Impact-Focused Process for Selecting, Engaging, and Evaluating Partners

Executive Summary

This document focuses on the process to select, evaluate, and if necessary discontinue partners in the NASA Harvest Consortium. It characterizes three primary partnership types (funded partner, unfunded collaborator, and unfunded end user), and how they fit into the Harvest program of activities. It does this in the context of the mission, priorities, key elements, and metrics of success for Harvest.

Introduction

Agricultural decision makers need access to timely, objective, accurate, and actionable information to strengthen food security, market stability, and human livelihoods. NASA Harvest (Harvest) – a new a multisectoral Consortium – is driven from this decision maker or "end user" perspective. Harvest's Programmatic Missions is to **enable and advance adoption of satellite Earth observations by public & private organizations to benefit food security and agriculture in the US and worldwide**. Harvest is composed of over 40 partners who are leaders in their fields and who are advancing both the state of the science as well as the adoption of satellite-based Earth observations in support of informed decisions for food security and agriculture.

Harvest is a non-traditional program element for the NASA Applied Sciences Program (Box 1). Harvest relies on its partners to implement activities that meet the needs of decision-makers. Harvest prioritizes impactful projects and relationships, and as such does not demarcate partnership types publicly. However, internally for the sake of management and procedural clarity, Harvest distinguishes between three types of partners: **Funded Partners**; **Collaborators**; and, **Stakeholders or End Users.** In this document, Harvest describes its internal process for selecting, engaging, and reviewing the performance of its funded partners. Harvest creates sub-contracts with funded partners to engage specific multi-disciplinary teams to execute projects to support defined end-users. These sub-contracts enable Harvest to operate with agility and respond to changing priorities and end user needs.

Box 1: Key Elements of NASA Harvest

- Has a clear Programmatic Mission guiding program elements, projects, activities, and evaluation.
- Consists of related projects and activities, emphasizing innovation in both science and technology transfer.
  - Where each project contributes to the Harvest Programmatic Mission
  - Where activities have a basis in science toward transition to operations;
  - Where each activity has an element of inter-connectedness and interdependence; and
  - Where projects are at a mix of implementation levels designed to evolve over the lifetime of the Harvest.
- Has a strategy for transitioning research to operations, including the securement of sustained funding beyond NASA Harvest participation.
- Has an innovative, consistent, and coherent plan of outreach and community engagement.
- Has a clear model of management and multi-level reporting to facilitate coordination and collaboration across projects and activities.
- Facilitates awareness raising and uptake of NASA EO data, applications, and information products by operational users from diverse sectors and geographies.
- Identifies and articulates community priorities.
- Has strong international standing.
- Coordinates and communicates regularly across NASA Programs, Centers, and Missions.

Box 2: Definitions of Relevant Terminology

Partner: Harvest has three types of partnership: funded partners (receiving funding for specific projects and deliverables), project collaborators (working on Harvest projects), and stakeholders, which in turn can be subdivided into "end-users" and "next users".

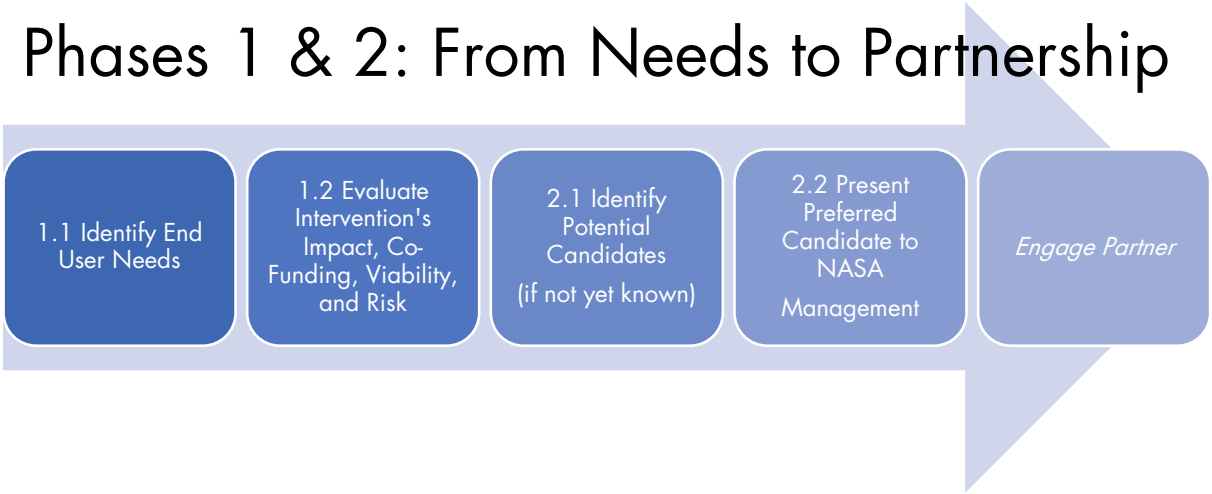
- **Funded Partner:** A partner receiving funds either directly or through a sub-contract from UMD's Harvest award. These partners have expectations commensurate with any NASA funded activity, including reporting, deliverables/milestones, and participation in programmatic events.
- **Collaborator**: Unfunded partner, but with a specific leveraged project or mission that contributes to Harvest's goals. These collaborators do not have the same level of reporting requirements, and cannot be held to strict deliverables and milestones schedules. However, Harvest may still discontinue these relationships based on a collaborator disengaging or not delivering, or on shifting priorities for Harvest.
- **Stakeholder:** Organizations and entities with a vested interest in Harvest products or outcomes. The majority of our stakeholders are "end users," given the Harvest emphasis on operational adoption of our activities. An example of a stakeholder who is *not* necessarily an end user might be NASA Headquarters, who clearly wants to see us be successful and has an interest in us taking certain directions in our program, but they are not necessarily going to *use* the outcomes themselves.
    - **End User**: Entity or organization that is helped by or uses a Harvest information product, technology, or who will adopt a methodology or tool developed and/or transferred by Harvest.
        - **Next User**: A term we use internally that implies the layered-nature of usership. i.e. a group that we may refer to as a Harvest "end user" may in fact – and usually will – have their own "end users", and so on and so forth. In that sense, they are the "next user" of Harvest activities. However, for ease of communication, we generally use the term "end user" for anyone who is interested in a Harvest product or outcome, regardless of further usage.
        - *Note: Harvest partners will promote end user adoption of non-Harvest activities where appropriate. This may be accomplished through the G20 GEO Global Agricultural Monitoring (GEOGLAM) Initiative, to which Harvest majorly contributes.*

Harvest Mission Statement: A multisectoral, interdisciplinary Consortium to enable and advance adoption of satellite Earth observations by public & private organizations to benefit food security and agriculture in the US and worldwide.

Harvest Priorities:

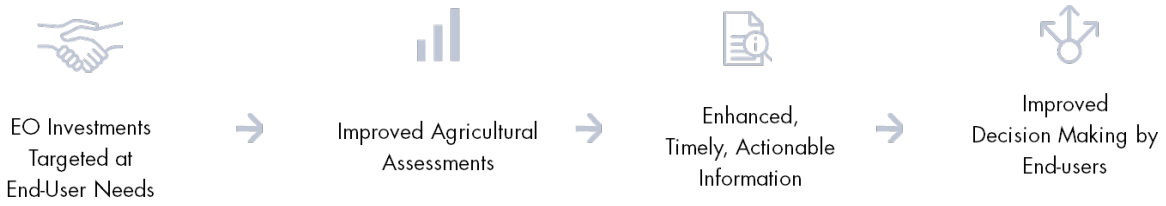
- Through the provision of transparent, and timely EO-based information on crop production and through improving capacity of the domestic and international communities to generate this information autonomously:
    - Increase food security and strengthen human and environmental resiliency in the agricultural context
    - Reduce food price volatility
- Improve awareness and understanding of the applications of NASA's and other satellite data products by users from a wide range of sectors and geographies in the areas of agriculture and food security

Phases 1 & 2: From Needs to Partnership



Phase 1: Identify End User Needs and Harvest Capability Gaps

1.1 Background: Harvest & End User Needs



- Harvest is driven by end user needs.
- The Harvest Leadership Team (HLT) set strategic priorities at the start of the NASA Harvest, in November 2017, in line with end user priorities identified prior to and during the proposal process. These are **Harvest's Priorities:**
    - Increase food security and strengthen human and environmental resiliency in the agricultural context
    - Reduce food price volatility and the impact of agricultural market volatility on human livelihoods
    - Improve awareness and understanding of the applications of NASA's and other satellite data products by users from a wide range of sectors
    - Further, Harvest aims to create a diverse portfolio across several dimensions, including:
        - Geographic diversity (i.e. US and low- and middle-income countries);
        - Sectoral diversity (i.e. public and private sector), including diversity within sectors such as across the federal government or across supply chains
- These activities are addressed through **Harvest's Working Areas** (Figure 1).
- HLT periodically reviews these strategic priorities and evaluates user needs against those priorities.
- The HLT had a set number of funded partners identified at the outset of the program, who were selected based on their ability to contribute to meeting identified end user needs at that time.
- Through Harvests' successes, existing end users have deepened their interest and brought with them new opportunities for intervention. Meanwhile, through general outreach activities (e.g. Social Media, Newsletters, Conferences), awareness of the Harvest program has expanded, and as such,

we have been approached by new end users. A first step toward engaging any new funded partner or deepening investment in an existing funded partner is evaluating the end user request or need.

Figure 1: Harvest's Working Areas and Leads

Nota Bene I: Funded partners can also be added to the Consortium because they meet a crucial need in the program not directly related to "end user needs". These typically fall under the heading of Programmatic Foundations including management, documentation, communications and outreach, education and technology transfer, and the Harvest Portal.

1.2 Evaluate Specific Intervention with Respect to Harvest Priorities

- As a first cut, the HLT evaluates the relevance of end user needs with respect to Harvest Priorities and the balance of Harvest's portfolio across application readiness levels (ARL), risk, and around its Working Areas.
- If the end users' needs align with Harvest priorities and objectives, strengthen or add to the diversity of Harvest activities, they are then evaluated using the following criteria:
    - Level of **technical capacity & current EO usage**
        - Capacity for sustained uptake: the partner allocates trained staff, budget, information technology, and other resources to fully adopt and maintain the EO system (e.g. as expressed in an MOU; budget; operational plan; etc.).

- Availability of **co-funding** for the intervention
  - Willingness to commit adequate staff resources: the partner allocates technical staff, provides training and other support needed to adopt and sustain EO systems;
- Potential **impact** of an intervention, qualitatively assessed as relating to:
  - Human livelihood impact (e.g. population impacted by decision)
  - Environmental impact (e.g. improving sustainability, resilience to climate change)
  - Financial impact to the end user
  - General societal benefit
  - Transferability of intervention to future users
- These end user needs are then evaluated in a 5-dimensional matrix that takes into account the above criteria as well **as availability and maturity ("application readiness level" or ARL) of existing EO technologies** for that intervention and whether or not the existing technology is within the **portfolio of Harvest funded partners**.

NASA Harvest: Matrix for Evaluation of End User Needs vs. Harvest Priorities and Impact

		EO Exists and Harvest Has [outline]...	
Size of circle = potential impact **Color of circle** = co-funding Red = low chance of co-funding Yellow = good chance of co-funding Green = co-funding available		Method/tech at low ARL	Method/tech at high ARL
End User Institution Has...	High EO Usage & Technological Capacity	User 3	User 4
	Low EO Usage & Technological Capacity	User 3	User 2

MATRIX EXAMPLE: User 2 has methods ready and low current EO usage, which taken together mean a decision process can be seriously augmented by EO. The EO technology exists, although it is not currently in Harvest's portfolio. Further, User 2 has co-funding available, meaning the activity is very viable. However, the impact of the activity otherwise is relatively low, as communicated by the small circle. Meanwhile, User 4 has high EO usage and is unlikely to have co-funding. However, the potential impact is very large *and* Harvest has a technology ready in its portfolio. Therefore, only incremental investment would be needed for the intervention for this end user, making the lack of co-funding a less important factor.

- All of these factors would be weighed against the current portfolio of activities and the HLT would make a decision whether to continue with this end user immediately, in the future, or not at all.

Nota Bene II: Funded partners can also be added to the Consortium because they have a very strong existing set of activities with strong end user engagement of their own. In this case, the evaluation would still use the same matrix, however both the partners and their established end users would be brought into the program.

Phase 2: Identify & Evaluate Potential Funded Partners

2.1 Identify Work Needed & Potential Partners

- Once an end user need has been identified, evaluated, and confirmed as aligned with Harvest objectives, a scope of work is established to meet that need. The HLT leverages its decades of experience in satellite-based agricultural monitoring and the associated networks in which it is engaged to identify potential funded partners to meet that need, if such capabilities cannot be found within the existing Harvest portfolio. The HLT applies the following criteria to help identify partners that would be a good fit for the Harvest Consortium:
    - **Partner's Alignment with Harvest Mission Statement and Priorities:**
        - This may mean shared vision, ongoing research activities that directly contribute to meeting the need, and existing collaborations with other end users of similar type.
    - **Potential Partner's Technology Application Readiness Level (ARL):**
        - Harvest aims to have a balanced portfolio of high and low-ARLs, to both focus on immediate transition of methodologies to users as well as to advance the science to develop future applications. The HLT will evaluate the ARLs of the potential partner's technology as appropriate for the end user case.
    - **Partner Commitment:**
        - Co-funding available: the partner provides co-funding for the project (e.g., amount provided; percentage of project budget provided by partner).
        - Willingness to collaborate: both with end users and with other Consortium Partners to share data, methods, and experiences, as well as contribute to the overall strength of the program.
    - **Partner Record with Applications:**
        - Strong experience in the related field.
        - Demonstrated commitment to operational transition of methods.
        - Strength of its scientific and technical capabilities.

Nota Bene III: A partner may be identified for which funding is not available or cannot be given (e.g. international collaborator). In that case, the same Criteria are used to select partners, although greater flexibility is seen in the Harvest-Partner relationship.

2.2 Identify Work Needed & Potential Partners

- After discussion with the HLT, the proposed partner makes a presentation of current activities and proposed work to the HLT, appropriate Harvest partners, and the NASA Food Security Office (FSO), highlighting planned integration into Harvest program of activities.

Phase 3: New Partners & Expectations

Phase 3: Adding New Funded Partners & Collaborators

Mechanisms for Adding Funded Partners

- New funded partners are added as new funding becomes available (e.g. through discontinuing other funded partners or receiving new funding from NASA for high priority initiatives *[See Phase 4]*, or through the Seed Starter Program.
    - The Seed Starter program is typically reserved for partners with a lower ARL (higher risk), or those that need minimal funding for partnering.
    - Proposed new partners who need to develop their application (to ARL 3) can be supported by the Seed Starter program at a lower level of funding. To be agile, this can be decided by the Harvest Program Director.
- Partners develop a detailed workplan, including deliverables and associated timelines, upon acceptance into the Consortium. This is done via a meeting or teleconference with the HLT and management.
    - Funded partners are provided with clear partnership expectations and a 'read me' on logo usage, font, funding acknowledgement guidelines, and communications.
    - As applicable, they will also be onboarded into Harvest Working Areas, with facilitation from Harvest Partnership Management.
- New funded partners sign a sub-contract agreement with University of Maryland.

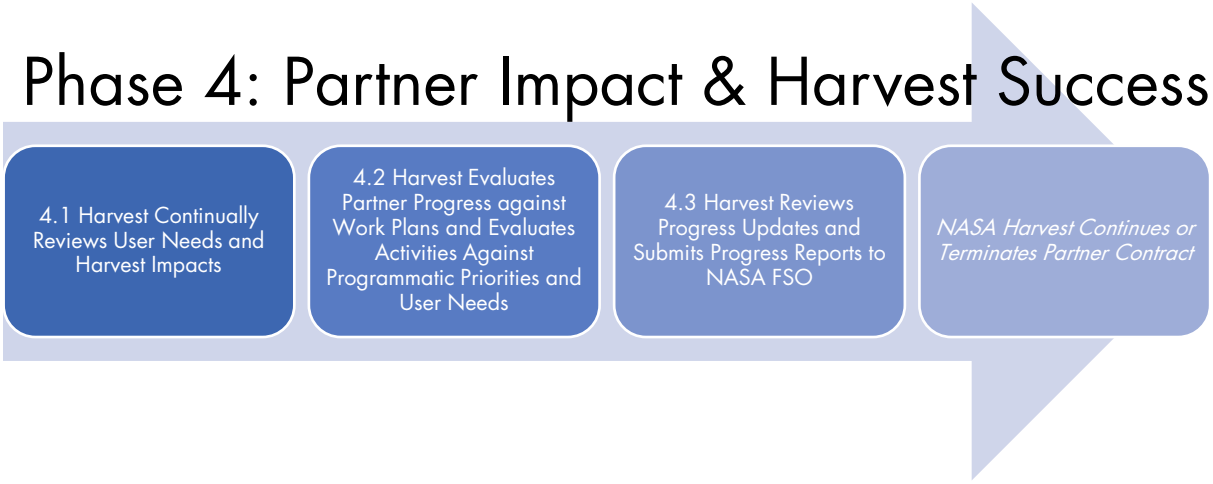
Funded Partner Expectations

- Partners will contribute to the Harvest objectives by enhancing the application of EO to agriculture or food security.
- Partners will complete quarterly reports detailing milestones, deliverables, and budget updates. These reports will reflect upon progress relative to workplan, and in the context of NASA metrics of success for programs within the broader NASA Applied Sciences Program *(text box, Introduction).*
- Partners will share highlights and newsworthy stories with the Harvest Communications Team approximately 6-12 times per year.
- Partners commit to attend the Harvest Annual Meeting for the duration of their participation in the partnership.
- Partners will complete an annual report detailing project progress and key deliverables, which may be used in the Consortium's annual report to NASA.

- Partners will share their data and methodologies across the Harvest Consortium, as agreed to at the outset of the agreement. Where possible, data, publications, and methodologies will be made openly available and accessible via the Harvest Portal.

Mechanism for Adding & Expectations of Unfunded Collaborators

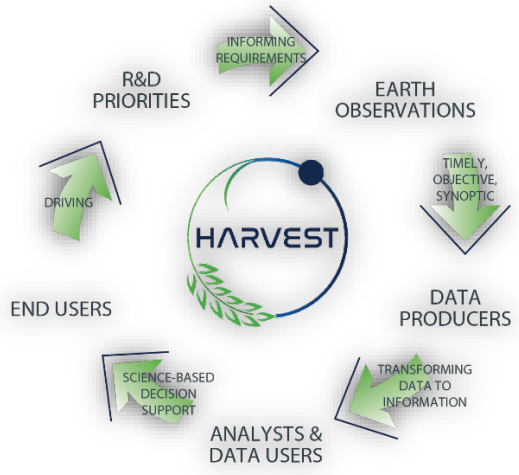
- New Unfunded collaborators are added through a more flexible process. They may indicate commitment informally (e.g. in an email), or if needed, sign an institutional level Memorandum of Understanding (MOU) with University of Maryland Hub.
- Unfunded Collaborators agree to:
    - Attend the Harvest Annual Meeting
    - Provide quarterly brief progress updates (written or in teleconferences)
    - Share data, methods, products, and documentation with other Harvest Consortium members.



Phase 4: Reviewing Partner Progress & Finding a Path Forward

4.1 Continuous Dialog with End Users Keep Harvest Centered on Impact

- As stated, Harvest is driven by end user needs, but it is an ongoing dialog and not a single point of departure. Harvest and relevant partners remain in regular contact with end users toward keeping up-to-date with evolving priorities, assessing the viability and ongoing relevance of the Harvest intervention, and – if needed – correcting course. In this sense, 'needs assessment' is not a single activity, but a continuous, cyclical process and an iterative dialog. The Matrix (Phase 1.2) and its underlying concepts are revisited by the HLT.



4.2 Partner Evaluation and Work Plan Re-visiting

- Funded partners submit quarterly reports and monthly newsworthy items to the HLT.

- The HLT reviews activities against Consortium priorities and performance on a quarterly basis, based on delivering on project work plans and feedback from end users.
- The HLT and Funded Partners jointly review progress and discuss adjustments to planned activities, as needed, at which time new workplans are established or approved.
- The HLT may decide to discontinue a sub-contract with a funded partner if Consortium priorities change or if the funded partner is unable to perform the agreed upon tasks.

4.3 Harvest Reporting to NASA

- The HLT and FSO work together to provide updates on Harvest activities to NASA leadership on a weekly basis, as drawn from internal calendars (TeamUp) and external communications (Twitter, website).
- The HLT compiles partner activities – successes and failures alike, organized around Harvest Working Areas – into a quarterly report submitted to NASA FSO.
- The HLT develops an annual report reflecting on major successes and major lessons learned, situated in the context of impact and programmatic underpinnings *[Box 3]*. This is used as the basis for Harvest's own work plan, developed annually and in direct reflection of the Annual Report.

Box 3: Success Criteria for Harvest & Related Activities

Impact

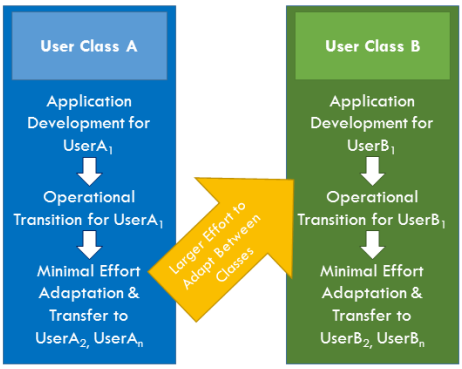
- Demonstrated uptake of NASA EO data, applications, and information products by operational users, including *[Harvest activity group targeting these communities]*
  - US Government *[Domestic Strategy]*
  - Private Sector *[Public-Private Partnership]*
  - International Foreign Governments *[Markets & Trade; Food Security & Early Warning]*
  - Humanitarian Sector *[Food Security & Early Warning]*
  - Economics communities *[Markets & Trade]*
- Impact of Harvest products and activities on food security, agricultural sustainability, and resilience
- Increased awareness of the capabilities of NASA data and Earth observations in general
  - Well-coordinated outreach and communication strategy, tailored to various audiences
  - Identification of potential new data sources, information sources, and usership

Programmatic Underpinnings

- Quantitative and qualitative assessments of the value of Earth observations, through Harvest cases
- Evidence of value-added through integration of NASA investments relevant to food security and agriculture
  - Harvest facilitating a whole greater than the sum of its parts
- Services to the EO, Food Security, and Agriculture Communities
  - Improved access to information on and integrative tools for assessing food security and agriculture, via Harvest Portal
  - Preparation of user community for new or planned missions and associated data products
  - Articulation of observation and information requirements for observation continuity and future missions
  - Identification of community priorities and future research agenda
- Well-documented processes for identifying priorities, engaging new partners, identifying maturing projects and transitioning them to sustained funding sources for their continuation, and terminating projects which are not contributing to the Programmatic Mission.

As Consortium partner activities reach maturity and completion, Harvest will work with partners to ensure sustained funding sources for their continuation or operational adoption by end users.

- The methodology or activity – if applicable – may be identified as a candidate for transition to other users of the same user class, or to users of another user class.
- This successful completion may also mark the end of that Harvest funded activity, with those funded partners transitioning to (unfunded) collaborators until another avenue of interaction is identified.



Terminating Contracts & Collaborations not Contributing to the Programmatic Mission

- A Consortium project could be discontinued due either to shifting Harvest Priorities, or changing end user needs/priorities, or underperformance. Examples of underperformance include:
    - Inability to deliver milestones or major deviation from anticipated timelines
    - inability to adhere to Consortium agreements to share data and methodologies
    - Non-participation in Consortium activities (meetings, outreach, working areas)
    - Loss of end user connections
- If HLT identifies a funded project that should be discontinued (during Phase 4.2), the following procedure will be used:
    1. The funded partner will be asked to give a presentation to report on the work to date and their remaining planned activities within the current annual funding cycle. The presentation will be made to the HLT, the appropriate Hub members, and NASA. The presentation can be in the form of a Webex and will be made available to the HLT and NASA.
    2. The HLT will then evaluate the project activities with inputs from NASA. The Harvest Program Director will decide whether the funded activity should be discontinued. The case for discontinuation will be discussed with NASA.
    3. The final decision to continue or discontinue the funded activity will be made by the Program Director with input from NASA and the HLT.
    4. The HLT will consider contract modifications on a case by case basis (e.g., no-cost extension; budget increase; scope of work adjustment).
    5. The project partners will be notified of the decision and will be required to provide as-of-yet completed deliverables and a final report on their funded activity to the HLT. The steps in the process and reasons for discontinuing the activity will be documented.