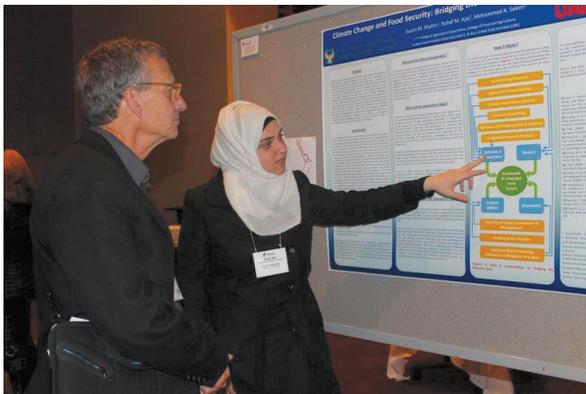


Rationale and Preamble

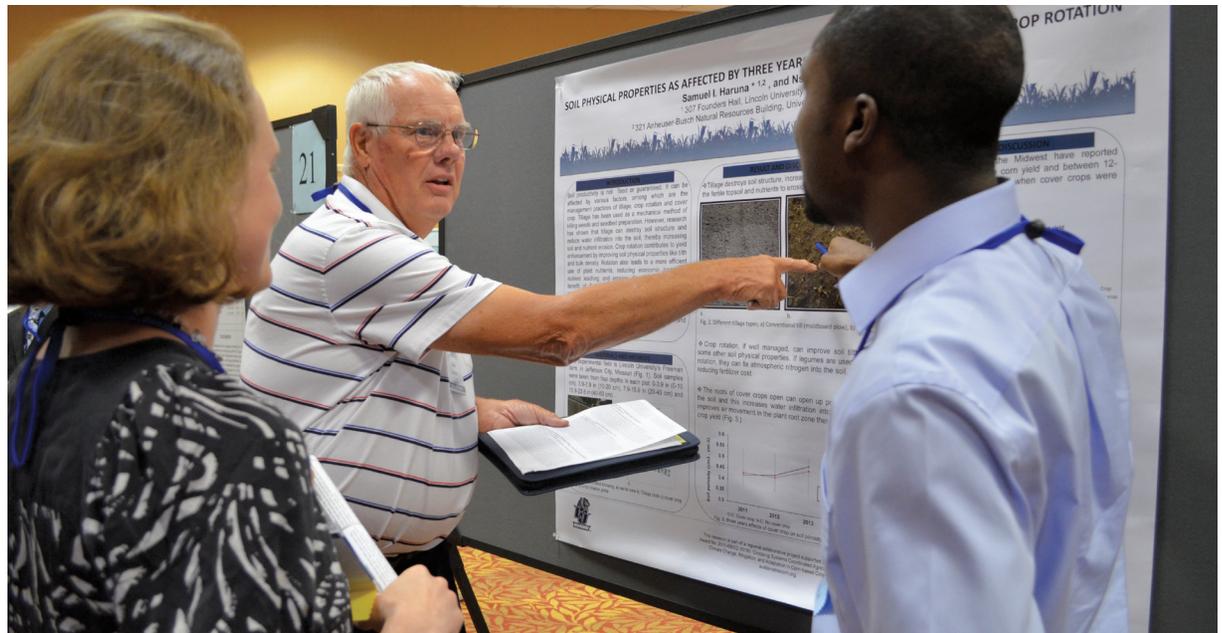
Your project will succeed only if its participants, regardless of their roles in the project, are successful in what they do and feel rewarded and recognized for that success. Enabling participant success requires ensuring that participants have the resources they need, clearly articulating reasonable expectations, establishing mechanisms for accountability, and recognizing and rewarding achievement. In very large projects, individual participants will have diverse motivations for participating and criteria for success. Without appropriate feedback and rewards, participants may lose motivation, underperform, and ultimately even lose faith in the value of large-scale, collaborative endeavors. On the other hand, aligning opportunities for individual and team success and cultivating participants' growth will improve project outcomes. You must attend to these needs for co-investigators and key personnel and help create a project-wide culture that encourages mentoring and recognition for achievement across the project and throughout its duration.



Participants learning and supporting one another's success. Credit: Anonymous

Enabling Participant Success throughout the Project

Enabling participant success is important throughout the project and can be supported through different activities during each phase (Table 4.1). During Phase I (Proposal), for example, it is important to incorporate the mentoring ethic and define mentoring opportunities and expectations within the proposal. During Phase II (Getting Started), the culture of the project is established and should include establishing expectations for performance and participation, and tools and mechanisms to promote mentoring. Uniquely, in large projects, there are additional demands on participants to ensure they work effectively within the team. This requires additional effort by participants that constitute “transaction costs” (described in more detail below) that may be beyond their expectations and prior experience in research. Make sure to set participant expectations, roles, and opportunities for professional growth that are consistent with their respective career stages. During Phase III (Performing), maintain the established expectations and visible reward structures established in Phase II. Participants' perceptions can be monitored through an annual internal survey. In Phase IV (Finishing Strong), create opportunities for new proposal development, job opportunity networking, interview skills practice, conference presentations, and other activities that benefit participants as well as the entire project and its visibility. Table 4.1 summarizes specific approaches to enabling participant success throughout the project life cycle.



Graduate students explain their research to a farmer at an extension and outreach meeting. Credit: Anonymous

**TABLE 4.1
APPROACHES TO ENABLING PARTICIPANT SUCCESS
THROUGHOUT THE PROJECT LIFE CYCLE**

	PHASE I	PHASE II	PHASE III	PHASE IV
	PROPOSAL	GETTING STARTED	PERFORMING	FINISHING STRONG
Establishing and communicating clear, achievable expectations for participants	x	x	x	x
Providing rewards, recognition, and incentives for individual team members		x	x	x
Fostering professional growth		x	x	x
Balancing participants' needs		x	x	x
Accounting for investments inherent to large projects	x	x	x	x
Managing conflicting demands for faculty time		x	x	x
Adapting to challenges and opportunities	x	x	x	x
Planning for adaptation	x			
Promoting clear understanding for the team of adaptation processes		x	x	x
Acknowledging the importance of iteration and reflexivity	x	x	x	x
Balancing execution of planned milestones with innovation	x	x	x	x
Creating space for "disruptive innovation"	x	x	x	x
Promoting team-wide understanding of critical path	x	x	x	x

Establish Clear Expectations for Participants and Facilitate Participant Success in Meeting Them

Although proposal page limits typically preclude listing detailed responsibilities for each anticipated project participant in very large projects, expected participant roles should be outlined in a management plan so these are clear from project inception (see Section 7, Project Design and Management). A detailed project management plan that includes each key individual should be developed early during the project or prior to the award period. This plan should include expectations for interactions among team members and for participant accountability, procedures for conflict resolution, expectations for earning authorship, and rights to intellectual property. The management plan should delineate project deliverables and milestones, the metrics to be used to assess progress and completion, specific actions, reporting requirements, due dates, and persons responsible for each project milestone and deliverable. Project-wide, there will need to be an understanding that these milestones and deliverables may be modified as the project progresses. Throughout the project, these milestones and deliverables should be kept current both to ensure participant accountability and to avoid amorphous or runaway expectations that are difficult to achieve that would otherwise lead to frustration by project leadership and participants alike.



Designing expectations with participant input fosters greater commitment to project goals.
Credit: Leigh Bernacchi

Providing Rewards, Recognition, and Incentives for Individual Team Members

Altruism is an important attribute for participants in collaborative research. Nonetheless, each participant, regardless of their role, will still need to derive some personal benefit from their participation. This will enable all participants to perform at their highest level and contribute the time and energy necessary for project success. Specifics of these benefits will vary widely with individuals' personal and career situations. For some, project-wide acknowledgement of contributions and achievements are desired, while for others, financial resources such as funding for salary release or to support technical staff may be critical. Other benefits include opportunities for authorship on peer-reviewed publications or early access to new datasets or analyses generated by the project. When assigning tasks, it is critical to assess whether the responsible participant will benefit along with the project as a whole.

Professional growth opportunities can be optimized for all project participants. These can include, but may not be limited to, acquiring disciplinary and interdisciplinary skills and knowledge (see Section 5, Support for the Next Generation of Researchers). To support this, leaders and mentors throughout the project should be expected to help members of their teams to acquire skills and knowledge. This could involve, for example, field technicians taking a few extra minutes to help their crew understand the theory or rationale behind a particular protocol. Or, it may involve the lead author on a synthesis paper calling meetings with co-authors during the data analysis phase to ensure all authors understand a new approach being taken.

Accounting for Transaction Costs Inherent to Large Projects

Effective participation in large projects requires more time, effort, and energy than is typical for smaller endeavors. This is because large projects often require collaborators to communicate frequently with others outside their discipline, to attend more meetings which are necessary to coordinate a large effort, and to navigate the protocols necessary to communicate and share data across disciplinary and institutional boundaries (see Section 3, Creating a Culture of Collaboration). These additional investments are sometimes referred to as



Coordinated activities can build trust and relationships. Credit: Anonymous

“transaction costs” (Goring et al. 2014). These costs are unavoidable, but you can deal with them in two ways. First, you can ensure that participants understand the reasons for transaction costs but also the benefits to the project and its participants to be derived from investing the extra effort. It is best to discuss this early in the project, preferably during the proposal writing (Phase I) and team molding (Phase II) stages, but to re-iterate throughout the project life cycle. This helps prepare everyone for the extra investments necessary for success. Second, as the director, strive to mitigate transaction costs wherever possible. Actions such as choosing user-friendly communication technology, minimizing unnecessary e-mails and meetings, or carefully planning all communication and meetings to optimize participants’ use of time can go a long way toward reducing transaction costs.

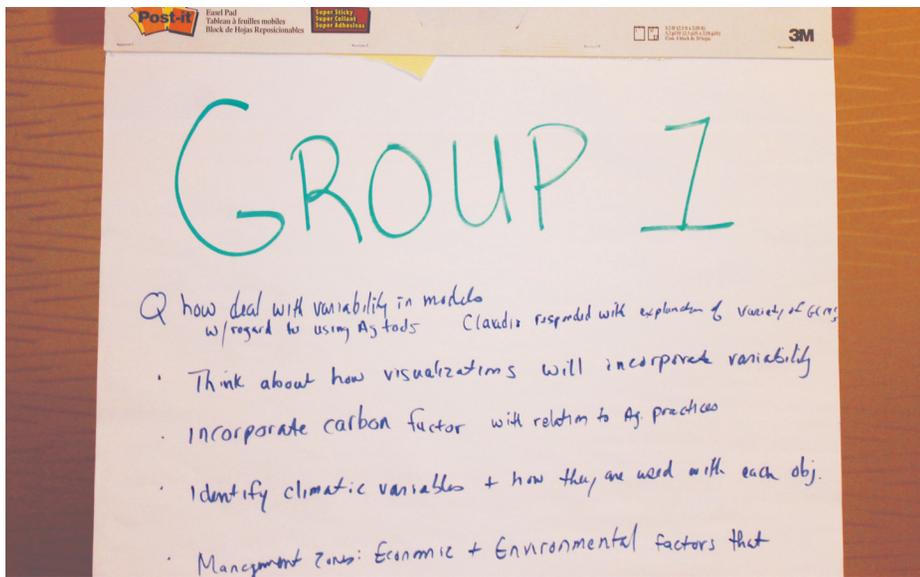
Managing Conflicting Demands for Faculty Time and Attention

You will likely have to spend several hours each workday focused on the direction of your large, complex project. This is seldom true of project co-PIs who lead smaller projects and are often involved in many other projects and endeavors at the same time. One byproduct of this difference in level of focus means that directors and

the leadership team usually will have a much deeper and more thorough understanding of project direction and flow than will many other investigators. Team communication will be enhanced if you understand these differences in investment among team members and structure project activities and expectations accordingly. Periodically bringing the entire team “up to speed” on the large-scale status and function of the project can help align participants’ mental models and vision with those of the leadership team. You can minimize conflicts with the demands on participants’ time by scheduling project meetings so they do not interfere with major disciplinary meetings, field seasons, and university semesters or holiday breaks. This of course, becomes quite difficult when institutions have different schedules (including quarter vs. semester systems) and the many disciplines represented in your project have different primary professional societies. Plan ahead! As project termination approaches, academic participants at all levels will be increasingly drawn away as they must pursue new projects and opportunities. This is inevitable. Adjust your expectations and plan accordingly to achieve project goals given this constraint.

Adopting Mechanisms and Processes for Adapting to Challenges and Opportunities

Like a complex species, large projects evolve over time in many ways, from the prominence of different disciplinary focus areas, to the involvement level of stakeholders, and to the structure of the project itself. Planning for this inevitable change is critical. Mechanisms for adaptation can be built into the project during the writing of the project proposal, management plan, and schedule (Morton et al. 2015). Scheduling checkpoints during the project’s life will enable assessment of project status and structure and allow for adjustments to be made. Internal or external project assessment professionals can be especially helpful in designing and implementing instruments such as surveys or indices for determining the health or status of project functions at these checkpoints. It is critical that project participants recognize the need for re-directed efforts based on these assessments and work together to apply existing mechanisms or devise new ones to enable and facilitate smooth transitions in structure and focus as necessary. While iterative assessment can feel unproductive, in most cases patience with this particular transaction cost will generally pay off in more efficient project function in the long term.



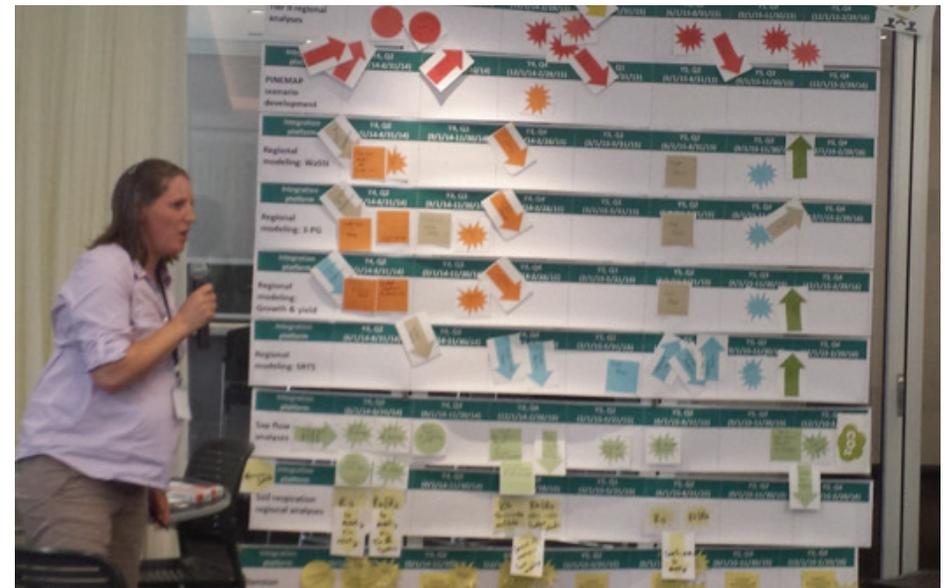
Small group discussions are effective at encouraging everyone to propose their creative ideas and solutions and, when shared with the larger team, enable the whole group to distill the key ideas and incorporate them into the team goals. Credit: Anonymous

Balancing Execution of Planned Milestones with Innovation

The success of all projects requires a commitment to initially promised and planned milestones and deliverables. Therefore, planning necessarily structures the project around meeting these requirements. At the same time, an anticipated benefit of large projects is the emergent creativity that is potentially generated by very large numbers of investigators charged to think across disciplines to address complex issues (see Section 3, Creating a Culture of Collaboration). Accordingly, projects can create space for this sort of innovation to occur within the project. Unforeseen concepts, approaches, and even goals and objectives may emerge from these unique interactions. The director must facilitate the processes to engender the innovation and involve the project membership in identifying new directions that are consistent with the overarching themes and intent of the project. In other words, there can be great value in embracing and supporting this sort of “disruptive innovation” whenever appropriate, assuming it does not detract from the project’s core mission.

Promoting Project-wide Understanding of the Critical Path for Achieving Project Outcomes

The successful execution of large projects usually involves the parallel operation of multiple lines of effort, some of which depend on each other in a sequential manner for data, model simulations, or other inputs and outputs. It is helpful to outline as early as possible the actions and resources necessary to achieve project outcomes using Gantt charts, a critical path analysis (Willis 1985, Figure 4.1) (also see Project Design and Management), or other approaches. A sound logic model (NIFA 2015) can be a very useful tool for structuring and planning project execution. Delays in bottleneck regions of the path can be disastrous, so all project participants should be made familiar with the critical path network and the role they play in it, especially in terms of their responsibilities to pass data or products to other participants. It is beneficial to regularly assess progress along the critical path and update or modify plans as necessary.



A critical path analysis for the USDA-NIFA sponsored PINEMAP project showing timing of important tasks and passage of products such as data or modeling analyses among work groups. The analysis in this figure was assembled by the entire project team at an annual meeting and periodically shared with the group to help keep progress on track. Credit: Timothy Martin

Take Away Messages:

- Success of your project is not possible without ensuring the success of its individual participants.
- Setting clear expectations in a project management plan and communicating these expectations are important first steps to ensure participant success.
- The project management plan should be flexible and include extra time for iteratively assessing progress and adapting to new challenges and opportunities during the course of the project life cycle.



Graduate students at the McCall Outdoor School (MOSS), University of Idaho.
Credit: Anonymous

- Establishing mechanisms to reward achievement is essential for keeping participants motivated. It is important to recognize that rewards may need to differ to meet the needs and values of each participant. Rewards may include financial resources, authorship, responsibility, public recognition, or opportunities for professional growth.
- Participation in large projects usually requires more time, effort, and energy from participants than might be necessary for smaller endeavors. Project directors must assure that participants understand the nature of such transaction costs as well as the benefits that will be derived from investing that extra effort. Project directors should also mitigate unnecessary transaction costs wherever possible.

- Project directors need to keep other participants regularly updated on project progress and be mindful of the competing demands of other project participants. Major project meetings and deadlines should not interfere with disciplinary meetings, field seasons, and university semester, quarter, or holiday breaks to minimize conflicts with the demands on participants' time. Plan ahead!



The USDA-NIFA sponsored REACCH project band in performance.
Credit: Leigh Bernacchi

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