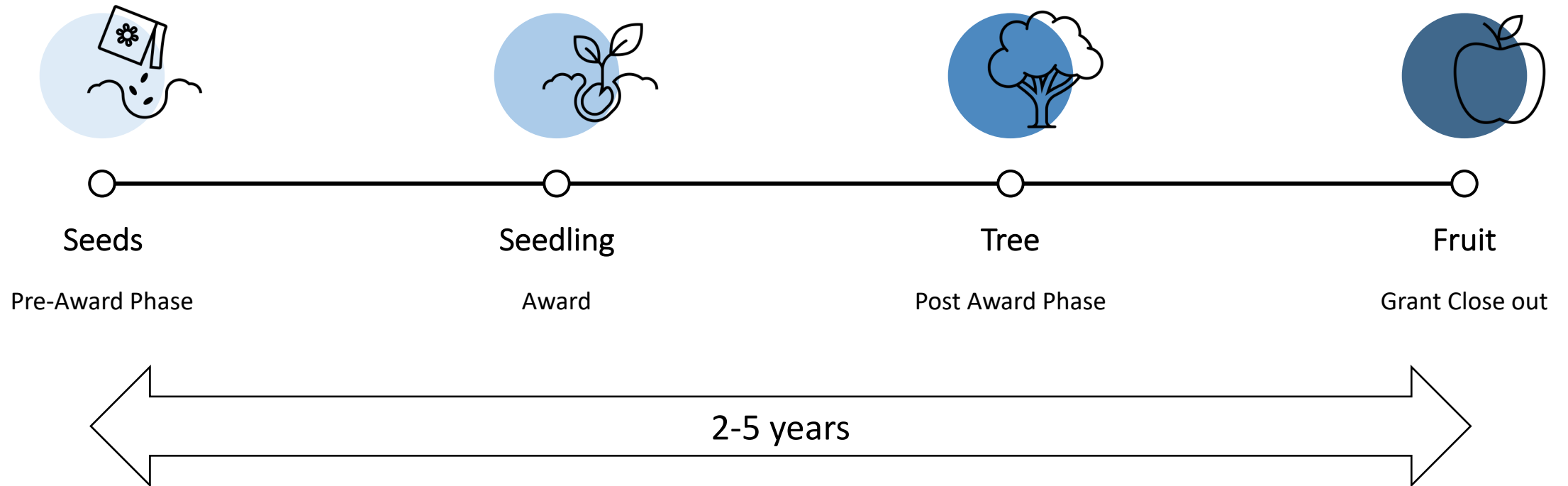Share and Learns:
Funding Opportunities in Engineering Education

Wednesday, January 18, 2023

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This presentation represents my own experiences and advice related to working with funding agencies.

Grant Timeline

Seeds

Pre-Award Phase

Seedling

Award

Tree

Post Award Phase

Fruit

Grant Close out

2-5 years

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Identify your purpose: Why do you want a grant?

Seeds

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Identify your purpose: Why do you want a grant?

Foundational	Applied
Discovery	Adaptation
Exploratory	Implementation

Seeds

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Explore: Who wants to fund your work?

Local/College

University/State

Funding

Federal

Private

Seeds

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NIH Calls to Explore at the National Level

- [PAR-22-000](#) Team-Based Design in Biomedical Engineering Education
  - Focused on the creation of UG design experiences ($20K/yr), $5K in summer salary/yr, $5K/yr of staff support allowed, may include 6-10 weeks of clinical immersion for $20K/yr additional funding = $40K direct costs, $10K salary
  - Can include prototyping costs and services, travel, stipends for 1 faculty member, 1 staff member, and student stipends if doing an immersion experience
  - Typical 25-page proposal research plan and supporting documents
  - Requires a letter of intent in April prior to May submission

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NIH Calls to Explore at the National Level

- ## PAR-19-197 - Summer Research Education Experience Program
  - Focused on research experiences for high school students, undergraduate students, and/or science teachers during the summer academic break. Up to $125K/yr depending on proposal - limit $50K in personnel to support program, participant costs vary based on HS, teacher, UG and may include housing
  - Must tie to NIH priority funding topics, can supplement T32s https://grants.nih.gov/grants/guide/pa-files/PAR-21-168.html
  - Typical 25-page proposal research plan and supporting documents
  - Requires a letter of intent in February prior to March submission

NIH Calls to Explore at the National Level

- Connect with your units to express your interest in being involved in large training grants – T32s need an education plan and educational experiences. Those can be quite a good amount of funding.

- Connect with faculty to help with dissemination/outreach on existing grants

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NSF Calls to Explore at the National Level

20-558 - PFE: Research Initiation in Engineering Formation (PFE: RIEF)

- The PFE: Research Initiation in Engineering Formation (PFE: RIEF) program has two goals: 1) Support research in the Professional Formation of Engineers (PFE), and 2) Increase the community of researchers conducting PFE research.
- Focus is on learning literature and methods in a mentored partnership with experienced EERs
- Up to $200K over 2 years
- Typical 15-page proposal research plan and supporting documents
- November submission

NSF Calls to Explore at the National Level

- [23-510](#) - Improving Undergraduate STEM Education: Directorate for STEM Education (IUSE: EDU)
  - Supports projects to improve STEM teaching and learning for undergraduate students, including studying what works and for whom and how to transform institutions to adopt successful practices in STEM education. Strong reliance on Theory of Change and detailed Research Questions.
  - $200K to $2M over 2-5 years depending on the proposed project - *Track 1: Engaged Student Learning and Track 2: Institutional and Community Transformation*
  - Typical 15-page proposal research plan and supporting documents
  - No letter of intent, due dates depending on pathway either Jan or July

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NSF Calls to Explore at the National Level

[23-527](#) NSF Scholarships in Science, Technology, Engineering, and Mathematics Program (S-STEM)

- Supports institutions of higher education to fund scholarships for academically talented low-income students and to study and implement a program of activities that support their recruitment, retention and graduation in STEM. Offers 3 tracks: Track 1 (Institutional Capacity Building), Track 2 (Implementation: Single Institution), Track 3 (Inter-institutional Consortia)
- Focus is on awarding scholarships and mentoring - up to $15K/year for UG and up to $20K/year for graduate students (MS or PhD), renewable for 5 years. Funding can also be used for PI salary and educational programming/mentoring
- $1-5M over 6 years depending on track
- Typical 15-page proposal research plan and supporting documents, requires many admin letters
- March submission deadline

NSF Calls to Explore at the National Level

- **22-586** CAREER Proposals Submitted to the Directorate for Education and Human Resources (EHR)
  - Encourages eligible members of the STEM education research community to submit proposals to NSF's CAREER program. EHR invests strategically in research to understand factors and issues that influence STEM learning and education, opportunities and approaches to broaden participation in STEM, and STEM workforce development.
  - Novel research with strong emphasis on filling gap in literature and practice
  - Average award size for RFE is $400K over 5 years. Award can fund research, trainees, prof dev, etc.
  - Typical 15-page proposal research plan, has many additional supporting document requirements
  - July submission deadline

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NSF Calls to Explore at the National Level

[22-514](#) Broadening Participation in Engineering (BPE)

- The BPE program aims to support innovative and convergent research, curriculum, collaborations, and strategies in broadening participation and equity as they relate to engineering and the engineering profession. Communities served by the BPE program (K-12, Higher Education, Non-Profit, and Industry) are intentionally broad.
- Strong emphasis on theoretical and scientific literature and broadening participation assessment and dissemination efforts
- $100K to $1.2M depending on the pathway : Track 1: Planning and Conference Grants, Track 2: Research in Broadening Participation in Engineering, Track 3: Inclusive Mentoring Hubs (IM Hubs), and Track 4: Centers for Equity in Engineering (CEE).
- Typical 15-page proposal research plan and supporting documents
- Track 1 & 2 – rolling submissions, Tracks 3 & 4 - Letter of intent September, November submission deadline

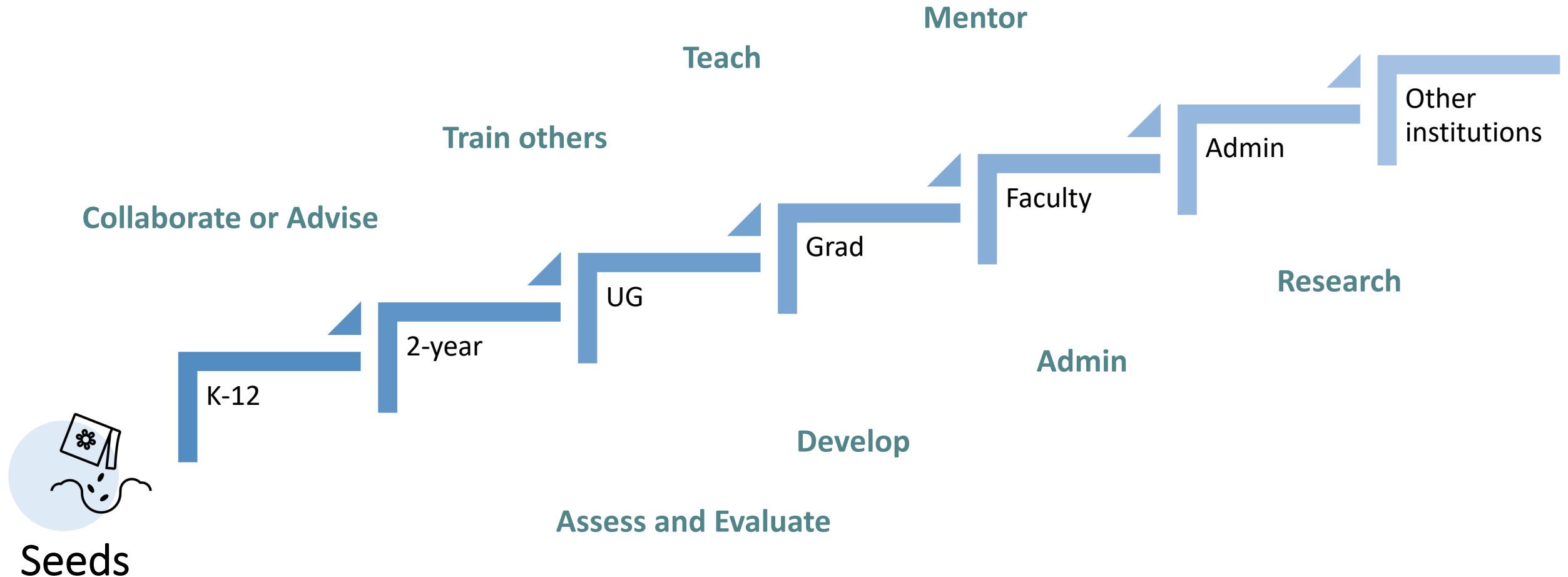BEEC

NSF Calls to Explore at the National Level

- Research in the Formation of Engineers (RFE) – no call refer to [Dear Colleague Letter](#)
  - Supports research on the professional formation of engineers and the design and development of new approaches to engineering education and training.
  - Novel research with strong emphasis on filling gap in literature and practice
  - Average award size for RFE is $350,000 for 36 months. PIs who wish to submit a proposal with a budget greater than $350,000 must contact a cognizant program officer prior to submission.
  - Typical 15-page proposal research plan and supporting documents
  - No letter of intent, no due date, rolling deadlines

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NSF Calls to Explore at the National Level

[22-587](#) IUSE/Professional Formation of Engineers: Revolutionizing Engineering Departments (IUSE/PFE: RED)

- Projects include consideration of the cultural, organizational, structural, and pedagogical changes needed to transform the department to one in which students are engaged, develop their technical and professional skills, and establish identities as professional engineers or technologists. The focus of projects in all tracks should be on the department's disciplinary courses and program. RED project initiatives are expected to be institutionalized at the end of the funding period.

- $1 to 3M depending on the pathway : RED Innovation $1-3M over 5 years, RED Adaptation and Implementation (RED A&I) $1M over 5 years

- Typical 15-page proposal research plan and supporting documents, required dept head as PI

- Limited campus submissions, July submission deadline

Gather your team - Who will you work with and what will they do?

Seeds

Mentor

Teach

Train others

Collaborate or Advise

Other institutions

Admin

Faculty

Grad

UG

2-year

K-12

Research

Admin

Develop

Assess and Evaluate

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Spend your money - Detail your spending plan before writing your grant

Seeds

Personnel
PI, Co-PIs = summer salary (up to 2 months)
Postdocs = full salary
Research Assistants semester, AY, FY?
Check your local requirements for appointment length and whether you need to pay tuition
Participant costs (IRB)

Supplies
Equipment
Materials
Surveys (some have costs)
Software

Dissemination
Publishing fees
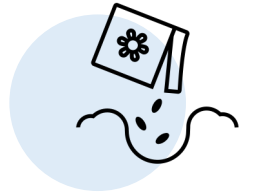Conference attendance (most NSFs require you to come to NSF once a year)
Travel for the grant
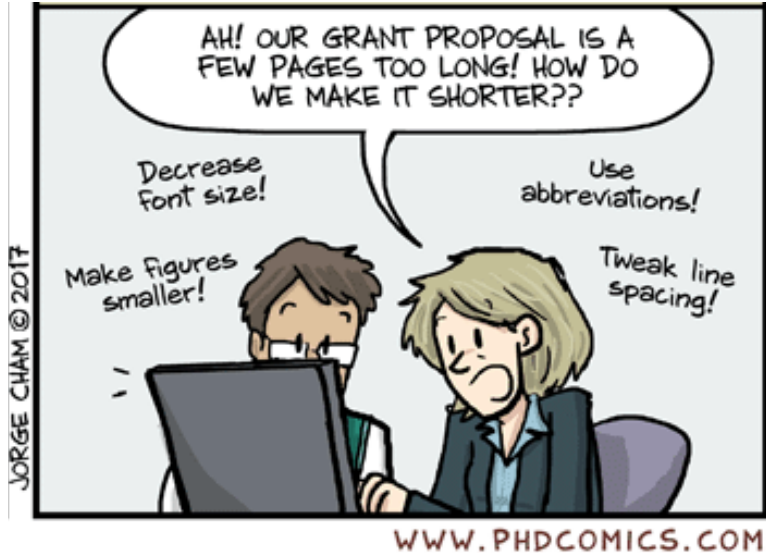Workshops

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What is summer salary

Seeds

Write the grant – follow formatting guidelines and include all documents

Emphasize NEW ideas founded on literature

The title is important!

Needs clearly stated research questions

Detailed methodology for approach and analysis of data

Demonstrate success potential with preliminary data – NSF is risk averse

Discuss the significance to your field and others

A clear, concise, comprehensive Proposal Summary

Seeds

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Grant Reviews and Feedback

Tree

Reviewers weigh the relative merits of:

- Intellectual Merit
- Probability of success
- Feasibility
- Applicant's qualifications
- Preliminary work
- Broader Aspects

Remember who your review is…

- A busy researcher with too many demands on her/his time.
- Will compare yours with the 2 or 3 others that they have been asked to review
- Will read it in 60 min or less
- Will compose his/her review in less than 30 min
- Will rely on reviews and the author's Summary Statement

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Grant Reviews and Feedback

E   Excellent; Fund it!

VG   Very good; Fund it if there is money

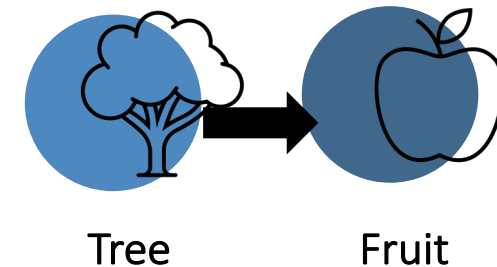G   Good; Don't fund it; proposal needs work

F   Fair;   Proposal is NOT GOOD. Kiss of death.

P   Poor; fundamental rethinking needed before resubmission

Tree

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Post-Award Meetings and Reporting

Tree   Fruit
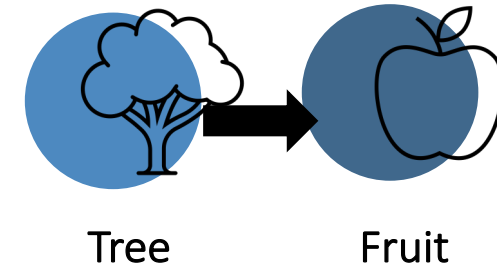
Annual reports   Required annual meeting

Evaluation reports   Consortiums

Internal reports   ASEE NSF grantees sessions

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Grant Close–out and Next Grants

Tree → Fruit

Every end is a new beginning.

Final reports

Outcomes reports

Publish/present any final papers

Graduate students

Results from prior

Collaborative grants

Adaptations of your work

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With careful planning, you can navigate the grants process like a pro and fund your work

Seeds

Pre-Award Phase

Seedling

Award

Tree

Post Award Phase

Fruit

Grant Close out

2-5 years