SINGAPORE FOOD STORY (SFS) R&D PROGRAMME 2.0

'SEED' GRANT

CALL FOR PROPOSALS - INFOSHEET

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1. BACKGROUND

1.1. Singapore imports more than 90% of its food, making us vulnerable to food supply and safety risks, such as disease outbreaks, geopolitical disruptions, and climate change.

1.2. To secure a supply of safe food in Singapore, the Singapore Food Agency (SFA) has been working closely with the ecosystem to build the agri-food industry's capability and capacity to produce 30% of Singapore's nutritional needs locally and sustainably.

1.3. The Singapore Food Story (SFS) R&D Programme was initiated in 2019 to drive research in four domains of (i) Aquaculture; (ii) Sustainable Urban Agriculture; (iii) Future Foods; and (iv) Food Safety.

2. OBJECTIVES OF 'SEED' GRANT

2.1. This grant call serves as a platform for knowledge creation and discovery science through supporting R&D in areas with lower Technology Readiness Levels (TRLs[1]).

2.2. It aims to encourage researchers, technology providers and potential adopters to co-develop innovative solutions for aquaculture, sustainable urban agriculture, future foods, food safety domains.

2.3. Through this grant call, SFA is seeking to explore innovations that strengthen current capabilities and knowledge for food security, as well as enhance its resilience against unanticipated needs and tap on emerging opportunities.

3. SCOPE OF GRANT CALL

3.1. This grant call supports lower TRL R&D which demonstrate strong innovation potential. Applicants shall address the following challenge statements under the respective domain (refer to Table 1) in their Research Proposals. Applicants could also propose emerging areas not mentioned in Table 1 if it could significantly contribute towards local production.

3.2. Applicants shall take into consideration food safety aspects in ALL submitted proposals. For proposals related to novel foods, refer to SFA's guidelines on submission of safety assessments for novel foods and novel food ingredients on SFA's Novel Food page: https://www.sfa.gov.sg/food-information/novel-food.

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[1] Technology Readiness Level ("TRL") is a scheme to assess the maturity of technologies.

Table 1: SFS 2.0 Challenge Statements

#	Domains and R&D Focus Areas	Challenge Statements / Desired Research Outcomes	Baselines for Reference
1	**Aquaculture** • Genetics & Breeding • Fish Feed & Health; Platform Technology / Facility • Emerging Areas	• Develop superior fry/ fingerlings for tropical aquaculture species with superior traits that can contribute to more than 30% increase in productivity for closed systems • Improve fish feed conversion ratio (FCR) to 1.2 or lower at an affordable cost • Reduce fish mortality from key fish diseases from 70%-100% to 20% or lower	• Productivity for closed systems: 500 tonnes/ha/yr • FCR: 2.0 • Fish mortality from key fish diseases: 70-100%
2	**Sustainable Urban Agriculture** • Seed Genetics & Breeding for controlled environment agriculture (CEA) • Sustainability • Emerging Areas	• Develop seeds with superior traits for CEA that could improve yield by more than 20% through faster plant growth, resulting in lower resource use and better business cost • Reduce average energy consumption by more than 30% for vertical farming (e.g. via optimised lighting recipes and air-conditioning and mechanical ventilation systems)	• Productivity for indoor vertical farms: 1,000 tonnes/ha/yr • Energy consumption of indoor vertical farms: 30kWh/kg
3	**Future Foods** • Improving Process Development to enable future manufacturing of alternative protein (AP) • Strengthening Nutrition & Functionality of AP products • Emerging Areas	• Develop scale-down process and digital twin model to enable improved efficiency and sustainability of AP modalities such as Microbial Proteins or Cultured Meat [1] • Develop novel technologies and approaches to improve viability of AP production process, e.g. bioreactor design or optimising use of media. • Develop alternative/novel carbohydrates and lipids, and other specialty ingredients to enhance nutrition availability and functionality of AP products and boost consumer acceptance • Characterise and apply impact of in-process modifications to enhance AP functionality [1] The aspirational targets are to reduce production cost of Microbial Proteins by 3x from ~S$18/kg to S$6/kg, and Cultivated Meat from USD120/kg to USD6-17/kg by 2030.	• Microbial Proteins: ~S$18/kg • Cultivated Meat: USD120/kg
4	**Food Safety** • Methodologies for toxicity & allergenicity assessment • Emerging Areas (e.g. bio-surveillance)	• Develop non-animal-based screening methodologies to ensure safety of food innovations, particularly for unexpected hazards • Demonstrate at least 30% improvement in throughput (time) or cost savings for selected methodologies	Examples of conventional animal-based screening methodologies: • Short term toxicity studies with rodents: 14 or 28 days • Subchronic toxicity studies with rodents: Generally 90 days but can be up to 12 months.

3.3. Research Proposals shall demonstrate strong potential for innovation, proof of concept and eventually, real-world application within and beyond Singapore. Applicants shall clearly articulate the levels of improvement the proposed research will contribute to achieving the specified desired outcome. These improvements will need to be compared with the global best-in-class technologies or solutions that are already available in the market. The target TRL at the end of the project is expected to be higher than the entry TRL specified in the Research Proposal.

3.4. Research Proposals shall clearly articulate how the projects can value-add to research capabilities in the local context, which includes, but is **not limited to**, plans for scientific publications in international journals, intellectual property generation, collaboration with industries to advance research outcomes/solutions.

3.5. Research Proposals with identified relevant industry partners (e.g., through provision of Letters of Intent from industry partners stating their intended contributions) shall be considered favourably. Such contributions include in-kind services, cash, or a combination of the two towards the project. In-kind services can include labour, materials, and other services.

3.6. Funding support for each Research Proposal awarded shall be up to a quantum of up to **S$1 million** for a **period of up to 18 months**. Proposals with a funding quantum and/or project length that exceed(s) these limits may be considered. Strong justifications will be required.

3.7. Cross-disciplinary/multi-disciplinary Proposals, are strongly encouraged. Applicants are also strongly encouraged to collaborate with foreign organisations and experts, especially in areas with potential for introduction of new research capabilities and transfer of technical expertise into Singapore.

4. ELIGIBILITY, FUNDING SUPPORT & OTHER IMPORTANT INFORMATION

4.1. Principal Investigators (PI) from all Singapore-based institutions of higher learning (IHLs), public sector agencies and private sector entities, are eligible to apply.

4.2. Singapore-based IHLs and public sector agencies will qualify for up to 100 percent of the approved qualifying direct costs[2] of a project.

4.3. Funding for private sector entities for research projects would be conditional on collaboration with a public research performer.

4.4. Tiered funding support levels would apply (up to 30% for all non-Singaporean entities; 50% for Singaporean Large Local Enterprises; 70% for Singaporean Small and Medium-sized Enterprises, start-ups and not-for-profits).

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[2] More information on the non-fundable direct costs of research can be found in Appendix I.

4.5. Support for indirect costs[3] of research may be provided, only for Singapore-based IHLs and public sector agencies. Funding support for indirect costs of up to 30 percent of the total qualifying approved direct costs (i.e., total direct costs less exceptional items) will be allowed. This is subject to the approval from SFA. Host Institutions will be responsible for administering and managing the support provided for the indirect costs of research.

4.6. All projected output and achievements of the proposed research are expected to be commensurate with the level of funding requested.

4.7. Research Proposals already funded by other agencies or are being considered for funding by other agencies will not be considered under the present call. PIs will need to declare other funding sources during the application.

4.8. The Lead PI must be based in Singapore[4]. All funding awarded must be used to carry out the research and innovation activities in Singapore unless approved in the grant.

4.9. Collaboration with foreign organisations and experts in the capacity of Co-Principal Investigator (Co-PI), or as Collaborator is allowed. However, contracting out the whole or substantial part of the research work is not permitted.

4.10. Collaborators are not permitted to receive, directly or indirectly, any part of the funding, whether in cash or in the form of assets acquired using the funding or otherwise. All assets acquired using the funding must be located in Singapore and maintained within the control of the grantees.

4.11. Urban Solutions and Sustainability (USS) domain agencies have compiled a metadata catalogue to improve data discoverability for researchers. It seeks to encourage early (i.e. pre-award) data-related discussions between Lead agencies and Investigators and will serve as a central reference for datasets available within agencies for request.

4.12. Interested Investigators from:
• Public Institutions (i.e. AUs, polys, A*STAR Research Entities, and Temasek Life Sci Lab) may approach your respective Research Offices, who will assist to write in to request for the metadata catalogue.
• Local Entities (that are not part of the list of public institutions) may write in to request for the metadata catalogue directly. If approved, an authorised signatory from the organisation must agree to a non-disclosure undertaking before the metadata catalogue is shared.

4.13. Agencies will assess the requests based on the grant call topic (e.g. if sharing of agencies' data is indeed useful given the nature of the topic) and may request for

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[3] Indirect costs in research are those costs that are incurred for common or joint objectives and therefore cannot be identified readily and specifically with a particular sponsored research project, but contribute to the ability of the Institutions to support such research projects (e.g. providing research space, research administration, utilities), and not through the actual performance of activities under the sponsored research projects.
[4] Lead PIs must have a minimum of 9 months employment with a Singapore-based organisation (Singapore-based institutions of higher learning (IHLs), public sector agencies, not-for profit research laboratories as well as companies and company-affiliated research laboratories/institutions), and fulfil at least 6 months of residency in Singapore over a period of 1 calendar year.

further substantiations. Please note that agencies reserve the right to approve/deny any requests for the metadata catalogue, and that any data subsequently requested from the Government and/or public agencies will require the signing of separate non-disclosure agreements (NDA).

5. APPLICATION

5.1. This call for proposals is a single full proposal stage.

5.2. The Lead PI is required to submit an online application via the Integrated Grant Management System (IGMS). Separate submissions outside of IGMS will not be considered. Once PIs have submitted their documents online, their applications will be routed to the Director of Research (or equivalent) of their respective Host Institution for online endorsement.

5.3. Please download and refer to the manuals and training guides from the IGMS at https://researchgrant.gov.sg/Pages/faqs.aspx for all instructions and guidelines on the submission process.

5.4. It is mandatory for applications to be lodged in IGMS and endorsed by the Host Institution.

5.5. Applications are complete only if all relevant documents are submitted. The Research Administrative Office from IHLs or equivalent outfits in companies are required to ensure information submitted by their researchers for the grant call are compiled according to the requirements set out. Incomplete submissions will be rejected.

5.6. The application documents required for the submission can be downloaded from the 'Research Proposal' section of the IGMS website. Completed documents should be uploaded in the IGMS website.

5.7. SFA is currently utilising Robotic Process Automation (RPA) to extract information from submitted Research Proposals. **Please submit your proposal in MS Word format** and do not alter the format within the proposal template. Please be advised that failure to adhere to the provided instructions may lead to the rejection of your proposal.

5.8. The following documents are required for the submission. It is advised to restrict the total attachment size to be less than 25MB. Please follow the naming convention and format for labelling of soft copy attachments:

Attachment	Naming Convention	Format
Research Proposal	RP_ *Project title*	MS Word
Annex A – Curriculum Vitae	CV_ *Project title*	PDF
Annex B – Detailed Project Budget	Budget_ *Project title*	MS Excel
Annex C – Detailed Methodology	Methodology_ *Project title*	PDF

Annex D – Letters of Support	LOS_ *Project title*	PDF
Annex E – Suggested Peer Reviewers	SPR_ *Project title*	PDF
One-Slide Summary (NABC model)	Summary_ *Project title*	PDF

5.9. Content for the proposal (excluding up to 4 pages of technical attachment and Annexes) must not exceed 10 pages and must be written in Arial font size 12-point with single line spacing. Refer to research proposal template for more specific details.

5.10. In case of discrepancy between the information in the IGMS application form and the attachments uploaded, the information in the attachments shall be taken as final.

5.11. Applicants are to note that **where relevant privileged or confidential information is needed to help convey a better understanding of the project, such information should be disclosed and must be clearly marked in the proposal.**

6.   SELECTION PROCESS AND AWARD

6.1. All endorsed proposal(s) eligible for funding will be subjected to a round of Peer Reviews, followed by evaluation by a Scientific Evaluation Panel. Where appropriate, proposals may also be sent to industry resource persons and relevant national agencies for additional review. All information needed for a proper and complete evaluation should therefore be included in the application.

6.2. Proposals will be evaluated based on the following broad criteria:

a) Potential Contribution to Grant Objectives
   i. *Relevance and amount of contribution of proposed research in addressing the challenge(s) posed.*

b) Scientific Excellence and Innovation Potential
   i. *Quality and significance of proposed research, including the potential for breakthrough/innovation to advance knowledge and understanding within its own field or across different fields.*

c) Potential for Proof-of-Concept, Application & Deployment in Singapore and Beyond
   i. *Feasibility for advancement of research outcomes/solutions.*
   ii. *Potential for application of research outcomes/solutions within and beyond Singapore.*

d) Execution Strength and Technical Competency of Research Team
   i. *Quality of plans for execution and delivery of the research programme and goals, including the appropriateness of the proposed milestones, deliverables and reasonableness of the budget.*

ii. *Quality, significance, and relevance of the recent research record of the PI and co-PIs and the strength of the applicant group, including likely synergy in delivering research and potential for international leadership.*

6.3. Selection of Peer Reviewers/Evaluators is at the sole and exclusive discretion of the Singapore Food Story R&D Programme Office, which shall not be liable for the release of information concerning proposals to third parties by individuals involved in the review process. The Singapore Food Story R&D Programme Office reserves the right to modify the review process.

6.4. Applicants shall agree that they shall not take legal action against the SFA, the Peer Reviewer, or any member of the Scientific Evaluation Panel in relation to their role in evaluating and deliberating the project proposal.

6.5. The SFA is under no obligation to award research grant in whole or in part to any proposal. SFA may require proposals to be revised or combined as it sees fit to enhance research outcomes, facilitate integration of research concepts and technologies, and optimise funding resources. **SFA's decision on project and funding support will be final** and shall be abided by the applicants.

7. CONTACT

7.1. For further enquiries, please contact the Singapore Food Story R&D Programme Office at SFA_RND@sfa.gov.sg.

APPENDIX 1 – NON-FUNDABLE DIRECT COSTS OF RESEARCH

Information on non-fundable direct costs of research is appended in the tables below.

Type of Expenses	Description
Salaries of Lead PIs / Investigators	Not allowable, to ensure no double-funding of salaries and related costs, as the salaries are already supported from other sources (e.g. faculty salaries are supported separately by the IHL as it is in support of the IHLs' core mission).
Salaries of teaching staff / Teaching substitutes	Not allowable, as this is already being supported from capitation grants.
Undergraduate tuition support	Not allowable, as this should be supported under the respective scholarship grants and bursary schemes.
Salaries of general administrative support staff	Not allowable, as this is an indirect cost*
Costs related to general administration and management	Not allowable, as this is an indirect cost*. This includes common office equipment, such as furniture and fittings, office software, photocopiers, scanners and office supplies.
Costs of office or laboratory space	Not allowable, as this is an indirect cost*. This includes renovation/outfitting costs, rent, depreciation of buildings and equipment, and related expenditures such as water, electricity, general waste disposal and building/facilities maintenance charges.
Personal productivity tools & communication expenses	Not allowable, unless the use of mobile phones and other form of smart devices were indicated in the methodology for the Research/I&E Project. All other costs under this expense type should be supported from Indirect Costs.
Entertainment	Not allowable, as this is an indirect cost*.
Refreshment	Not allowable, unless this is related to a hosted conference or workshop for the Research/I&E Project. All other costs under this expense type should be supported from Indirect Costs.
Audit fees (Internal and external audit) and Legal fees	Not allowable, as this is an indirect cost*.
Fines and Penalties	
Professional Membership Fees	
Staff retreat and team-building activities	
Patent Application	Not allowable, as this should be supported from overheads given to I&E Office (IEO). This includes patent application filing, maintenance and other related costs.

*Indirect Costs are to be funded from the Indirect Costs provision under a selected funding support, or from other funding sources.