Appendix-D

MAHATMA PHULE KRISHI VIDYAPEETH, RAHURI
CAAST (Centre for Advance Agriculture Science and Technology) Project on
"Climate Smart Agriculture and Water Management" (CSAWM)
Department of Irrigation and Drainage Engineering
Dr. A. S. College of Agricultural Engineering and Technology
Rahuri-413 722, Dist-Ahmednagar
Phone: 02426-243176, 243232 e-mail : caast.csawm2018@gmail.com

No. CAAST-CSAWM/Notification/RA/ 71 /2018   Date: 14/09/2018

NOTIFICATION

Application are invited from the eligible candidate for the post of Research Associates in different disciplines of Agricultural Sciences, Agricultural Engineering and Social Sciences purely on temporary and contractual basis as ad-hoc arrangement in the Centre for Advance Agriculture Science and Technology (CAAST) Project entitled "Climate Smart Agriculture and Water Management" (CSAWM) operational in the University. These positions are available until end of the project. The interested candidates are encouraged to apply in the prescribed format (provided in this notification) by sending PDF copy/copies of the application along with the related certificates/material/documents by email, post, courier service or in person in CAAST-CSAWM Office at Rahuri so as to reach by the last date **08/10/2018 (5.15 pm).**

The email id is caast.csawm2018@gmail.com; The postal address is: "The Recruitment Officer, CAAST-CSAWM, Department of Irrigation and Drainage Engineering, Dr. A.S. College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist; Ahmednagar-413722 (MS).

For any questions/queries on application-procedure, candidates can contact Dr. N. N. Firake, Recruitment Officer, CAAST-CSAWM, MPKV, Rahuri on the email ID or on cell phone (02426-243176, 07775818077).

The applications will be scrutinized for the eligibility; and then short listed on merit. If numbers of applications are more, only short listed candidates will be called for the interview. Candidates if called for an interview should bring the hard/printed copy of application (including attached documents) and all the original documents for verification purpose. In absence of the documentary proof of the original certificates/documents at the time of interview, the candidate will not be eligible to appear for the interview.

The candidate should apply separately for each post, if eligible and wish to apply for more than one post.

The date of interview will be communicated to eligible candidates separately by email/text massage.

The details of the post and required qualifications are given below:

Name of the Post	Discipline/Subject	No. of Posts	Qualifications
Research Associate	Irrigation and Drainage Engineering	03	**Essential:** Ph.D. degree in Irrigation and Drainage Engineering /Water Recourse Development and Management /Water Resources Engineering/Irrigation Water Management Engineering or equivalent **OR** Masters or M. Tech. (Agri. Engg) degree in Irrigation and Drainage Engineering /Water Recourse Development and Management/Water Resources Engineering /Irrigation Water Management Engineering or equivalent having 1st Division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** *(for positions at Central Campus, Rahuri)* • Knowledge and/or experience in pressurized irrigation systems such as sprinkler, drip and its automation, moisture sensors, weather based irrigation scheduling system, IoT for water resources. • Knowledge and/or experience of developing/working with simulation models, decision support system; open source or commercially available software such as DSSAT, MIKE SHE/11, MODFLOW *(for positions at College of Agril., Pune)* • Knowledge and/or experience of different systems in controlled environment (polyhouse and shadenet house); climate and other controls, automatic operations of different systems in polyhouse/shadenet house.
Research Associate	Water Resources Engineering and Management	01	**Essential:** Ph.D. degree in Hydrology/Water Recourse Development and Management /Water Resources Engineering/ Irrigation and

			Drainage Engineering Irrigation /Water Management Engineering or equivalent **OR** Masters or M.E. or M. Tech. (Civil Engg./Agri. Engg) degree in Hydrology/Water Recourse Development and Management /Water Resources Engineering/ Irrigation and Drainage Engineering Irrigation /Water Management Engineering or equivalent having 1st Division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Knowledge and/or experience of application of remote sensing, GIS and IT in water resources development and management, canal water management and control, reservoir operation and canal automation, SCADA systems.
Research Associate	Soil and Water Conservation Engineering	01	**Essential:** Ph.D. degree in Soil and Water Conservation Engineering/ Soil and Water Engineering or equivalent **OR** Masters or M. Tech. (Agri. Engg.) degree in Soil and Water Conservation Engineering/ Soil and Water Engineering or equivalent having 1st Division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Knowledge and/or experience in river basin modeling such as AVSWAT, Water Erosion Prediction Project (WEPP), HEC-HMS, HEC-RAS models, erosion modelling.
Research Associate	Farm Machinery and Power Engineering	01	**Essential:** Ph.D. degree in Farm Machinery and Power Engineering or equivalent **OR** Masters or M. Tech. (Agri. Engg.) degree in Farm Machinery and Power Engineering or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years

			research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Knowledge/experience in design, development; and operation of precision farm machineries and implements, variable rate applicators, soil dynamics, soil and implement integrator, zero tillage, minimum tillage machineries, hands on experience on software like SOLID WORKS/CATIA/CREO
Research Associate	Mechanical Engineering	01	**Essential:** Ph.D. degree in Mechatronics/Machine Design or equivalent **OR** Masters or M. Tech. (Mech. Engg.) degree in Mechatronics/Machine Design or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Knowledge and/or experience in Robotics, drones, design of agricultural implements and machineries, CAD, CAM, CAE, Simulation and software like SOLID WORKS/CATIA/CREO
Research Associate	Agronomy	02	**Essential:** Ph.D. degree in Agronomy/Crop Science or equivalent **OR** M. Sc. (Agri.) degree in Agronomy/Crop Science or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** • Knowledge and /or experience of farm management, field experiments, experimental designs. • Knowledge and /or experience in rainfed agriculture, conservation agriculture, organic farming.

Research Associate	Horticulture	02	**Essential:** Ph.D. degree in Horticulture or equivalent **OR** M. Sc. (Agri.) degree in Horticulture or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** *(for positions at Central Campus, Rahuri)* • Knowledge and/or experience of weather related and water management aspects of vegetable and fruit crops. *(for positions at College of Agril., Pune)* • Experience and/or knowledge of polyhouse/shadenet house cultivation of vegetable and flowers.
Research Associate	Plant Protection	01	**Essential:** Ph.D. degree in Entomology/Plant Pathology or equivalent **OR** M. Sc. (Agri.) degree in Entomology/Plant Pathology or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge of development/use of whether parameters-pest/disease relationships, pest/disease forecasting
Research Associate	Agricultural Meteorology	02	**Essential:** Ph.D. degree in Agricultural Meteorology/ Meteorology or equivalent. **OR** M.Sc. (Agri.) degree in Agricultural Meteorology/Meteorology or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** • Experience and/or knowledge of handling

			of agro-meteorological instruments and maintenance, collection of data, organizational management, liaison with different organisations such as IMD, State Govt., Weather Service Providers, NGOs. • Knowledge of working with climate change models including GCM, RCM and down-scaling models, crop models, meta data analysis.
Research Associate	Bio Technology/ Plant Physiology	01	**Essential:** Ph.D. degree in Bio Technology/Plant Physiology or equivalent **OR** M. Sc. (Agri.) degree in Bio Technology/Plant Physiology or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge of plant physiological responses to environment and climate change such as rising atmospheric CO_2, temperature, light etc., understanding of the complex interactions between plants/crops and climate, plant growth chamber. Candidate from Plant Physiology background should have working knowledge of Biotechnological tools (molecular marker techniques)
Research Associate	Soil Science and Agril. Chemistry	01	**Essential:** Ph.D. degree in Soil Science and Agril. Chemistry/Soil Physics or equivalent **OR** M. Sc. (Agri.) degree in Soil Science and Agril. Chemistry/Soil Physics or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge of soil physics, soil and water analysis, climate-soil interactions, crop/plant response to soil nutrients, carbon sequestration

Research Associate	Extension Education and Communication	01	**Essential:** Ph.D. degree in Agril. Extension Education **OR** M. Sc. (Agri.) degree in Agril. Extension Education or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge of social sciences in the weather–climate enterprise, institutional aspects of agriculture systems, capacity building, report writing.
Research Associate	Social Science	01	**Essential:** Ph.D. degree in Social Welfare/Communication/Social Science or equivalent **OR** Masters, MSW or M. Sc. degree in Welfare/Communication/Social Science or equivalent or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge of social sciences in the weather–climate enterprise, institutional aspects of agriculture systems, capacity building, report writing.
Research Associate	Computer Applications	01	**Essential:** Ph.D. degree in Computer Science /Engineering /IT or equivalent **OR** Masters or M. Tech./M.E. /MCA degree in Computer Science /Engineering /IT or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** • Experience and/or knowledge in web based application design and development (languages such as HTML5, CSS, PHP,

			JAVASRIPT), knowledge and experience of languages such as C++, Fortran visual OR/AND
			• Experience and/or knowledge in mobile application design and development (iOS, android)
Research Associate	Geo-Informatics	01	**Essential:** Ph.D. degree in Geo-informatics/ Geo-Information Science or equivalent **OR** Masters or M.Sc./M. Tech./M.E. degree in Geo-informatics/ Geo-Information Science or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge technologies required for analyzing, distributing and visualizing geo-spatial data, image analysis, soft computing and artificial intelligence, meta data analysis in context of natural resources management.
Research Associate	Remote Sensing and GIS	01	**Essential:** Ph.D. degree in Remote Sensing and GIS Applications or equivalent **OR** Masters or M. Tech./M.E. degree in Remote Sensing and GIS Applications or equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge in application of RS/GIS techniques in agriculture, water resources, hydrology, weather, climate change
Research Associate	Electronics and Telecommunication	01	**Essential:** Ph.D. degree in Electronics/Electronics and Telecommunication/Instrumentations or equivalent **OR** Masters or M. Tech./M.E. degree in Electronics/Electronics and Telecommunication/Instrumentations or

			equivalent having 1st division or 60% marks or equivalent overall grade point average, with at least two years research experience, as evidenced from Fellowship/ Associate ship/ Training/other engagements. **Desirable:** Experience and/or knowledge in development and application of computer hardware, software and electronic instrumentation, control and communication systems in agriculture, water and climate sectors, IoT platforms, different sensors and communication between sensors and software.

Note: For all the posts stated above, the teaching or teaching assistantship/training experience is desirable.

Emoluments for Research Associate:

1. With Ph D: Rs. 40,000=00 per month consolidated +HRA as applicable
2. With Master's degree holder: Rs. 38,000=00 per month consolidated +HRA as applicable

Age limit:

The Upper age limit for Research Associate will be 40 years for men and 45 year for women.

Other terms and conditions:

1. The Research Associate will be under the administrative control of the concerned Co-Principle Investigator (Co-PI) and Principle Investigator (PI).
2. The successful candidate may get the appointment of Research Associate for a fixed duration. The engagement/appointment will stand terminated on the date stated in the appointment order or on completion of the tenure of the scheme whichever is earlier; whether so communicated formally on individual basis or not. The University (MPKV) or this project (CAAST-CSAWM) holds no responsibility for regularization/ appointment by absorption or otherwise against any regular post on termination of the project as it is purely temporary; time bound arrangement on contractual and co-terminus basis with the project.
3. The Research Associate shall have no legal right to claim his/her regularization/ appointment by absorption or otherwise against any regular posts or any further contractual engagement on termination of this CAAST-CSAWM Project. The engagement in the scheme is purely time-bound, non-regular and on co-terminus basis with the CAAST-CSAWM Project. The services of the incumbent shall stand terminated automatically on expiry of the project/appointment order whichever is earlier.
4. If any Research Associate leaves his/her assignment without permission for one month, he/she will stand terminated from the date of his/her absence

5. The appointment of Research Associate will be terminated at any time by issue of 24 hours notice if the Research Associate found to be negligent in his/her work or found guilty of gross negligence in his/her duties or of grave misconduct or of discipline.

6. Research Associate will not leave the project in the middle of his/her tenure. Further, however, if he/she intends to do so he/she has to give one month notice in writing in advance or remit the amount of one month's salary. Alternatively CAAST-CSAWM Project, MPKV can terminate the services of Research Associate by giving one month notice by citing no reasons thereof. Research Associate has not any right of claiming permanency benefit of the said post or such posts by virtue of this appointment.

7. While leaving the job, Research Associate has to hand over the complete charge to a person nominated by Principal Investigator and obtain No Objection Certificate from Principal Investigator.

8. Since Research Associate are engaged for the CAAST-CSAWM Project work full time, the Research Associate will not be allowed to do any other work or to accept or hold another appointment with or without remuneration elsewhere.

9. Research Associate will devote whole time to the assignment given and will not be allowed to accept or hold another appointment paid or otherwise during period.

10. Research Associates are full time workers and are required to adhere to the administrative, financial and disciplinary regulations of University/Institute where the incumbent is working. Regular attendance of the Research Associate may be ensured by the concerned Co-PI/PI by keeping an attendance register.

11. Research Associate will have to work any where in the jurisdiction of MPKV as and when need arises.

12. Research Associate has to perform all duties, responsibilities that will be assigned to him/her by the Principal Investigator/Co-Principal Investigator authorities as per the requirements of the project.

13. The research or any work done by the Research Associate will be property of the CAAST-CSAWM Project, Mahatma Phule Krishi Vidyapeeth and the Research Associate will have no control or right on the same.

14. The CAAST-CSAWM Project, MPKV, Rahuri will have the intellectual property rights/proprietary right on research outputs of the RA made during the period of working in the CAAST-CSAWM Project. However, in case the RA has done some research work, his/her name can accordingly be acknowledged/included appropriately in the research paper(s) as solely decided by the PI. No right in this regard can be claimed.

15. The Research Associate may be deputed by the PI to attend symposia/seminars/conferences/workshop/training etc., in India.

16. The Research Associate shall settle their claims within one month and in no case after the final settlement of the accounts of the scheme.

17. The Research Associate should execute the bond on bond paper if Rs. 100/- stating the terms and conditions are acceptable to him/her and will abide by the same as per the format provided from time to time.

The candidates should apply giving full details as per the enclosed prescribed format **(Application From for Requirement of Research Associates under CAAST-CSAWM)** to the Recruitment Officer, CAAST-CSAWM, Department of Irrigation and Drainage Engineering, Dr. A. S. College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri-413 722 (MS), Dist. Ahmednagar on or before 08.10.2018 by using the means stated in the beginning of this Notification.

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Recruitment Officer
CAAST-CSAWM
Dept. of Irrigation and Drainage Engineering
Dr. A. S. College of Agril. Engg. and Technology
MPKV, Rahuri

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Copy submitted with respects for favour of information to (to be sent by an email):
1) Finance and Account Officer, PIU-NAHEP, Krishi Anusandhan Bhawan-II, Pusa, New Delhi 110 012
2) National Director and Dy. Director General (Agril. Education), ICAR, Krishi Anusandhan Bhawan-II, Pusa, New Delhi 110 012
3) Under Secretary, NAHEP, ICAR, Krishi Anusandhan Bhawan-II, Pusa, New Delhi 110 012
4) National Coordinator, M&E, NAHEP, ICAR, Krishi Anusandhan Bhawan-II, Pusa, New Delhi 110 012
5) National Coordinator (CAAST), NAHEP, ICAR, Krishi Anusandhan Bhawan-II, Pusa, New Delhi 110 012
6) The Director General, MCAER, 13218, Bhosalenagar, Bhamburda, Pune-411007
7) Various SAUs/ICAR Institutes/Engineering and Social Science Colleges in India
8) The Dean, F/Agri. and Director of Instruction, MPKV/Dr.PDKV/Dr.BSKKV/VNMKV
9) The Director of Research, MPKV/Dr.PDKV/Dr.BSKKV/VNMKV
10) The Director of Extension Education, MPKV/Dr.PDKV/Dr.BSKKV/VNMKV
11) The Associate Deans (All),
12) The Associate Director of Research, (NARP) (All)
13) The Specialists (All)
14) The Heads of Departments (All), MPKV, Rahuri
15) The Planning Officer, MPKV, Rahuri
16) The Comptroller, MPKV, Rahuri
17) The Deputy Registrar (Admn.) MPKV, Rahuri
18) The Asstt. Registrar, (Admn.) MPKV, Rahuri
19) The PA to Hon'ble Vice-Chancellor, MPKV, Rahuri
Copy f.w.c.s. for information to:
1) Associate Dean, CAE & T, Dr. PDKV, Akola / VMKV, Parbhani / Dr. BSKKV, Dapoli.
2) Head, Dept. of Horticulture/Agronomy/SWCE/IDE/FMPE/Agril. Entomology/Plant Pathology/Agril. Botany/Bio Technology/Agro-meteorology, MPKY, Rahuri/Dr. PDKV, Akola/VNMKV, Parbhani/Dr. BSKKV, Dapoli
        2/- It is requested to give wide publicity to this notification.

3) In-charge ARIS Cell, MPKV, Rahuri.
        2/- It is requested to upload this notification on University web site for wide publicity.

MAHATMA PHULE KRISHI VIDYAPEETH
CAAST (Centre for Advance Agriculture Science and Technology) Project on
"Climate Smart Agriculture and Water Management"
Department of Irrigation and Drainage Engineering
Dr. A. S. College of Agricultural Engineering and Technology
Rahuri-413 722, Dist-Ahmednagar

Application Form for Requirement of Research Associate

1	Post applied for						
2	**Full Name (in Block letters)**						Photo
3	**Father's /Husband Name**						
4	**Gender**	Male/Female					
5	**Date of Birth**						
6	**Age as on 08.10.2018**						
7	**Marital Status**						
8	**Mobile Number**						
9	**E-mail Address**						
10	**Correspondence Address (with pin code)**						
11	**Permanent Address**						
12	**Whether belongs to SC/ST/OBC/General**						
13	**Subject specialization**						

14	Sr. No.	Name of degree	Board/ University	Year of passing	Duration of Course (in year)	Max. Marks	Marks Obtained	Marks/ Percentage OGPA
	1.	**10th Class equivalent**						
	2.	**10+2/ Higher Secondary equivalent**						
	3.	**Bachelor's Degree**						
	4.	**Master's Degree**						
	5.	**Ph. D.**						

	6.	**Others (Specify)**					

15	**Are you NET Qualified?**	**Yes/No**
		If yes, which of the following. (✓)

1. ASRB- NET
2. CSIR-NET
3. UGC-NET
4. MHRD-GATE
5. DBT-Biotechnology Eligibility Test 7 Test Conducted in Bioinformatics by Bioinformatics National Consortium
6. ICMR-JRF Entrance Exam
7. ICAR JRF Entrance Exam
8. Dop – GPAT
9. **DAE-JEST & JGEEBILS, NBHM**

16 Work experience (certificates to be provided):

Sr. No	Designation	Name of employer	Period		No. of years and month
			From	To	
1.					
2.					
3.					

17 Publications (Number only and attached the list separately; and provide the copies of full length papers):

1. **Published papers in Journals:**
2. **Chapters published in Book:**
3. **Books published:**

18	**Present employment details**	
19	**Additional Information, If any**	

The information given above my me are true to the best of my knowledge and belief. If any information is being found false, my candidature/Services, if selected, may be terminated without any notice.

Date: / /   **Signature of Applicant**

Roles and Responsibilities of Research Associates

1. Centre for Advance Agriculture Science and Technology Project on "Climate Smart Agriculture and Water Management" (CAAST-CSAWM) which is the World Bank-ICAR aided project under "National Agricultural Higher Education Programme" (NAHEP) is multidisciplinary (different disciplines of agricultural sciences, agricultural engineering, engineering; and social sciences) and multi-activities (education, research, training and organization) programme. The Research Associates need to co-ordinate with the disciplines other than his/her own to develop and adopt the integrated solutions of different activities.

2. CAAST-CSAWM involves the collaboration and co-ordination with many National and International Organizations and Institutes. The Research Associates are expected to continue and sustain the co-ordination with these organisations.

3. Research Associates need to assist in teaching in their own disciplines but in context of climate change agriculture and water management; perform the duties of demonstration; assist the students registered on the programme for their on and off station case studies and projects.

4. Research Associates also need to assist in different research activities of CAAST-CSAWM; and are expected to develop and implement the research programmes leading to the expected outputs of the project and take those to logical end under the guidance and supervision of the CAAST-CSAWM faculties, the faculties, scientists and experts from the collaborating organisations and institutes.

5. The Research Associates need to produce different teaching aids including audiovisuals, print, internet and web based materials required for the CAAST-CSAWM Programmes.

6. The Research Associates are expected to write and publish the research reports, popular articles, bulletins, research papers in high impact journals, training manual... under the supervision and guidance of the CAAST-CSAWM faculties, the faculties, scientists and experts from the collaborating organisations and institutes

7. The Research Associates are expected to participate in different outreach programmes of the CAAST-CSAWM.

8. Several workshops, brainstorming sessions and meetings including by video conferencing will be organized in CAAST-CSAWM; and the Research Associates need to participate in the organization of these events.

9. Several advanced and hi-tech instruments will be acquired in the CAAST-CSAWM and the Research Associates need to participate in the procurement of these instruments and also should have the attitude and aptitude to use these instruments for the outputs and outcomes to be achieved in CAAST-CSAWM.

10. CAAST-CSAWM involves intensive education and academic activities involving students, faculties, experts, guest faculties etc; and the Research Associates need to maintain the track record of all the activities related to his/her disciplines.

11. CAAST-CSAWM is the platform on which the state of art education, research and dissemination technologies will be developed and used; and the selected Research Associates will be working in friendly multidisciplinary environment and they need to be proactive, friendly, enthusiastic, dynamic, positive attitude, techno-savvy.

12. The selected Research Associates need to follow the terms and conditions stated in this Notification.

CAAST (Centre for Advance Agriculture Science and Technology) Project on
"Climate Smart Agriculture and Water Management" (CSAWM)
Mahatma Phule Krishi Vidyapeeth, Rahuri

About the Project

India ranks second worldwide in farm output, but has very low agricultural productivity. Currently in spite of the great efforts put forth for improving the productivity of rice and wheat, India ranks 13 and 14 in the world. India ranks still lower for productivity of other food commodities. If we enhance our productivity, we can produce more, save land and water resources and improve the soil health by appropriate use of chemicals. As an example, we could produce 2.5 times what we currently do, if we were to produce wheat at the rate at which New Zealand does. Similarly if we produce rice at Chinese levels, we could halve the amount of land devoted to rice cultivation making available the land for other purposes. Thus productivity needs to be increased to enable the farmers get more remuneration with less resources, maybe it is land, water, labour, fertilizers, chemicals. On 28th February, 2016 while talking at the Farmers' rally in Uttar Pradesh, the Prime Minister stated that it is his dream to see farmers double their income by 2022 when India completes 75 years of its independence. Thus the goal of the Agriculture University scientists/teachers need to be to produce the technology and competent human resources for enabling the farmers to adopt the technology for doubling the farm income in the realm of climate change and climate variability. Precise use and application of inputs considering the principles of climate smart agriculture can provide a way to do it. Precision agriculture is the technique of the site specific management of crops taking in to account in-field variability by using GIS, GPS and Remote Sensing technologies to produce and manage climate, soil and crop variability in order to optimize the use of water, fertilizers and chemicals in agriculture

There is growing concerns about climate change and variability and their adverse impact on different sectors of development including agriculture and water. Hence while enhancing the productivity of agriculture and efficiency of water use, it is necessary that increase in agricultural productivity, water use efficiency and farm income is on sustainable basis and without having an adverse impact on the environment. At the same time, it is necessary to reduce the exposure of farmers to short-term risks, while also strengthening their resilience to adapt to longer-term stresses; and whenever possible, help farmers to reduce greenhouse gas emissions. Climate smart agriculture offers solution to this. FAO defined climate smart agriculture as "agriculture that sustainably increases productivity, enhances resilience (adaptation), reduces/removes greenhouse gas emissions (mitigation) wherever possible, and enhances achievement of national food security and development goals"

The current perception of scientists, extension workers and farmers respectively for developing, disseminating and adopting the generic practices need to be changed if the limited available natural resources such as land and water need to be utilized efficiently and optimally and the inputs such as fertilizers and chemicals are to be used efficiently so as to

make farming more remunerative, environmental friendly and less polluted. Hence the focus needs to be changed from generic to specific, meaning specific to crop, soil, weather, different systems and finally to farm. The IT technologies coupled with remote sensing, including satellite, GIS, GPS, SDSS enable to connect the aspects of precision agriculture, water management, climate smart agriculture; facilitate the intricacies associated with offering solutions to providing farm specific precision technologies in real time considering the climate variability and climate change; and provide the means for dissemination and adoption.

Currently globally the agriculture and water management are moving towards precision, climate smart, specific and in real time; and many multinationals are showing interest in India. Few Indian companies have also started the thought process. Under such circumstances it is necessary to develop the human resources in India by equipping them with the technologies and tools that suit to Indian agriculture and water sectors. Thus there is a need of both developing the technologies and human resources.

The Climate Smart Agriculture and Water Management (CSAWM) is the science of adapting and building resilience of agricultural and food security systems to climate change through smart agricultural and water management practices for reducing greenhouse gas emissions from agriculture (including crops, livestock and fisheries). More productive and more resilient agriculture requires a major shift in the way land and water are managed to ensure that these resources are used more efficiently and precisely. Cultural, environmental, social, institutional, political and governance factors affect the adaptation and mitigation processes in agriculture. It is important to identify suitable practices, methods and technologies to transform the larger scale agriculture in to the climate smart precision agriculture with smart water management.

With these views, the project CAAST (Centre for Advance Agriculture Science and Technology) Project on "Climate Smart Agriculture and Water Management" (CSAWM) is being implemented in Mahatma Phule Krishi Vidyapeeth, Rahuri under World Bank-ICAR 'National Agricultural Higher Education Programme"

Rational of the CSAWM

- Growing pressure on the natural resources such as land and water; and in turn the need of their precise use and application, precise use of fertilizers and chemicals to enhance the productivity, improve soil health and reduce pollution

- Precision farming technologies developed in US and European countries may not be applicable for the Indian agro-eco system.

- Address the challenges faced by climate change and variability

- Necessity to develop the tools and methodologies such as SDSS and real time advisories for making precision agriculture and water management smart by employing geo informatics.

- It is expected that this sector which is currently in infant stage in India will expand geometrically to keep pace with the fulfilling the goal of doubling farm income by 2022.

- This is the importunate time that we develop the human resources that have expertise and competence to start the entrepreneurship and meet the requirement of the industries in precision and climate smart agriculture and water management.

Objectives of the Project

- To develop the capacity amongst the faculties and scientists for the development and adoption of the precise Climate Smart Agriculture and Water Management technologies.

- To start the one year Post Graduate Diploma in "Climate Smart Agriculture and Water Management" for developing the human resources enabling them to start entrepreneurship and employable in public sectors and private industries, strengthen the current M.Sc., M. Tech. and Ph. D. programme (for their research projects); and make provision for the perspective beginner/middle level faculties/researchers for Post Doctorate studies in precision water management, precise climate smart agriculture and Geo-informatics..

- To develop an integrated system including RS/GIS and GPS tools, modelling and SDSS tools using unmanned aerial system (UAS aka. drone) and sensor based technologies; and mobile applications and their applications for climate smart and precision agriculture and water management.

- To conduct end-to-end capacity building through on-the-job training and case study based learning; enhance the employment and placement rate; and business and entrepreneurship opportunities.

Linkages established

International
- Washington State University, Pullman, WA, USA
- Mississippi State University, Starkville, MS, USA
- Asian Institute of Technology, Bangkok, Thailand
- International Water Management Institutes (IWMI), Colombo, Sri Lanka
- Michigan State University, USA (proposed; they have shown interest)

National
- Indian Institute of Remote Sensing (IIRS), Dehradun
- National Institute of Abiotic Stress Management (NIASM), Malegaon (Kh), Baramati
- Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad
- National Bureau of Soil Science and Land Use Planning (NBSS and LUP), Nagpur
- Indian Meteorological Department (IMD), Pune
- Maharashtra Remote Sensing Application Centre (MRSAC), Nagpur
- Water and Land Management Institute, Aurangabad

Industries
- AECOM, USA based multinational (industry partner)
- KisanHub, St John's Innovation Centre, Cambridge, United Kingdom.
- Climate Change Agriculture and Food Security, CCAFS (CGAIR Organization)
- Sayadri –Agro, Nashik
- Netafim Irrigation, Pune
- Jain Irrigation Systems Limited, Jalgaon
- Innosapien Agro. Technologies Pvt. Ltd.
- Quantela, Banglore

NGOs
- WOTR
- BAIF
- GRASP, Aurangabad

Achievable Expected Outcome

- The competent human resources created ready for generation, adoption and dissemination of tools and technologies for Climate Smart Precision Agriculture and Water Management
- Improved competence amongst the faculties on precision agriculture and water management, climate smart agriculture and Geo-informatics (by way of change in attitude and knowledge) through faculty up-gradation programmes by way of international and national trainings
- Enhanced employment opportunities of the students in industries
- The entrepreneurship and consulting opportunities for the students in the sectors of Geo-informatics, precision agriculture and water management and climate smart agriculture
- International alliance and exposure and thereby enhancing the diversified environment in the University
- Enhanced collaboration with private industries
- Development of the tools and technologies
- Enhanced production and productivity of agricultural commodity