
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instruments Aus	Analika NEP 18030 KGPV2,		
	x) Tipping Bucket with tipp limit switch JaiBalaji, Jalsa BC9T IS/ IEC 60947	Fabricated	Fabricated		
4.	i) BIN-3 Soil bin with hinge and hook with slope upto 10% by hydraulic lift system. Fabricated soil bins(6mx3mx1m) with rugged structure of MS steel. MS screwed Jack hold mechanism for holding the soil bin after lifting by the hydraulic pumps in a particular slope. At Bottom of bin a 6mx6" perforated PVC pipe running through sand gravel for collection of percolated water arrangement and stilt overflow to sense turbidity and tipping bucket measurement.	Fabricated	size6mx3mx1m	--	--
	ii) Hydraulic Lift for soil Bins about 40T capacity, with 0-10% slope varying. Dual cylinder arrangement connected to common hydraulic power pack with pump, oil tank arrangement. Bin slope Lift activated through SCADA.	Standard ISI	Twin Cylinders each 15cms/10cms OD/ID with 60cms stroke		
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms,	Campbell scientific Inc US	CS650		

	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 30cms	Campbell scientific Inc US	CS650		
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	CS616		
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	CS616		
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	CS616		
	viii) Stilt water collector fabricated with stand and flow arrangement	Fabricated	Fabricated		
	ix) Turbidity sensor probe +connector 0-NTU=0V, 30000-NTU=2.5v	Mc Van Instruments Aus	Analika NEP 18030 KGPV2,		
	x) Tipping Bucket with tipp limit switch JaiBalaji, Jalsa BC9T IS/ IEC 60947	Fabricated	Fabricated		
5.	Hydraulic Pumping Unit 5hp/3.7Kw ABB motor coupled with Hydraulic High pressure pump model 3028,30303888 with six nos Eaton Vickers PTBA DGMFN 3YA2W2D solenoid release valves for interconnecting high pressure lines to cylinders, hoses etc. to all three bins. Hydraulic oil tank is about 100 litres capacity.	EFF2-ABB-Eaton Vickers-Yuken	3.7Kw/5.0HP 1425Rpm IP55, S1,		
6.	MS Rainfall simulating Unit GI square structure pipe Consisting VFD drive NGEF motor 0.18Kw/0.25Hp 910Rpm with single stage gear coupled to Oscillating mechanism structure feeding six nozzles in 6m length. Inlet water hose pipe connected through Side festooning. Discharge selection from 0-150mm of rainfall is made through SCADA.	Fabricated /	0.37 kw / 0.5 Hp 1425 Rpm Geared Motor Brass nozzles Discharge specific		
7.	Trolley Traverse: Fabricated GI square pipe frame balanced trolley structure of 3.65mx4mx6m on Rail. Wheel mounted VFD drive motor 0.75Kw/1Hp gearbox coupled with sprocket chain arrangement. Movement position sensed and controlled through SCADA to traverse front/back on 24 meters track. Trolley has 4m wheel base and height of 2.2m over and above each bin. Rainfall simulator central ceiling mounted to this Trolley with side festooning wire-pulley structure for water, electric supply cables.	Fabricated	i)1Hp/0.75 Kw geared motor. Fabricated. ii)Side festooning for water, electricity lines.	i) ii)	

8.	Position sensing Limit switches –Twelve numbers	Jai Balaji	Jalsa BC9T IS/IEC60947		
9.	Data logger CR1000's module measures sensors, drives direct communications and telecommunications, reduces data, controls external devices, and stores data and programs in on-board, non-volatile storage.	Campbell	CR1000 with NL120		
10.	Redesigned or 2.2KW/3Hp 415V50Hz2800RPM Monoblock submersible pump motor – for 0-150mm Rainfall simulation, redesigned pump for required pressure/ required discharge needed.	KEC or redesigned one	KEC or redesigned one		
	(ii) The Lysimeter with automatic pumping and drainage systems, a supervisory control and data acquisition system, a soil and temperature moisture monitoring system, a control sump well for all the four lysimeters. Three of the lysimeters are in Open Top chambers. One lysimeter in ambient.	--	--	--	--
11.	i) Lysimeter-1 Control /Ambient Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. It include necessary trenching, civil work for mounting the Load cell, common soil Service well, with surface cover on Lysimeter tank.	Fabricated	Fabricated	--	--
	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar Including PCB's. (Replacement of any Load cell needs un-Mounting and Re-mounting of Lysimeter too)	JJ Chennai			
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	CS616		
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	CS616		

	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	CS616		
	viii) Ambient Weather Air temperature Class A sensor IP68, 3or4 wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount	--	--		
	ix) Infrared Temperature Sensor	Raycmltj3m, 24v 20ma cat-ii	Rayteck fluke company		
12 .	i) Lysimeter-2 e-Temp Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated infrared temperature over and above ambient temperature selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	Fabricated	--	--
	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar Including PCB's. (Replacement of any Load cell needs un-Mounting and Re-mounting of Lysimeter too)	JJ Chennai			
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	CS616		
	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	CS616		
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	CS616		
	viii) Ceramic IR Heaters in SS Enclosure twelve numbers with power controller and cabling. Needs to maintain a temperature selected through SCADA (generally ambient +3°C).	Elstein FSR	FSR1000, 230 V 1000Watt		

	ix) Infrared Temperature Sensor	Raycmltj3m, 24v 20ma cat-ii	Rayteck fluke company		
	x) Ambient Weather Air temperature Class A sensor IP68, 3or4 wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount				
	xi) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. IR heaters mounting arrangements	Fabricated	Fabricated		
	Xii) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.) including fixing with all accessories per meter charges	Lexon	LEXAN make XL102UV Clear model or similar certified		
13 .	i) Lysimeter-3 e-Co2 Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated CO2 concentration over and above ambient concentration selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	Fabricated	--	--
	ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar Including PCB's. (Replacement of any Load cell needs un-Mounting and Re-mounting of Lysimeter too)	JJ Chennai			
	iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
	iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
	v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	CS616		

	vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	CS616		
	vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	CS616		
	viii) Co2 Piped arrangement with flexible SS connector release valve	Fabricated			
	ix) CO2 PU distribution tube in open top chamber all sides Size- 8X12 A*U27 *574112	LEGRIS	PU CALIBRATED 98 SHORE		
	x) Replacement Rate of Fuji CO2 NDIR model ZPA-1	FUJI	FUJI ZPA-1		
	xi) Replacement Rate of sample suction gas pump and gas conditioner, moisture removal filters etc. complete Kit	Fuji			
	xii) Electrically operated solenoid valve release through SCADA control to maintain 550PPM	Fluid Control	Rotex automation		
	xiii) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. Co2 distribution arrangements	Fabricated	Fabricated		
	xiv) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.) LEXAN Clear model or similar certified including fixing with all accessories per meter charges	Lexon	LEXAN make XL102UV Clear model or similar certified		
	xv) Ambient Weather Air Temperature Class A sensor IP68, 3- or 4-wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount				
14 .	xvi) Infrared Temperature Sensor Raycmltj3m, 24v 20ma cat-ii	Rayteck fluke company	Raycmltj3m, 24v 20ma cat-ii		
	i) Lysimeter-4 e-Temp+Co2 Fabricated Stainless steel cylindrical soil tank of size 1.2 dia and 2 m depth with 6.4mm thick stainless steel along with drain tubes. Elevated CO2 concentration over and above ambient concentration selectable through SCADA. It includes necessary trenching, civil work for mounting the Load cell, and common soil Service well, with surface cover on Lysimeter tank.	Fabricated	Fabricated	--	--

ii) Load cell Precision weighing system 6T with 10 g digital resolution- three 2T sensors placed at 120° apart, load on a common triangular bar Including PCB's. (Replacement of any Load cell needs un-Mounting and Re-mounting of Lysimeter too)	JJ Chennai			
iii) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
iv) Multi-parameter smart sensor for volumetric water content, bulk electrical conductivity and temperature of soil at 15cms	Campbell scientific Inc US	CS650		
v) Soil sensor for volumetric water content of soil at 45cms	Campbell scientific Inc US	CS616		
vi) Soil sensor for volumetric water content of soil at 60cms	Campbell scientific Inc US	CS616		
vii) Soil sensor for volumetric water content of soil at 90cms	Campbell scientific Inc US	CS616		
viii) Ceramic IR Heaters in SS Enclosure twelve numbers with power controller and cabling	Elstein FSR	FSR1000, 230 V 1000Watt		
ix) Ambient Weather Air temperature Class A sensor IP68, 3or4 wire PT100 temperature probe for air waterproof stainless steel sensor tip with Protection Shield & Mount				
x) Infrared Temperature Sensor	RAYCMLTJ3M, 24V 20ma CAT-II	Rayteck fluke company		
xi) Co2 Piped arrangement with flexible SS connector release valve	Fabricated			
xii) CO2 PU distribution tube in open top chamber all sides Size- 8X12 98 SHORE A*U27 *574112	LEGRIS	PU CALIBRATED 98 SHORE		
xiii) Replacement Rate of Fuji CO2 NDIR model ZPA-1	Fuji	FUJI ZPA-1		
Xiv) Replacement Rate of sample suction gas pump and gas conditioner, moisture removal filters etc. complete Kit Fuji	Fuji			
xv) Electrically operated solenoid valve release through SCADA control to maintain 550PPM	Fluid control system	Rotex automation		

	xvi) Open top Chamber 4mx4mx3m fabricated with 65mm GI coated flanged MS Pipes Class-B. IR heaters mounting and Co2 distribution arrangements	Fabricated			
	xvii) 6mm Thick multi wall UV Stabilized Polycarbonate sheet for 85% PAR Clear-for all side. (with 10year onsite Warranty for 85% PAR, yellowing, breaking etc.) LEXAN make XL102UV Clear model or similar certified including fixing with all accessories per meter charges	Lexon	LEXAN make XL102UV Clear model or similar certified		
15	Portable soil Moisture Meter – with all accessories	FieldScot	TDR300		
16	Data logger CR1000's module measures sensors, drives direct communications and telecommunications	Campbell	CR1000 with NL120		
17	Load cell Data module PCB 4nos for each lysimeter. Load cell sensors drives direct communication with PCB, converts it to suitable RS232/RS485 data for connecting to control room Omron modules. Mounted in lysimetric sump control box-2.	Fabricated	Load Cell Manufacturer's Proprietary part		
18	Outdoor Electrical panel IP65 in SS enclosure comprising of self-standing with all Voltages, frequencies, Temp local indication selection, manual control and SCADA control for temperature. i)3ph 415v80A BTH SCR power controller with4-20ma,1-5V-DC,0-10V-DC connectivity -2nos ii) 3ph 415v100A DU100 MCCB -1no iii) 3p TP MCB - C32-2nos iv) 3p TP MCB - C-6-1no, v) SP MCB - C-4-1no	Fabricated	i)BTH SCR ii) Schneider iii) Schneider iv) Schneider v) Schneider	i) ii) iii) iv) v)	
19	All interconnecting electrical, Standard signal cable connecting sensors data logger and power cabling. (Control & RJ45 Cable At point 17 terminals Rat Damaged at one or two other places too) i)Control-per Meter, ii) Power-per Meter, iii)RJ45-per Meter	Standard ISI	i)Control-per Meter ii) Power-per Meter iii)RJ45-per Meter		
20	Flex PVC LDPE pipe 40mm Dia, 3phase 440V pump 2-5 LPS discharge etc. The 3phase 440V KEC submersible pump set 2-5 LPS discharge pump set. i)PVC 40mm--per Meter ii)3HpPumpMotorSet with all accessories		i)PVC 40mm--per Meter ii)3HpPumpMotorSet with all accessories		
21	Digital Pan Evaporimeter Kaizen Imperial with standard Evaporimeter pan and probe, Solar Panel Charging for 2x7.2Ah SMF batteries, RS232 Data Link, with EEPROM memory and data saved in Ms-Excel files.	Kaizen Imperial	Kaizen Imperial DER 59		

22	Digital Recording Rain gauge for rain fall times and duration as well as momentary contact events stored in memory. Ms-Excel based tabulated data form retrieved through USB port of PC/laptop. Standard tipping bucket type Catch area 330CM ² Collector.	Kaizen Imperial	Kaizen Imperial Product Code 80		
23	HP workstation Intel XeonE-5 1603 2.8 10M 1066 4C CPU, C602, 64Gb RAM, SATA500GB 7200RPM, AMD FirePro V3900 1GB GFX, 16xDVD RW-SATA,600W SMPS-90%Effcy, USB-KBD, USB-Mouse, Monitor 21.5" 32Bit-Windows 7 Prof Licensed, Image Recovery.	HP	Z420		
24	OMRON SCADA System with Data Management- FA communications software licenced CX-Supervisor Run Plus V3 Tweaking of few points absolutely needed. (Upgraded Version if any)	Omron (Upgraded Version if any)	licenced CX-Compolet / Sysmac gateway		
25	HP LaserJet pro 200 Colour Printer	HP-M251N	Cartridges Set		
26	Online UPS 10KVA, 3phase i/p 3phase o/p, 12v 26ah-30nos SMF batteries with 3phase input servo stabilizer. Batteries replaced in 2019 May	AB Power make	i)26AH 12V SMF-30nos ii) 3phase input servo stabilizer iii) Online UPS 10KVA		
27	Electric Control Panel for VFD IP55 in SS enclosure wall mounted with all Voltages, frequencies, local indication selection, SCADA control for Variable frequency drives			--	--
	i) VFD drive for water pump flow adjustment operated by SCADA-Pump, I/P-3Ph,380-480V,50Hz,O/P-3Ph,0-480Volts,5A,0.1-400Hz, 3.8KVA, 3Hp	DELTA	VFD O 22 M43B 2.2Kw460v3ph		
	ii) VFD drive for Trolley traverses operated by SCADA. -Trolley I/P- 3Ph,380-480V, 50Hz, O/P -3Ph,0-480Volts,4A, 0.1-400Hz, 3.1KVA, 2Hp	DELTA	VFD O 15 M43B 1.5Kw460v3ph		
	iii) 3ph MCB 16A-Pump	Schneider	C16		
	iv) 3ph MCB 10A-Trolley	Schneider	C10		
	v) Thermal Protector with cut-off/reset-Trolley 1.0A--1.5A	Schneider	LAD7B106/LRD06		
	vi) Thermal Protector with cut-off/reset-Pump 2.5A-4.0A	Schneider	LAD7B106/LRD06		

28	Electric Control Panel for PLC and Controls IP55 in SS enclosure wall mounted with all Voltages, frequencies, local indication, selection, SCADA control for PLC, VFD, other sensors.			--	--
	i)Omron Interactive Display source -rs232c/rs485/rs422 Lot No:14513M, 24V DC 7W	Omron Corporation	NB7W-TW00B		
	ii)Omron Programmable Controller with Modules ID232, OD211, OD211, AD081, DA041, Input Card-40pin Cable, ,	Omron Corporation	OmranSysMac CJ1M CPU11-ETN		
	iii) Relay unit Isolated/driver R-12, 8881113-\$relay, R-13-8Relay, R-11 6Relay, R-14 8 Relay, Isolated 29 Relay Units	Omron Corporation	Omron Corporation		
	iv) VFD drive for oscillating RF simulator I/P-3Ph,380-480V,50Hz,7.1A,O/P-3Ph,0-480Volts,5.5A,0.1-600Hz, 4.4KVA, 3Hp	DELTA	VFD O 22EL43A 2.2Kw3hp		
	v) Thermal Protector with cut-off/reset- oscillating RF simulator 4A-6A	Schneider	LAD7B106/ LRD10		
	vi) motor starter Thermal Protector with cut-off/reset for hydraulic power pack 7A-10A	Schneider	TC LC1D173 / TC LR1 D09314		
	vii)3ph MCB TPN-1	Siemens	C32		
	viii)3ph MCB TP -2 Main, Logger	Schneider	C32, C6A		
	ix) DP MCB -1 no Control	Schneider	C6		
	x) Mains Power on sensor	Seltzer	MKP28		
	Xi) 3phase Protector and Phase Sequence	Minilec	VSP-D2		
	xii) Control Power transformers, Switching Power supply 24v DC sources, 29 Relay Units Misc etc		i)SMPS-24V source ii)Relay Units		
	Total Cost of Spares counted one unit each rates: ₹				
	In Words: ₹				

Part B (ii) :: AMC**Part B (ii) :: AMC Service Charges**

Sl no	Details	Year	Price	Total Amount
1.	Comprehensive AMC Charges for SCADA based Rainfall Simulator along with Lysimeters Facility including all charges except spare parts whose prices are quoted here with separately.	1 st year (0-12Months)		
2.	Comprehensive AMC Charges for SCADA based Rainfall Simulator along with Lysimeters Facility including all charges except spare parts whose prices are quoted here with separately.	2 nd year (13 th to24 th month)		
3.	Comprehensive AMC Charges for SCADA based Rainfall Simulator along with Lysimeters Facility including all charges except spare parts whose prices are quoted here with separately.	3 rd Year (25 th to36 th month)		

TOTAL PRICE QUOTED PART A + PART B (i) + PART B (ii) in Rs. _____

TOTAL PRICE QUOTED PART A + PART B (i) + PART B (ii) in words _____

**Price bid
To be submitted in (BOQ)**

S.L NO	PARTICULAR		PRICE QUOTED
1	PART A	Total Onetime pre AMC repair charges	
2	PART B(i)	AMC (component replacement charges during AMC)	
3	PART B(ii)	AMC service charges 1 st year	
4		AMC service charges 2 nd year	
5		AMC service charges 3 rd year	
TOTAL CHARGES QUOTED (in figures)			
TOTAL CHARGES QUOTED (in words)			

Bidder name and signature

TECHNICAL COMPLIANCE STATEMENT

We_____ certify that our firm quoted components/parts/sensors/items is technically complies with the required components to be replaced.

Bidder name with seal and sign

UNDERTAKING

We_____ hereby agree to undertake the AMC of SCADA based rainfall simulator along with lysimeters facility of three years after satisfactory completion of one time repairs stipulated in the tender document.

Bidder name with seal and sign

Bid Securing Declaration Form

Date: _____

Tender No. _____

To

**The Director
ICAR-Central Research Institute for Dry Land Agriculture**

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.

I/We accept that I/We may be disqualified from bidding for any contract with you for a period of one year from the date of notification if I am /We are in a breach of any obligation under the bid conditions, because I/We

1. have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or
2. having been notified of the acceptance of our Bid by the purchaser during the period of bid validity (i) fail or reuse to execute the contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Signed: (insert signature of person whose name and capacity are shown)

In the capacity of (insert legal capacity of person signing the Bid Securing Declaration)

Name: (insert complete name of person signing the Bid Securing Declaration)

Duly authorized to sign the bid for an on behalf of (insert complete name of Bidder) Dated on

_____ day of _____ (**insert date of signing**)

Firm / company / Corporate Seal (where appropriate)