



J-WAFS
Abdul Latif Jameel
Water & Food Systems Lab

J-WAFS Water and Food Seed Grants 2019 Request for Proposals

1. About J-WAFS and this request for proposals

Population growth, climate change, urbanization, and development are bringing unprecedented challenges to the world's diverse needs for water and food. The Abdul Latif Jameel Water and Food Systems Lab, J-WAFS, was established in 2014 as an Institute-wide effort to bring MIT's unique strengths to bear on these problems. J-WAFS is seeking proposals from MIT PIs for innovative research that has the potential to have significant impact on issues and challenges related to the world's water and food supply. Proposals are sought from all parts of MIT.

J-WAFS funds a diverse portfolio of research relevant to water and food—spanning fundamental science, engineering and technology, supply chains, big data, business models, development efforts, economics, urban design and infrastructure, and more—through seed grants and other funding mechanisms. As we continue to grow J-WAFS' impact, we invite proposals for projects that can effect meaningful, perhaps even measurable, changes on the world at large.

Water and food issues are vast, and responses to many specific challenges require considerations that go beyond a single discipline. Further, problems of water and food take different forms in different parts of the world, and many solutions call for a regional focus addressing specific contextual considerations, whether geographic, economic, social, or other. Thus, interdisciplinary proposals and proposals with international reach or a specific geographic focus are welcome.

2. General information for proposers

J-WAFS anticipates funding six to seven projects with seed grants of up to \$75,000 per year for one to two years, free of overhead charges. We are open to eligible proposals that further the overall J-WAFS mission, from all MIT schools and departments.

3. Timing

November 19, 2018: J-WAFS RFP announced

December 10, 2018: J-WAFS Survey Monkey Apply website open for submissions

5 pm, Wednesday, January 16, 2019: Proposals due

Spring, 2019: Announcement of funded projects

September 1, 2019: Start of funded projects

4. Funding and Eligibility

The Principal Investigator submitting the proposal may be an MIT professor or a member of the research staff with principal investigator privileges (generally senior or principal research scientist, or senior or principal engineer¹). The lead PI will have full responsibility for conducting and reporting on the research supported by the grant. Applicants may participate in up to two proposals.

Proposals in all areas related to water and food security are eligible for funding. While this RFP has no designated priority areas, areas of interest are detailed in the next section. Proposals should be for new, innovative projects that are sufficiently distinct from prior research. Requests for funding to supplement existing sponsored research, or for course or curriculum development, will not be considered.

Seed grant funding is available up to a maximum of \$75,000 per year for two years. We are looking for innovative early-stage projects that can benefit from one to two years of funding in order to: (1) establish proof of concept or gather critical data that will position the project to qualify for other future sources of funding; or (2) have a clear and significant outcome without subsequent awards. Projects that are intended to have real-world impact are favored. Multidisciplinary projects and projects that have well defined regional or international reach are also invited. New collaborations including team members in different schools of MIT are encouraged, as are proposals from junior faculty. Relevant interactions with industry are also encouraged.

Proposals that are primarily for equipment purchase will not be considered; equipment should be limited to no more than 20% of the total budget. Equipment purchases are expected to directly support the proposed research and should occur early in the project.

5. Areas of Interest

J-WAFS is interested in supporting all areas related to the world's water and food systems. The topics detailed below are examples of some of the most significant water and food challenges that seem to align with MIT strengths, and these examples provide an indication of the variety of research topics that J-WAFS is interested in funding. However, proposals in other areas related to water and food not explicitly detailed

¹ If you are an eligible PI (as above) and did not receive this RFP directly from J-WAFS, please send your contact information to arsutton@mit.edu to be included on the distribution list for future RFPs.

below will also be considered. We are open to research relevant to both developed and developing countries.

1. Water

- **Technologies:** particularly purification, disinfection, wastewater reuse, and desalination, including energy efficiency, environmental protection, and novel processes, in municipal, industrial, and agriculture sectors
- **Sensors and data analytics:** Sensors for contaminants in recycled water, sensors for contaminants in water generally, low-cost sensors for the developing world, and data analytics for water distribution networks.
- **“Contaminants of Emerging Concern” (CECs)** in water
- **Solutions for rural communities’ water needs:** globally, but also for Native American and other impoverished communities in the US.
- **Pricing strategies and other economic and policy incentives** to reduce water consumption and promote overall water conservation

2. Food Science and Safety

- **Food science/biotechnology:** biotechnology for improved nutrition and crop productivity
- **Food safety:** science, technologies, or policy to improve food safety and contaminant detection

3. Food Waste

- **Technologies:** particularly to improve food storage, transport, preservation, and loss reduction, as well as technologies to improve market access for small and medium-scale producers in developing countries.
- **Business innovations and processes** to support waste reduction across the supply chain, including for smallholder farmers, food processors, distributors, and consumers.

4. Agriculture/Crop Productivity

- **Soil quality** including soil sampling and monitoring, soil chemistry, nitrogen cycling, and solutions to restore and build agricultural soil;
- **Fertilization:** improvements or alternatives for fertilizer and fertilizer application; reduction of environmental impacts of fertilizer and pesticide use.
- **Technological and business innovations**, especially for smallholder farmers.
- **Sensors and data analytics:** sensors for soil health, data analytics to improve agricultural productivity or reduce greenhouse gas emissions from farming activities; precision agriculture.
- **Climate/agriculture nexus:** Characterizing greenhouse gas emissions from agriculture; ways to mitigate the agriculture sector’s impact on climate; science, technologies, policies, or locally

- adaptive practices for agriculture that address the need for climate change adaptation and resilience, including genetic engineering and other biotechnologies.
- **Solutions for rural communities' food needs:** globally, but also for Native American and other impoverished communities in the US.

5. Other challenges or strategies generally related to water supply and water quality, agriculture, food supply, and food safety.

Please note: Proposals that indicate policy guidance as a primary outcome should identify specific decision makers who are able to act upon it and should include a well-defined timeline and process by which this guidance will be discussed with them. (Also see below for info on IPL.)

6. J-WAFS Solutions

The J-WAFS Solutions program, managed through the MIT Deshpande Center for Technological Innovation, aims to help MIT faculty and students commercialize breakthrough technologies and inventions by transforming promising ideas at MIT into innovative products and cutting-edge spinout companies. J-WAFS Solutions has the mission of moving water and food technologies from labs at MIT into the commercial world, where they will improve the productivity, accessibility, and sustainability of the world's water and food systems.

The J-WAFS Solutions request for proposals will be issued in late winter, 2019. *If your project involves technology near the commercialization stage, please consider whether a Solutions grant may be more appropriate than seed funding. Inquiries may be directed as indicated below.*

7. Additional related resource and funding opportunities:

Opportunities for support for project specific to food/water systems challenges in India: J-WAFS-funded projects that are focused on food and/or water systems challenges in India may be able to collaborate with or receive support from the Indian Institute of Technology Ropar (IIT-Ropar). IIT-Ropar's resources include experimental fields, research expertise, and potential funding for collaborators and travel. Please refer to the supplemental information in the addendum for more detail.

Research that could benefit from operational weather, satellite, and ground data that is targeted at agricultural growing regions, or research related to water use in the US corn belt: TellusLabs, a local startup, is interested in partnerships with MIT researchers around their API and web-app. Please refer to the supplemental information in the addendum for more detail.

The MIT International Policy Lab (IPL) helps MIT scholars identify the policy relevance of their research and design outreach strategies to policy audiences (including domestic policy audiences). Some prior J-WAFS funded projects have benefitted from IPL support. Please refer to the [IPL website](#) for the current call for proposals, due in December.

J-WAFS is partnering with the *Abdul Latif Jameel Poverty Action Lab (J-PAL)* at MIT and is interested in proposals for projects with the potential for joint funding. J-PAL is a leader in impact evaluation, with a global network of researchers who use randomized evaluations to assess the effectiveness of programs and policies that aim to reduce poverty. Please refer to the supplemental information in the addendum to this request for proposals for more detail.

8. Proposal process

8.1. Application instructions

Proposals should be submitted on line through J-WAFS' web-based proposal portal, j-wafs.smapply.io. The portal will be active as of December 11, 2018. Applications must be completed by the deadline, 5 pm on Thursday, January 17. Instructions for the proposal are below, and templates and forms will be provided on the website. OSP review is not required and the “five-day rule” does not apply.

8.2. Submission checklist

1. Cover sheet (webform on application site)
2. Single PDF with file name “PIlastname-JWAFS2019.pdf”, containing:
 - Reviewer abstract (using template)
 - Proposal narrative (see below)
3. Budget (**Excel** document using template provided – NOT pdf)

8.3. Abstract

Please use the general format provided in the reviewer abstract template, which includes a “Confidential—Do not distribute” watermark. Abstracts should be limited to one page in length, and should follow the general format provided in the template. Successful applicants will have an opportunity to replace the reviewer abstract with a public version before this abstract is made available on the J-WAFS website.

8.4. Proposal narrative

The narrative should be single-spaced, 11 point font with 1” margins and numbered pages, and it should include the sections described below. *Sections 1-5 should together be no longer than five pages exclusive of graphs and tables.* Longer narratives may be returned to the PI for revision.

1. **Statement of purpose** – explicitly address background/problem being addressed; relevance to water

and/or food and significance of the proposed work; prior work and relevant preliminary results; innovative aspects of proposed work; objectives including expected follow-on research.

2. **Technical section** – describe research approach/methods; tasks and research timeline, including milestones or deliverables; and metrics for evaluating success. Proposals that indicate policy guidance as a primary outcome should identify decision makers who are able to act upon it, and include a well-defined timeline and process by which this guidance will be conveyed to them.
3. **Post-funding potential** – describe potential future research and funding, technology deployment, scale-up, etc., that will be enabled by the work supported by J-WAFS. Please be as specific as possible when discussing potential future funding sources. Alternatively, if the funded work will have an impact without subsequent awards, please clearly describe this. If you checked the box indicating interest in J-PAL or IIT-Ropar funding, please describe the potential for concurrent or follow-on work through those collaborations. If you have submitted or plan to submit a proposal to other MIT funding sources as indicated on the cover sheet form, please describe the status of any such proposals.
4. **Research team** – identify by name the members of the research team with a brief summary of research responsibilities and/or roles. Include names of RAs and post-docs if known. If applicable, describe any partnerships external to MIT (and include letters of support in the appendix). If you checked the box on the cover sheet form indicating interest in IIT-Ropar collaboration, please describe their potential role on the project and status of these plans.
5. **Cost narrative** – brief explanation of each line item in the budget.
6. **Appendices** –
 - A. Technical appendix (graphs and tables);
 - B. References;
 - C. CVs (*no more than two pages each*, for PI and other senior personnel);
 - D. List of acronyms if needed;
 - E. [NSF Form 1239](#) showing a complete list of existing and pending support. *Pending support must include any other MIT programs that you have submitted or plan to submit a proposal to, such as MITEI, Tata, etc.*
 - F. Letters supporting collaborative efforts if appropriate.

8.5. Budget

Seed grants are available up to a maximum of \$75,000 per year for two years. There is no F&A or fund fee. Graduate student RAs supported on the grant will receive the normal 50% Institute tuition match. Other personnel should have appropriate salary, EB, and vacation covered. PI salaries for the project should be limited to a maximum one month of summer salary for faculty. Equipment is limited to 20% of total budget. Other acceptable budget items include staff researchers or post-docs, technicians, M&S and other research

expenses, and justifiable travel for MIT personnel or for outside collaborators. *No sub-awards or pass-throughs are allowed*; this funding is intended to support MIT research.

Budgets should be submitted as an Excel document using the J-WAFS budget template. The J-WAFS budget template along with instructions will be available via the web-based application portal. Budgets do not need to be submitted in Kuala.

9. Evaluation Process and Review Criteria

The review process will evaluate and consider the following:

- Relevance to J-WAFS mission
- Technical merit and potential impact of research
- Innovativeness and differentiation from currently funded or past research
- Qualifications of research team for the work proposed
- Translational potential for future research funding or technology development/deployment

Following review, J-WAFS may request additional information or proposal modifications before final funding decisions are made. Requested modifications may include adjustments to the budget, schedule, tasks, or deliverables. Communications about any requested revisions will be directed to the lead PI.

10. If Your Project is Funded

10.1. Reporting

J-WAFS will assess the success of funded projects in meeting the stated objectives. Each funded project will be required to submit mid-year and year-end reports that detail project activities and research outcomes during each year of funding. Reports should also identify students supported by the grant, and dissertations, papers, or presentations arising from the work supported by the grant. The executive summary section of the report will be made public. Reporting formats and specific contents will be provided approximately six weeks before their due date.

10.2. Publications/Statement of support

All publications arising from work supported by J-WAFS funding should acknowledge support from “The Abdul Latif Jameel Water and Food Systems Lab at the Massachusetts Institute of Technology.” Publications arising from the funded work should be sent to Andi Sutton, J-WAFS’ communications and program manager, J-WAFS (arsutton@mit.edu).

10.3. J-WAFS Research Workshop

J-WAFS research workshops, held up to twice yearly, provide the opportunity for funded PIs to present to one another on their research aims and progress. These workshops will be by invitation and generally limited to the MIT community in order to protect prepublication research results. PIs are expected to attend, and students and other lab members are welcome.

10.4. Financial auditing

All funded projects will be subject to financial auditing, including requests for documentation of salaries and any expense listed on the account. The PI is responsible for reviewing salaries charged to projects, and for validating and certifying percentages of salary charged to a project. Salaries for personnel or stipends for students on the project should be charged over the course of the project and not all at once at the end. No equipment expenditures will be allowed during the final six months of the funding period. J-WAFS actively monitors all project accounts.

10.5. Changes to ongoing projects

Any change in the budget, work plan, deliverables, personnel, and requests for no-cost extensions should be directed in a timely manner to Renee Robins, rrobins@mit.edu for consideration. In general, however, projects will be expected to conclude on scope, on time, and on budget. Unapproved cost overruns will be the responsibility of the PI(s) to cover. Unexpended funds will be returned to J-WAFS unless a no-cost extension is approved.

11. Inquiries

Please direct general questions to:

Andi Sutton, Communications and Program Manager, J-WAFS
arsutton@mit.edu

Please direct budget or financial questions to:

Jasmine Edo, Financial and Project Coordinator, J-WAFS
jedo@mit.edu



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Addendum: Related Collaboration and Funding Opportunities

J-WAFS has identified some opportunities, within and external to MIT, for augmenting our seed grants through additional financial and non-financial resources that could be beneficial to some proposals we may fund. These are explained here, and the cover form for your proposal will ask you to designate interest you may have in pursuing either of these. Discussion with J-PAL or IIT-Ropar in advance of submitting your proposal to J-WAFS would be beneficial but is not required unless your proposed research depends on the additional resources they may provide.

Co-funding by the Abdul Latif Jameel Poverty Action Lab for an associated evaluation of the impact of programs and policies

About J-PAL

Founded in the MIT Economics Department in 2003, J-PAL is a network of over [140 economists](#) based at top universities (including 10 MIT professors) who specialize in measuring the impact of programs and policies using randomized controlled trials. J-PAL partners directly with governments, NGOs, and businesses to conduct evaluations in both developed and developing countries. Examples of past work by J-PAL affiliates in water and food include evaluations of:

- An innovative financing scheme for a [rainwater harvesting technology](#) in Kenya that improved dairy farmers' milk production, reduced time spent collecting water, and increased girls' school enrollment. *(Research by Tavneet Suri, Michael Kremer, Joost De Laat, and William Jack)*
- A [flood-tolerant rice variety](#) in India that increased farmers' yields in both flood and non-flood years. The use of this rice variety is currently being scaled up in flood-prone parts of India. *(Research by Alain de Janvry, Elisabeth Sadoulet, Manzoor Dar, and Kyle Emerick)*

Partnering with J-PAL to develop an evaluation

A collaboration between J-WAFS and J-PAL could support the development, evaluation, and potentially the scale-up of a technology, program, or policy targeting the water, food, or agriculture sectors, particularly if they are intended to benefit low-income households, small holder farmers, etc. If you are interested in being jointly supported by J-WAFS and J-PAL in order to conduct research that will include an impact evaluation, please check the box indicating this interest on your proposal cover sheet. In order to support the development of an evaluation component of a project, J-PAL can provide the

following assistance to researchers applying to the J-WAFS 2017 seed fund RFP as they prepare their proposals:

- J-PAL staff can help applicants determine if and how a randomized evaluation could potentially be integrated into the proposed research. This conversation can happen as early as the proposal development stage, through the submission of the proposal.
- If a randomized evaluation is feasible and desirable, J-PAL staff can connect J-WAFS applicants to J-PAL-affiliated researchers who may be interested in evaluating their technology, program, or policy.
- If a J-WAFS applicant partners with a J-PAL-affiliated researcher, funding for the randomized evaluation component of his/her technology or policy may be available from one of J-PAL's many research initiatives that fund randomized evaluations through competitive RFPs. Several initiatives could be a good fit for J-WAFS-funded projects, including J-PAL's Agricultural Technology Adoption Initiative ([ATAI](#)), Urban Services Initiative ([USI](#)), and Government Partnership Initiative ([GPI](#)).
- J-PAL's existing ties to governments, NGOs, and other implementers through their network of researchers and six regional offices could help J-WAFS applicants identify implementing partners for their technology, program, or policy, although affiliates and offices are also typically open to conducting an evaluation with an existing partner of a J-WAFS applicant.

Review and funding of J-WAFS/J-PAL collaboration proposals

J-WAFS and J-PAL have distinct sources of funding, proposal processes and timelines, and review committees. In the interest of stimulating and supporting collaborations that will be jointly funded, the programs will work to align the timing of their respective review processes and decisions to the extent possible. Proposals to each program should be developed making use of the support described above, and submitted jointly to the two program offices according to each program's instructions.

For the purpose of this call for proposals, please submit budgets for J-WAFS funding, with an indication of the amount to be sought for funding from J-PAL and corresponding work to be proposed. While the J-WAFS proposals should be submitted to J-WAFS by the due date for this call for proposals, the review timeline may be extended in order to accommodate J-PAL review of the evaluation component. Proposals dependent on a J-PAL evaluation will only be funded if they are approved by both programs.

Potential areas of interest for joint J-WAFS/J-PAL funding

Pricing and behavioral interventions aimed at water conservation: Recognizing the importance of piloting and measuring the impact of potential solutions before they are widely scaled up,

Water technologies aimed at addressing needs of low-income communities that are low-cost and scalable (purification, contamination, sanitation, etc): low-cost filters and desalination technologies,

sanitation technologies to protect local water supplies, monitoring technologies to prioritize purification and decontamination needs, etc.

Technologies, programs, economic incentives, and policies to improve economic outcomes for smallholder farmers: including irrigation, fertilizer, other policies to improve crop productivity, technologies to improve access to markets, resilience to drought/flood, etc.

For questions or if you are interested in learning more about J-PAL evaluations before submitting the proposal, **please contact Rebecca Toole** (rtoole@povertyactionlab.org) from J-PAL's Environment & Energy sector team.

Collaborations with the Indian Institute of Technology Ropar

J-WAFS has recently explored an institutional collaboration between MIT and the Indian Institute of Technology Ropar (IIT-Ropar) to support projects that address water and/or food system challenges in India. Applicants interested in pursuing research with a regional focus on India may be able to receive additional research support from this partner institution. This addendum provides general information about about IIT Ropar and opportunities for collaboration that could emerge. If you are proposing a project with a regional focus on India and are interested in finding out more, contact Renee Robins (rrobins@mit.edu) to receive a more detailed discussion of additional resources that could be available.

About IIT-Ropar

IIT-Ropar is one of eight new technological research universities set up by the Ministry of Human Resource Development (MHRD) of the government of India in order to expand the reach and enhance the quality of technical education in the country. IIT-Ropar, located in Punjab, a major agricultural region of India, has five engineering departments and five science departments. They are aiming to have 260 faculty members by AY20, and have been at MIT recently for faculty recruitment. While organized in traditional science and engineering departments, IIT-Ropar has made serious efforts to align its R&D focus with the intent of making a positive impact on the world, including research on water, agriculture, and environmental challenges. They are actively developing international collaborations including bilateral research projects, joint research centers, and faculty/student exchange. Professor Sarit K. Das, director of IIT-Ropar, has previously been a visiting professor at MIT. For more information, visit <http://www.iitrpr.ac.in/>.

Potential areas of mutual interest

Water resources assessment and development, particularly aimed at farmers of Punjab. This predominantly agricultural region is largely dependent upon groundwater for its irrigation, municipal, and industrial water needs, and faces problems of declining water table, droughts, and deteriorating groundwater quality. Some specific interests include understanding recharge mechanisms, identification

of groundwater pollution sources, water conservation, drought management, and hydrologic aspects of climate change.

Desalination and water purification technology using solar energy, including theoretical studies and experiments to evaluate performance. This might encompass brackish or otherwise impaired water sources.

Agriculture, soil health management, and food processing, including alternative fuel production using agricultural waste biomass, use of agricultural waste materials in water filters, and alternatives to crop residue burning, and strategies to preserve crops produced locally by small-holder farmers.

Use of IIT-Ropar and environs as a test-bed for research, given its location in a major agricultural region of India.

Review and funding of J-WAFS/IIT-Ropar collaboration proposals

If you are interested in learning more about the IIT-Ropar collaboration and how to make a connection with their to support your project, please contact us early in your proposal development process. For the purpose of this call for proposals, we ask that you contact J-WAFS executive director Renee Robins first in order to let us know of your interest in pursuing a potential collaboration and to find out more about the opportunities that could be available. We will then provide guidelines for developing an IIT-Ropar collaboration around your specific proposal.

Tellus Labs access to operational weather, satellite, and ground data

TellusLabs (<https://telluslabs.com>) is a satellite imagery and machine learning company that is building a “living map” of the world’s food supply. Their goal is to provide insights from satellite imagery that will help solve the biggest problems facing society. How will we feed a rapidly growing global population? How will we manage our increasingly limited water resources? How can we best manage our land and forest resources in an era of climate change? They seek to address these challenges through the innovative use of satellite imagery and Earth data, using an interdisciplinary approach that combines machine learning, statistics, remote sensing, and geospatial sciences. Specific opportunities for MIT collaboration suggested by TellusLabs are described below. Please contact Renee Robins if you are interested in an introduction and exploration of potential collaboration around your seed grant proposal.

Kernel access/augmentation: TellusLabs could provide access to its API and web-app (Kernel) to facilitate MIT research where operational weather, satellite, and ground data that is targeted at agricultural growing regions is required. Kernel could provide research groups with reliable daily summaries of plant health and weather in key growing regions without the effort required to source their own imagery pipelines. Kernel (web app and API) could further be modified to accept crop forecasts and

other key agricultural monitoring results from a J-WAFS-funded team in a geography where they do not have commercial work ongoing (eg. West Africa).

Irrigation monitoring: TellusLabs is focused on a very detailed (medium resolution satellite) coverage of the US corn belt that will land in time for the US 2019 season. As part of that work, they are interested in a research partnership to generate a water budget (modeled evapotranspiration) for irrigated lands in the US corn belt. The aim of this effort would be to open to the public an operational system that generates awareness on irrigation withdrawals from major aquifers.

TellusLabs resources:

- Link to Kernel product overview: <https://telluslabs.com/pages/kernel>
- Link to Kernel API spec: <https://kernel.telluslabs.com/api/>
- Link to some background on the team: <https://telluslabs.com/pages/company>