Causal Link Monitoring

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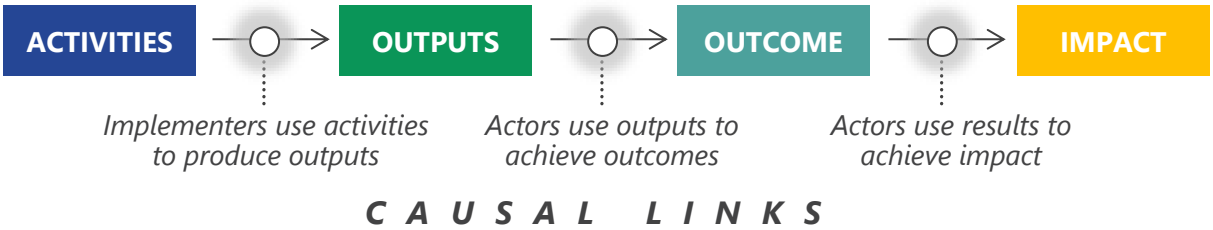
Causal Link Monitoring

Causal Link Monitoring (CLM)[1] integrates design and monitoring to support adaptive management of projects. CLM helps project planners and managers identify the processes that are required to achieve desired results, and then to observe whether those processes take place, and how.

Result-producing processes specify the causal links between results in a logic model or results framework—in other words, the processes between results.[2] CLM focuses on how specific individuals or organizations use results to achieve other results.

Figure 1. Causal Links Between Results in a Logic Model



In CLM, planners start by creating a logic model to help document predictable, agreed-upon elements of the project. Next, they refine the causal links by describing the processes that will transform results at one point in the causal chain to the next. Planners are often less certain about these result-producing processes. Finally, the CLM logic model is enhanced with information about two important sources of uncertainty, contextual factors that may influence the project and diverse perspectives on the problem and its solution.

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[1] CLM is an iteration of *Process Monitoring of Impacts*, which was developed as an approach for monitoring EU Structural Fund programs. *Process Monitoring of Impacts* addressed monitoring challenges associated with multiple objectives, a broad range of implementing agents, and a large number of projects associated with Structural Fund programs. It was inspired by Outcome Mapping, especially the focus on intended behavioral change and their performance and contribution toward expected results (Williams, B., and R. Hummelbrunner, 2011. Systems Concepts in Action: A Practitioner's Toolkit. Palo Alto, CA: Stanford University Press, pp. 92–107).

[2] In this brief, "results" refers to any effects arising from the use of project activities, including outputs, outcomes, and impact.

Contextual factors, though outside the project's sphere of control, may influence causal links. Project planners consult with partners and other stakeholders to capture diverse perspectives on the logic model and the situation it represents.

After the initial design phase, planners can see where the project's theory of change is complete and coherent, or where it is less certain. As the project moves into the implementation phase, project staff create a monitoring system that tracks the causal links between results, including result-producing processes and external influences, emphasizing areas with high uncertainty or low agreement. During implementation, CLM acts as a continuous "reality test" of the theory of change, helping managers detect and adapt to unpredicted causal links or contextual factors. Implementers revisit and update the design throughout the life of the project. As with other project design approaches, a CLM logic model can also inform evaluation design.

CLM helps ensure that project planners consider the most relevant factors and conditions for achieving results and that project implementers address those factors and conditions when facing the predictable and unpredictable aspects of each situation. To maximize the benefit of the approach, CLM should be implemented with complexity-aware monitoring principles.[3]

The annex describes the application of CLM to a fictional development project.

Overview of Causal Link Monitoring

CLM can add value to the design and monitoring phases of a program cycle by providing better information to guide implementation.

Iterative Project Design

During the design phase, CLM prompts planners to enrich their development hypothesis with assumptions about how key social actors will transform results in a causal chain into new results. A single causal link may include, or even require, multiple processes to achieve this transformation. Planners can amend the logic model to display causal links, using a variety of formats.

[3] Britt, H., 2013. Complexity-Aware Monitoring. *Discussion Note.* Washington, D.C.: United States Agency for International Development (USAID).

Figure 10 in the annex illustrates a logic model format with causal links displayed between results *(see Figure 2).*

A CLM logic model provides a richer and more useful picture of the project and its operational context. Result-producing processes include not only those of the project implementers, but also those carried out by other social actors operating in the project context. For example, social actors outside the project's control but within its sphere of influence use project outputs to achieve results. Identifying processes within the sphere of influence directs attention to strategic actions between the delivery of outputs and the achievement of results. Incorporating CLM into design prompts planners and project staff to ask, "What can the project and its activities do to effectively influence the behavior of others in the system to achieve results?"

CLM can inform a project's approach to Collaborating, Learning, and Adapting.[4] Specifying causal links during planning and observing them during implementation helps project staff identify actors and actions critical to the project's success. For example, managers might be prompted to provide technical assistance or incentives to key actors to support result-producing processes, or to partner with actors able to affect these processes.

Drafting a CLM logic model or enhancing an existing model with causal links should not be a burdensome exercise. For a design with a large scope, the focus should be on strategic areas, with the understanding that the logic model may evolve during implementation to incorporate new knowledge or changed conditions. Project staff may wish to identify where knowledge about causal links is limited or disputed, or where dynamic change is occurring—in other words, the more complex aspects of the project.

A CLM logic model should be updated as new information becomes available. In this way, the approach aids iterative planning. CLM can be used for a project that is well underway, even if it was not applied in the original design.

[4] Collaborating, Learning, and Adapting is "a set of processes and activities that help ensure programming is coordinated, grounded in evidence, and adjusted as necessary to remain effective throughout implementation" (USAID, Automated Directives System, Chapter 201, Program Cycle Operational Policy, pp. 47, 127).

Adaptive management seeks to better achieve desired outcomes and impacts through the systematic, iterative, and planned use of emergent knowledge and learning throughout the program lifecycle.

"What is Adaptive Management?" Greg Wilson, posted on October 17, 2106. https://antylles.com/2016/10/17/adaptive-management

Monitoring to Inform Adaptive Management

A CLM-designed monitoring system supports adaptive management in three important ways. First, CLM provides actionable data for managers before results can be observed. Whereas performance monitoring uses indicators that measure progress toward the intended results, CLM tracks the occurrence of result-producing processes long before changes would be apparent in the corresponding performance indicator, thus providing project staff with actionable information much earlier during implementation *(see Annex 1, Step 5).* Second, for difficult-to-measure results, evidence of result-producing processes may proxy for a result. Reviewing performance indicator data in light of data on the result-producing process improves the overall quality of data for decision-making *(see Annex 1, Step 6).* Third, CLM tracks planned and emerging result-producing processes, as well as important contextual factors influencing those processes. This is helpful for steering a project in uncertain or changing contexts *(see Annex 1, Step 3.)*

Conducting CLM

CLM involves seven steps, three for project design, three for monitoring, and a final step in which monitoring data inform redesign:

1. **Build a logic model.**
2. **Identify assumptions about causal links.**
3. **Enhance the logic model with diverse perspectives and contextual factors.**
4. **Prioritize areas of observation.**
5. **Collect monitoring data.**
6. **Interpret and use monitoring data for adaptive management.**
7. **Revise the logic model.**

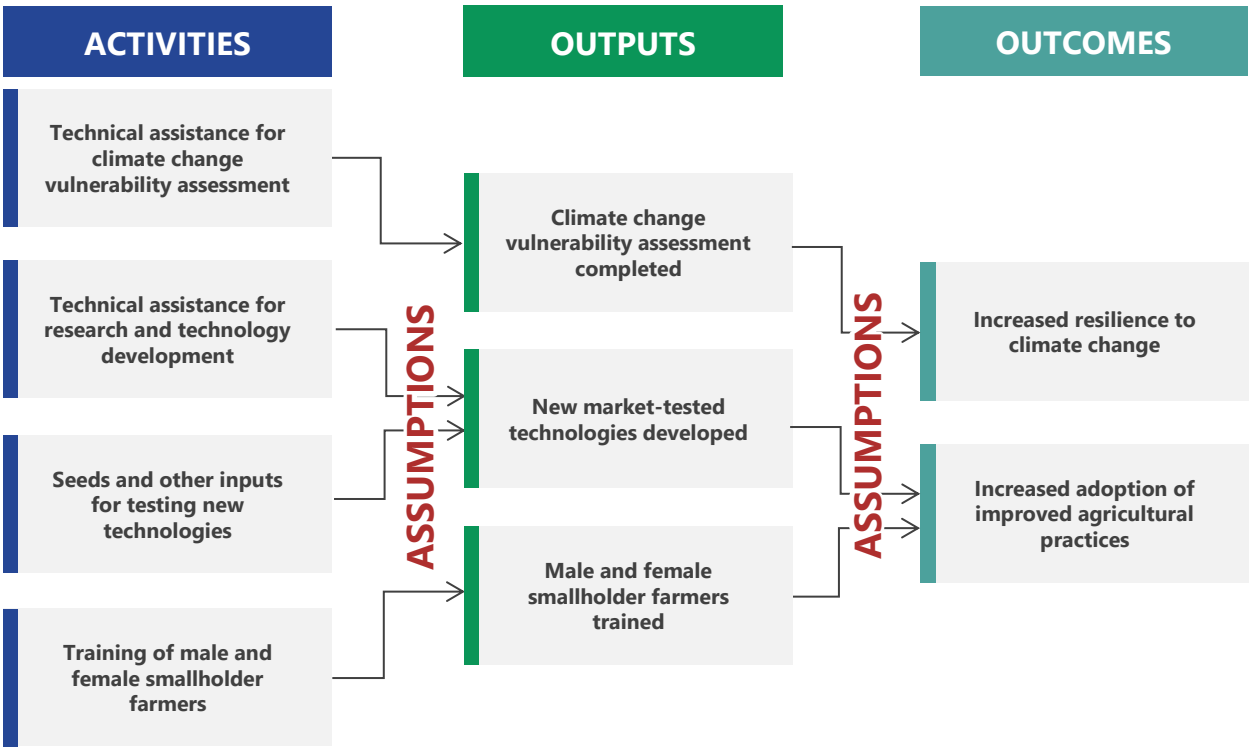
Annex 1 includes a step-by-step description of the application of CLM in a fictional development project.

Project Design with CLM

Step 1. Build A Logic Model

CLM is most effective when a project and its associated activities are depicted through a logic model, which illustrates the logical relationships, or links, between outputs and outcomes related to achieving the project purpose, with associated measures and assumptions to track the theory of change. The "logframe matrix" often used in project design is a type of logic model, but other models also work well with CLM. Those using a logframe matrix will have to develop an accompanying visual—a results "chain" or other graphic representation of the hierarchy of results and the processes between results, as illustrated in Figure 2.

Figure 2. Basic CLM Logic Model for the IIPA Project



Step 2. Identify Assumptions about Causal Links

Once the CLM logic model has been constructed, planners specify the assumptions behind the causal links. Causal links describe how specific actors use one result to generate or produce another result, such as using an *output to produce an outcome* *(see Annex 1, Figure 4).* Causal links can be expressed in the following pattern:

[Actor] uses **RESULT X** in order to achieve **RESULT Y.**

Planners may mine the project narrative and logic model for information about how specific actors are expected to transform results at one level into those at the next level. They may also draw on experience, local knowledge, and logical reasoning to describe result-producing processes. Where useful and possible, they should specify the extent or duration of change expected in a causal link by setting a target or a milestone.

Refining causal links is an iterative task that continues over the life of the project. During design, planners describe causal links to the best of their knowledge, making assumptions about the processes they expect to see, sometimes called "process assumptions." During implementation, these processes are monitored to see if they actually take place. By investigating the assumptions behind the causal links, the initial design can be strengthened, improving its coherence and consistency. Additional processes can be included instead of or in addition to those identified during planning.

It is not necessary to describe result-producing processes preceding every result for CLM to add value to design and monitoring. During the life of the project, planners and implementers may prioritize different areas of the theory of change to inform strategic decision-making and guide implementation *(see Step 4)*.

The design or logic model should be treated as a temporary "mental map," rather than a blueprint for implementation. During implementation, the logic model is updated by adding observed processes, both predicted and unpredicted. It is important to remain alert for unexpected or unwanted effects and adequately interpret the implications. Consider deviations from intended routes as an opportunity for learning and improvement. In this way, CLM supports iterative design and adaptation throughout the implementation phase, particularly in complex and unpredictable situations.

Step 3. Enhance the Logic Model with Contextual Factors and Diverse Perspectives

The achievement of results depends on external events and conditions, as well as the appropriate use of previous results. Contextual factors, such as the local economy, social norms, the regulatory or legal environment, or other projects, can have a positive or negative influence on the project's ability to achieve the intended results.

In a project logframe, the "Assumptions and Risk" column provides information about contextual factors. Other types of logic models will capture this information in various ways. Planners who have completed an analysis of the underlying situation will want to draw on those findings when drafting their CLM logic model, incorporating information about the actors and factors operating in the project's context.

Whatever approach is taken for the situation analysis, it should provide information about the project context. For example, a good problem analysis

will provide insights into the underlying theory of change, and may help tease out the logic model's underlying assumptions about causal links. Likewise, an analysis of the system actors can either support or call into question the assumptions about use of outputs or outcomes to bring about another level of change.

Project stakeholders are likely to have different opinions on the underlying problem, the project's intended results, and the route to achieving them. A CLM logic model should represent the diverse views and multiple perspectives of partners, beneficiaries, and other stakeholders. Planners can seek the views of project stakeholders through an actor analysis, but ideally the stakeholders will review the logic model together; joint review facilitates discussion and encourages consensus, where possible. If consensus cannot be reached (even temporarily), it is important to capture the differing perspectives, because this broader view often points to potential barriers or alternative routes to achieving results.

Planners can indicate alternative results or causal links by using boxes and lines, different colors, or scripts *(see Annex 1, Figure 6).* If a perspective implies a highly divergent pathway to an intended result, with several different elements and links, planners may find it useful to draft a separate logic model. Similarly, if stakeholders advocate for different results, planners may wish to represent this as a different framing of the situation.

A different perspective can affect the CLM logic model in one of three ways:

1. The final intended result is the same, but the pathway is different.
2. The pathway is the same, but the result is different (sometimes called an "unintended" result).
3. The pathway and the result are both different.

There are clear limitations to the range of perspectives that CLM can accommodate, because each perspective needs to be monitored and will thus increase the workload in subsequent steps. A way out of this dilemma is to consider only the implications that a different perspective has on achieving results, instead of drawing up an entire logic model for that perspective. This is particularly appropriate when Option 3 (different pathway and result) stems from a completely different mode of thinking and hence represents a different framing of the situation *(see Annex 1, Figure 6).* The implications of different framing can be conceived as contextual factors influencing specific elements or links of the logic model.

Project Monitoring with CLM

Once the initial design is complete (Steps 1–3), monitoring with CLM serves adaptive management during project implementation. Monitoring system are developed by answering four basic questions:

- What do we monitor?
- When do we monitor?
- What monitoring approaches and methods do we use?
- How do we make sense of the data and apply it to decision-making to help steer the project effectively in complexity?

CLM's Step 4, prioritizing areas of observation, answers the question of what to monitor. Choices about monitoring methods and timing are determined based on specific areas of observation identified for monitoring, as described in Step 5. In Step 6, project implementers make sense of monitoring data for adaptive management of the project.

Step 4. Prioritize Areas of Observation

CLM directs attention to what is taking place between results in the project logic model. A causal link selected for observation is referred to as an *area of observation*. The area of observation includes result-producing processes—planned and emergent—carried out by actors in the system, as well as important contextual factors influencing those processes *(see Annex 1, Figure 7).*

It is not necessary to monitor all causal links in the logic model. In selecting areas of observation, project staff prioritize those that are most strategic for success. The selection of strategic areas of observation will differ across projects. In addition, active areas of observation may change over the life of the project, depending on where and when change is taking place. During early stages of implementation, it may be most appropriate to focus on causal links for the use of outputs or lower-level results. Alternatively, it may be most helpful to focus on processes for which there is less certainty or agreement about how they will contribute to results, or where multiple stakeholders are collaborating.

The monitoring focus may naturally fall on those processes staff expect to see. However, monitors must remain attentive to unexpected or emerging processes in the area of observation. Attention to different perspectives about results and processes is one way to achieve this. Bounding the area of observation is helpful, because it is practically impossible to remain open to emergent processes across the entire logic model.

Performance monitoring assigns indicators to results while CLM monitors processes leading to results. Project staff may define milestones or assign quantitative indicators to results-producing processes if the nature of the

processes makes that meaningful. CLM and performance monitoring can be used as complementary approaches in an integrated project monitoring system.

Step 5. Collect Monitoring Data

Planning for monitoring involves selecting methods (*How do we monitor?*) and scheduling data collection (*When do we monitor?*).

How do we monitor? Monitoring plans for an area of observation begin with identifying the actors who are carrying out the result-producing processes and the most appropriate means of collecting data from those sources. Essentially, monitoring with CLM consists of collecting data to answer three questions about the area of observation:

- Are the planned result-producing processes taking place?
- What unplanned result-producing processes are taking place?
- What contextual factors are influencing result-producing processes?

Any number of data collection and analysis methods can be used to answer these questions. Where possible, staff should streamline monitoring and integrate it with the existing routines to minimize the time and resources to complete the analysis. Data collection should capture different perspectives because these can be used to cross-check information and reveal unexpected or emerging results and conditions during implementation.

When do we monitor? Monitoring should take place when the result-producing processes are observable. The relevant areas of observation will change over the life of the project, depending on which components are being implemented and when result-producing processes are likely to take place. During early stages of implementation, it may be most appropriate to focus on causal links for the use of inputs, outputs, or lower-level results. Later on, it may be preferable to focus on areas of observation between higher-level results. CLM monitoring does not require a baseline; it can be conducted on projects that are already underway.

Step 6. Interpret and Use Monitoring Data for Adaptive Management

This step—the crux of the CLM approach—involves analysis and interpretation of monitoring data to inform adaptive management. Project implementers review monitoring data on planned and unplanned causal links and the contextual factors influencing them to answer the following questions:

- What, if anything, needs to change in implementation?
- How can the project strengthen influence on causal links?

When interpreting monitoring data, project staff carefully consider the differences between the original design and actual implementation. In addition, they also pay attention to the full range of processes and effects that are triggered, regardless of whether they align with the original intentions. Implementers review the monitoring data for exceptions, discontinuities, or surprises to understand the project's unique dynamics and identify relevant changes or emerging challenges. Variations in implementation and results can be important sources of information for learning and improving implementation, because they can help identify weaknesses, point to possible alternatives, or lead to new solutions.

In the same way, differences among stakeholders are encouraged in CLM as a resource rather than an obstacle. Implementers should engage in dialogue and encourage different interpretations, conclusions, and recommendations. Implementers may convene a stakeholder meeting to review and interpret monitoring data and recommend implementation actions. Where possible, the representation of the project should capture diversity as well as consensus. Comparing the different perspectives will create a richer picture of the situation.

Staff may wish to integrate the review and analysis of data into the management cycle and link it with regularly scheduled activities, such as team meetings or performance reviews. The logic model may also function as a visualization and communication tool for discussions with stakeholders.

Step 7. Revise the Logic Model

In CLM, design and monitoring inform each other in an iterative way throughout the implementation phase. In essence, Step 7 restarts the CLM process. Implementers update the logic model to reflect new information gained through monitoring and document any changes made to implementation approach through adaptive management. As necessary, teams may add emerging processes, identify new assumptions about causal links, and enhance the design with new information about diverse perspectives and contextual factors. Project staff may share the revised design with the planners or donors as appropriate. Implementers may also revisit the selection of areas of observation that will be the most relevant in the next phase of monitoring.

Apply CLM with Complexity-Aware Monitoring Principles

Most development situations are characterized by a mix of the predictable and the unpredictable. The CLM logic model captures the predictable aspects of a project, while attending to distinct perspectives, contextual factors, and emerging results to help manage the more complex and unpredictable aspects. However, no single monitoring method is sufficient to address the dynamics of complicated and complex project contexts. Complexity-aware principles can ensure that a CLM monitoring system remains sensitive to complexity.

Complexity-Aware Principle: Attend to Performance Monitoring's Blind Spots

CLM addresses several of the weaknesses of performance monitoring systems that are particularly important in situations of increased complexity. By accounting for external factors that influence the project's ability to achieve results, CLM addresses the omission of alternative causes, a common blind spot[5] in traditional performance monitoring. The enhanced logic model tells a more useful story of the project's theory of change by including important contextual factors that are contributing to results. The enhanced logic model also includes multiple causal paths and feedback loops between contextual factors and the project, thus attending to another common failing of performance monitoring.

CLM's emphasis on known, or predictable, processes makes it suitable for complicated aspects of projects and strategies. To be useful in complexity, the approach must also be applied with due attention to emergent processes. When unpredicted processes are noted or predicted processes fail to occur, it is important to review and adjust implementation plans so they remain relevant and effective.

CLM's focus on processes leading to intended results means that it is less well-suited for identifying results, positive or negative, that were not included in the original design. Unplanned causal links can point to the need to capture additional results. Project staff are encouraged to use other monitoring or evaluation approaches to capture results not included in the original planning documents. A number of complexity-aware monitoring and evaluation approaches, such as Most Significant Change and Outcome Harvesting, seek to discover results without referencing predetermined objectives and work backward to determine the contribution.[6] Most Significant Change and Outcome Harvesting attend to all results, intended or unintended, positive, or negative.

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[5] Britt, H., 2013. Complexity-Aware Monitoring, p. 5.

[6] Britt, H., 2013. Complexity-Aware Monitoring, pp. 11–13.

Complexity-Aware Principle: Attend to Interrelationships, Perspectives, and Boundaries[7]

CLM applies the three key systems concepts—interrelationships, perspectives, and boundaries—in a number of ways. Using CLM, project staff draw a *boundary*, delineating each area of observation between the results. The area of observation is intended to capture complex *interrelations* between an intervention and its context. Different *perspectives* on an area of observation may be represented by monitoring data as stakeholders report on the processes from their point of view. Monitoring staff should also consider the different perspectives on the boundary that defines the area of observation.

Complexity-Aware Principle: Synchronizing Monitoring with the Pace of Change[8]

The general impetus behind the development of the CLM approach was the need for actionable data before data on higher-level results were available. Implementers who track causal links and keep an eye on contextual factors can adjust the implementation process and the design when necessary to achieve results, keeping in mind that the pace of change may speed up or slow as implementation proceeds.

Conclusion

CLM supports adaptive management by providing actionable data in a timely manner. In line with the principles of adaptive management, monitoring and (re)design inform each other in an iterative way throughout implementation. When implementers validate and update the theory of change (and logic model) during implementation, they can make management decisions that respond to the current situation and the longer-term desired results.

CLM is capable of providing information well before data on the results are available, and at a time when managers can still change course if the intervention is likely to be off track. This entails a shift in the accountability

[7] William, B., and H. Britt, 2014. Systemic Thinking for Monitoring: Attending to Interrelationships, Perspectives and Boundaries. Discussion Note. Washington, D.C.: USAID.

[8] Hummelbrunner, R., and H. Britt. 2014. Synchronizing Monitoring with the Pace of Change in Complexity. Discussion Note. Washington, D.C.: USAID.

of implementers, away from the achievement of results (which may depend on many other factors) toward their contributions and performance. The focus on result-producing processes emphasizes tasks under implementers' control or influence, such as the behavior of other relevant actors in a desired direction. The aspects placed in the foreground are those most decisive for achieving results: the quality of implementing activities, attention to contextual changes, communication flows, and changes in the behavior or capacity of partners and target groups.

CLM is particularly suited for interventions with long-term impact chains, where higher-level results are produced at the end of the implementation period or even later. In such cases, it is not feasible to monitor the achievement of results during implementation, but it is possible to observe the use of inputs or outputs. CLM can also be applied at different levels of a large-scale project to capture and track the entire theory of change or its component activities.

CLM can be introduced at later stages of implementation, regardless of the design method originally applied; for example, when a revising a project design to overcome challenges or incorporate learning gained during implementation.

With CLM, monitoring evolves with the project to reflect the need for different types of information as implementation proceeds and in response to the changing context. Project staff revise the monitoring priorities as necessary to inform adaptive management. For this reason, CLM can work well in combination with performance monitoring, in which results are measured using predetermined indicators and a standardized manner over the life of the project. In addition, the observation of result-producing processes can complement performance-monitoring indicators of difficult-to-measure results; for example, building capacity or improving sustainability.

The CLM logic model can accommodate multiple interrelationships, feedback processes, emergent phenomena, and different perspectives or framings. It is therefore well-suited for monitoring complicated and complex situations that display one or more of these characteristics. Moreover, because it is scalable, CLM can be used specifically for such aspects of an intervention—and use indicator-based performance monitoring for the simple aspects. CLM can also be used as a suitable alternative when seemingly simple aspects reveal themselves as more complex—or if sudden change occurs.

CLM and Evaluation

Although it is essentially a design and monitoring approach, CLM can be valuable for evaluation. For example, it offers a good basis for theory-based evaluation approaches, such as contribution analysis and process tracing.

Evaluators can build on a validated and updated logic model and use already collected monitoring data to assess the inference of the causal claims expressed in the model. With its iterative and flexible nature, CLM can be used in formative evaluations aimed at improving ongoing interventions, notably by fine-tuning the logic model and clarifying key causal links. Finally, CLM is an ideal complement to developmental evaluation, aimed at informing adaptive management through rapid feedback and supporting ongoing learning. Developmental evaluation builds on similar premises as CLM and can make effective use of the information provided by CLM.

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Annex 1

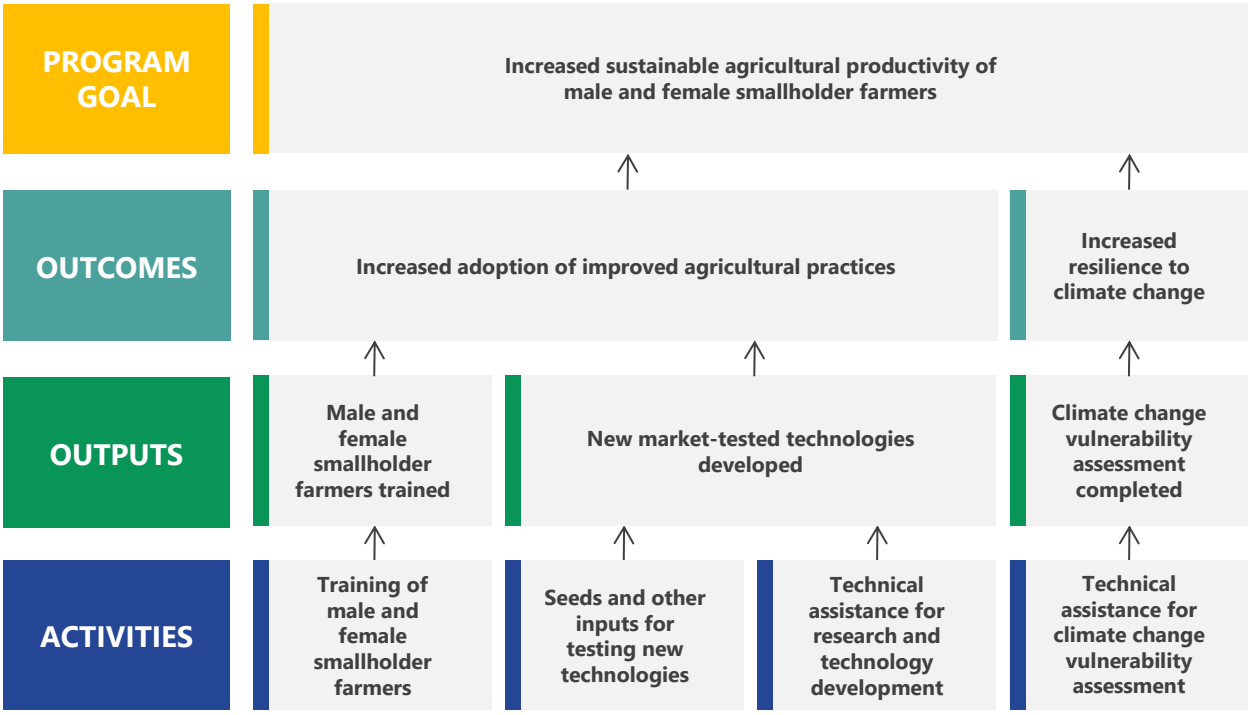
Illustration of Causal Link Monitoring in a Development Project

This annex describes the application of Causal Link Monitoring (CLM) to a fictional development project,[9] Innovation for Increased Productivity in Agriculture (IIPA). The illustrative project is based on an actual development intervention designed and funded by USAID, and which has been adapted to better illustrate CLM and its added value for adaptive management, both within and outside the agency.

The goal of the IIPA project is to increase the sustainable agricultural productivity of smallholder farmers in the target area. The project is part of a larger program to increase farmers' income in a rural area that has been exposed to climate change. *Figure 1* summarizes the project's logic model as a result framework.

The illustration follows IIPA staff through the seven steps of the CLM cycle:

Figure 1. Results Framework for the IIPA Project



[9] This annex is not intended as a standalone document but rather as a complement to the brief "Causal Link Monitoring," which describes the rationale, logic, and implementation of this approach.

Step 1. Build a Logic Model

Step 2. Identify Assumptions about Causal Links

Step 3. Enhance the Logic Model with Diverse Perspectives and Contextual Factors

Step 4. Prioritize Areas of Observation

Step 5. Collect Monitoring Data

Step 6. Interpret and Use Monitoring Data for Adaptive Management

Step 7. Revise the Logic Model

Project planners are most actively engaged in Steps 1 through 3, and staff responsible for project monitoring and implementation take the lead in Steps 4 to 6. Over the life of the project, IIPA staff engage with participating farmers, partners, the donor, and other stakeholders.

Figures 2 through 10 depict the iterative CLM process. Each step includes tips for practitioners and notes on how CLM adds value to project design, monitoring and adaptive management.

STEP 1 TIPS

Illustrate the project's theory of change in a logic model format that includes space for causal links between activities, outputs and outcomes (see Figure 10 for an example).

When using the horizontal CLM format, group results by causal sequence from left to right, starting with activities. Depending on the required level of detail, it may also be useful to include inputs.

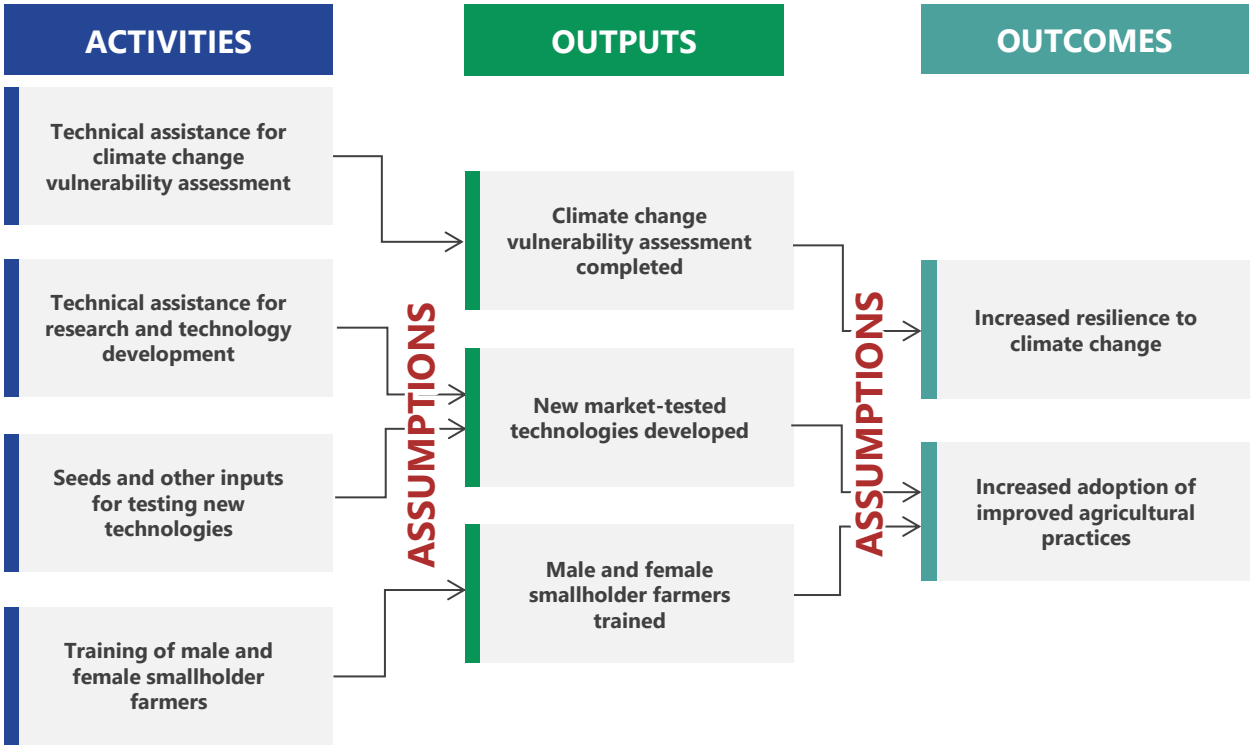
As much as possible, arrange activities in the order in which they will be implemented, from the top to the bottom of the model.

Step 1. Build a Logic Model

Design of the IIPA project began when the donor developed a results framework for the project *(Figure 1)* and the larger program to which it contributes. IIPA project staff further developed and refined design of the project, drafting a narrative description and indicators for performance monitoring. The first step in using CLM[10] was to transfer the results framework into the CLM format *(Figure 2)*, which accommodates causal links between results. The CLM logic model is arranged horizontally, with results presented from left to right according to their causal sequence.

[10] Depending on preferences or institutional requirements, project planners may work directly with the CLM logic model format or transfer the design from a results framework to a logframe or other logic model.

Figure 2. Basic CLM Logic Model for the IIPA Project



Step 2. Identify Assumptions about Causal Links

Once the IIPA project planners built the basic logic model, they worked to describe the causal links between planned results. They mined the project's narrative description and drew on their own expertise and experience as well as logical reasoning. For each causal link, they described their assumptions about how specific actors would use the results at one level to achieve results at the next level using the following formula.

[Actor] uses **RESULT X** in order to achieve **RESULT Y.**

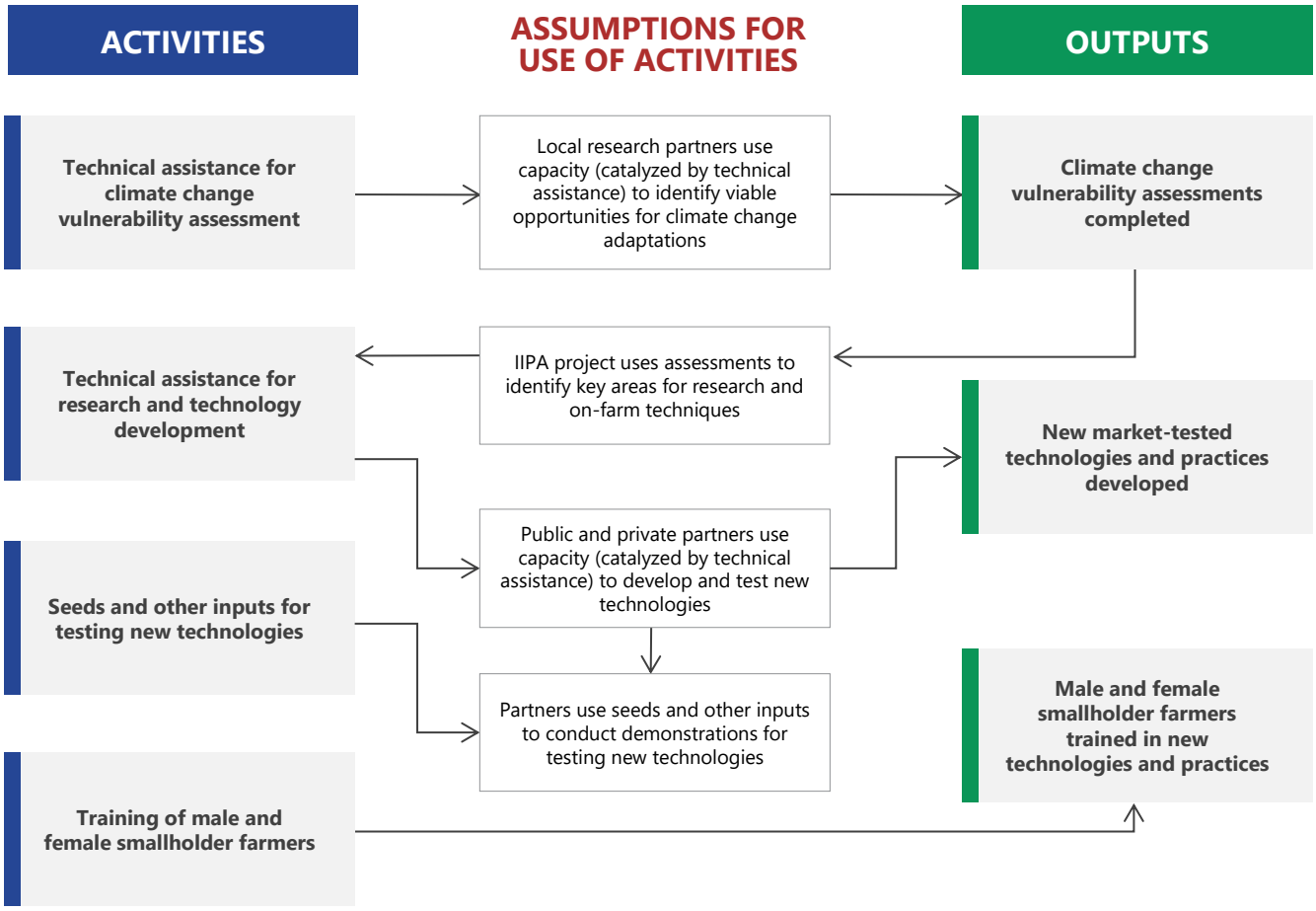
Staff first outlined causal links between activities and outputs and then those between outputs and outcomes, working from left to right on the CLM logic model.

Assumptions for the use of activities to achieve outputs. IIPA staff agreed after discussion that the findings of the climate change vulnerability assessment should inform identification of key areas for research and on-farm techniques. Therefore, they revised the original causal pathway. Staff inserted a feedback loop to indicate that the project will use the climate change assessments in designing the technical

assistance activities provided to public and private partners. Staff assume that the public and private partners will use that capacity to develop and test new technologies—the second output. They insert a results-producing process to document that assumption. IIPA staff considered the causal link between the training input and its output to be straightforward, so they did not describe it further.

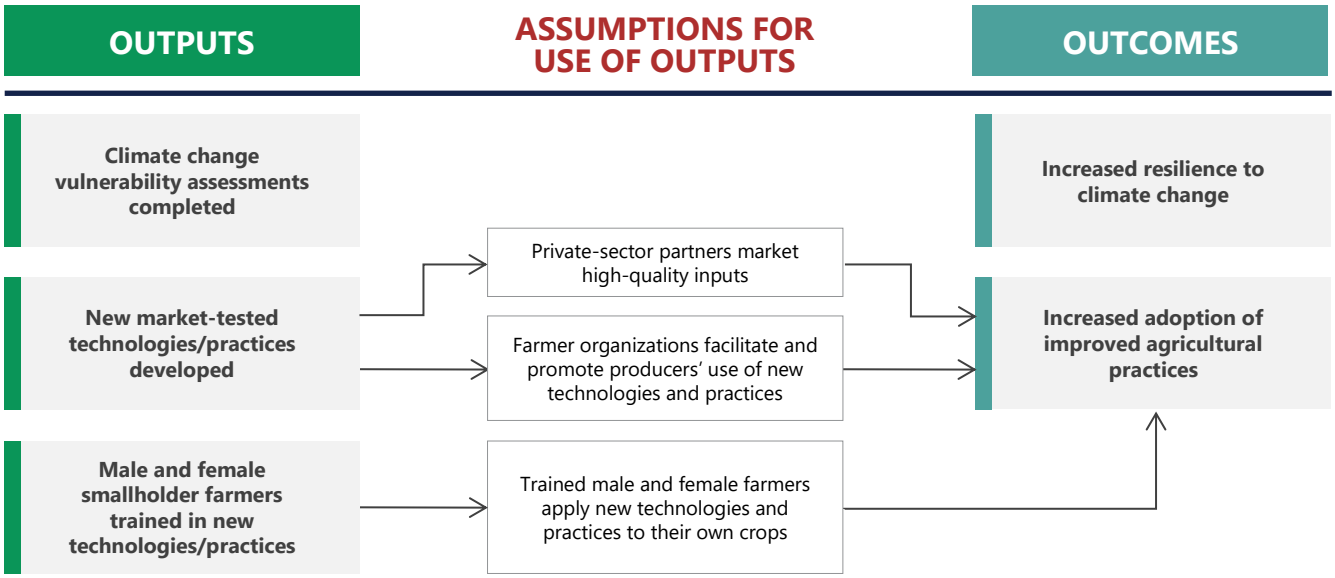
Figure 3 adds assumptions for use of activities, clarifying the causal links between activities and outputs.

Figure 3. Assumptions for the Use of Activities to Achieve Outputs



Assumptions for the use of outputs to achieve outcomes. The staff reviewed the project design and determined that moving from the three outputs to the expected outcomes (*Increased resilience to climate change* and *increased adoption of improved agricultural practices*) would not be as straightforward as outlined in the original result framework. To go to scale, the project would need to engage a wide range of actors (for example, farmers, private traders, farmer organizations, research partners, and others). The specific roles and actions of these actors were not defined in the original design. Therefore, project staff described results-producing processes for each actor. *Figure 4* adds assumptions for the use of outputs to the CLM logic model.

Figure 4: Assumptions for the Use of Outputs to Achieve Outcomes



STEP 2 TIPS

Specify the assumptions for each causal link using the following formula:

[Actor] uses **result X** in order to achieve **result Y.**

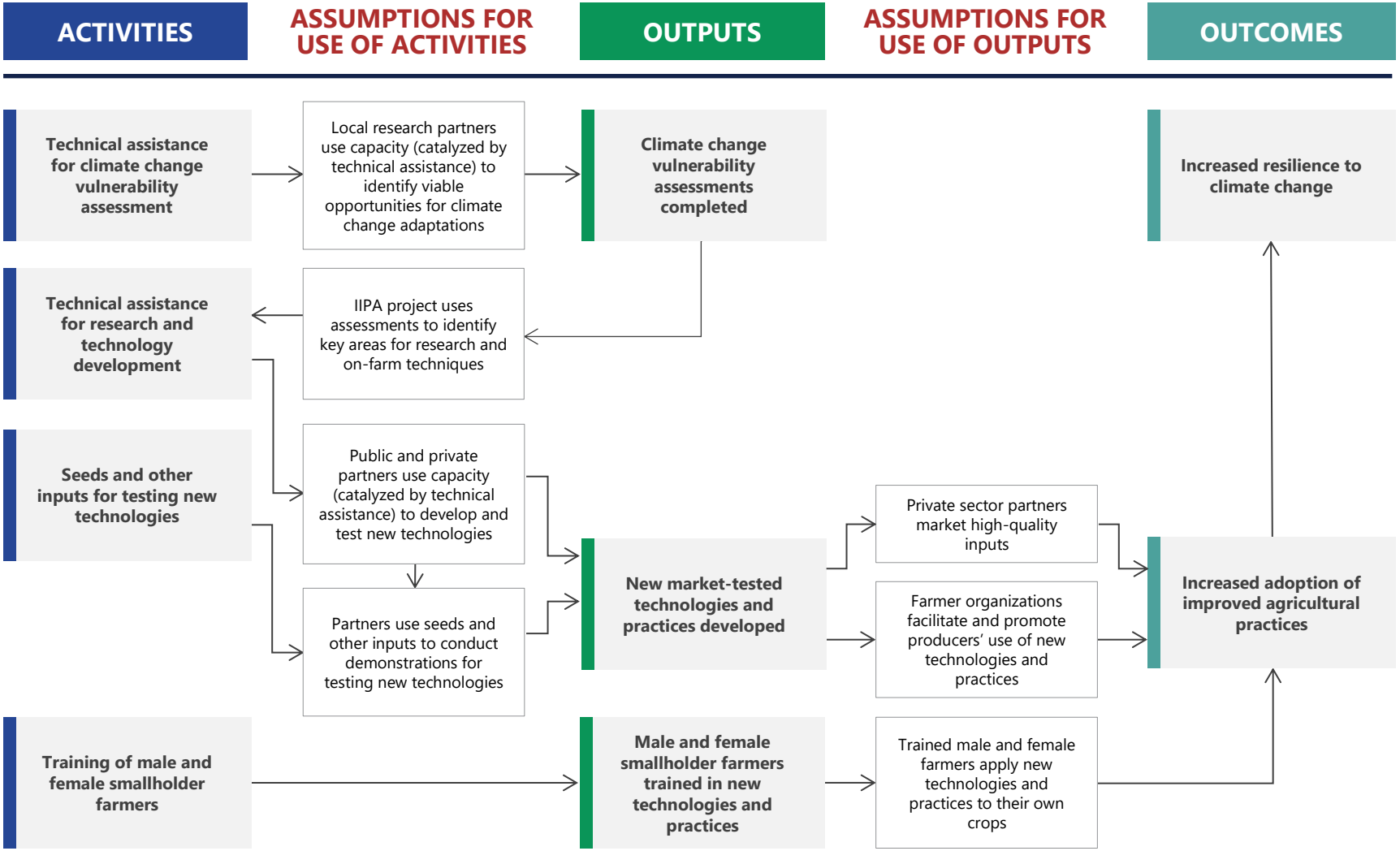
Each causal link may require more than one result-producing process.

To describe the result-producing processes, refer to the project design narrative, logframe or other logic model, experience, local knowledge, and logical reasoning.

Where useful and possible, specify the extent or duration of change expected for each result-producing process by setting targets or milestones.

Figure 5 shows the CLM logic model at the end of Step 2. It reveals—and corrects—a logical leap in the original results framework, which included a direct link between climate change assessments and the outcome *Increased resilience to climate change.* Increased resilience is now understood as a long-term result stemming from the other outcome, *Increased adoption of improved agricultural practices.*

Figure 5. CLM Logic Model with Assumptions about Causal Links



HOW CLM ADDS VALUE: STRENGTHENING THE INITIAL DESIGN

By delving more deeply into the assumptions behind the causal links, staff strengthen the project design by addressing inconsistencies and omissions.

"Causal leaps" become visible in the logic of the initial design, as in the case of the outcome Increased resilience to climate change. Causal links can specify the steps required to achieve the expected change.

Causal links clarify action needed by project staff or other partners to effectively support achievement of results.

Sequencing matters. A results framework may imply that project activities occur simultaneously. In contrast, completing a CLM logic model can uncover the most effective sequencing to achieve desired outputs and outcomes.

The CLM logic model makes it possible to show diverse and multiple interrelationships among elements. For example, an output may lead to more than one outcome. Feedback loops may also be captured, as in the example of the climate change vulnerability assessments influencing the development of new technologies and practices.

STEP 3 TIPS

Focus on contextual factors that are most likely to influence achievement of results. Insert these factors into the logic model alongside the causal links they affect.

Include different opinions on causal assumptions in the logic model by using separate boxes or varying colors or fonts, or a different line style (as in Figure 6, where italics and dotted lines mark the addition of gender-sensitive training and farmer field demonstrations).

If a perspective represents a framing of the situation (with different intended outcomes), include it as a contextual factor.

If a perspective implies a different pathway to an intended result, consider drafting a separate logic model.

Step 3. Enhance the Logic Model with Contextual Factors and Diverse Perspectives

The IIPA planners recognized that government incentives for agricultural inputs are vital for farmers' use of seeds and other inputs.[11] A change in government policies that distorts these incentives could seriously affect achievement of the outcome *New market-tested technologies and practices developed*. The design team added government incentives to the logic model as a contextual factor for this causal link (marked by a gray chevron in *Figure 6*).

The planners did not have enough information about how farmers will change their behavior to use the new technologies and training. Consultations with intended beneficiaries during the design phase were inadequate due to time constraints. Consequently, the CLM logic model now reflects only the knowledge and perspectives of donor and project staff involved in IIPA planning. To augment this incomplete information, project staff interviewed project partners (including traders and farmer organizations), and convened focus groups with farmers to gather diverse perspectives on the project and to inform their understanding about this critical link in the outcome chain.

[11] This information was included in the assumptions column of the project logframe and confirmed in consultations with partner experts.

Many farmers revealed in discussions that they prefer crops that require less fertilizer and produce higher output per hour worked, such as cassava. They are not inclined to use inputs like fertilizer that were developed for cereal crops.

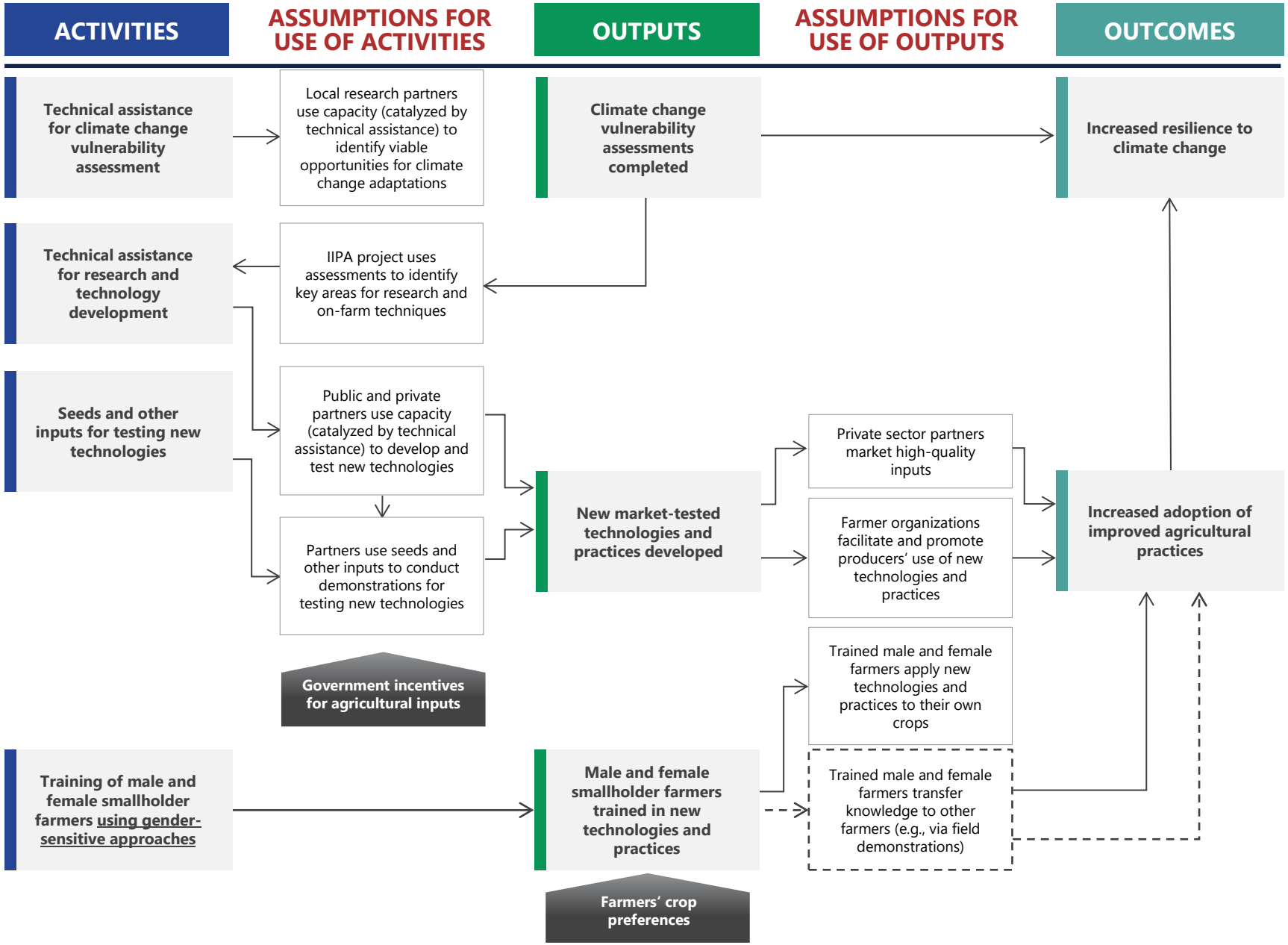
Project staff were surprised and concerned by the number of farmers who are shifting away from cereal production. The project design is based on the assumption that a significant number of farmers grow cereal crops and that they will be convinced to use fertilizers because of the higher yields. Instead, some farmers choose to grow crops that require fewer hours of work for comparable yields. The farmers' perspective represents a different framing of the situation—higher productivity for fewer hours worked rather than climate-resistant productivity. Farmers operating under this framing will select out of the project. If a substantial number of farmers prefer different crops, this could jeopardize the project's outcome, *Increased adoption of improved agricultural practices*.

Project staff considered the options and determined that the number of farmers willing to grow cereal crops and adopt new practices is sufficient to achieve the project's objectives. Staff agreed to proceed with implementation as planned while monitoring the influence of crop preferences on trained farmers' knowledge transfer. Project staff included crop preference as a contextual factor affecting the causal link to *Increased adoption of improved agricultural practices*, marked by a second gray chevron in *Figure 6,* below.

Based on additional information gleaned from the consultations, staff made further modifications to initial design as follows:

- Female smallholder farmers explained that it can be difficult for them to attend training. To facilitate their participation, training should be delivered at times and places, and in ways that are more convenient. Based on this feedback, staff incorporated gender-sensitive training delivery into the design by modifying the relevant activity.
- Farmer organizations and other partners agreed that trained smallholder farmers can play a more active role in increasing adoption of new technologies and practices by transferring knowledge to other farmers, for example through field demonstrations. Staff added an assumption on farmer field demonstrations to the logic model, marked by dotted lines in *Figure 6,* below.

Figure 6. CLM Logic Model with Contextual Factors and Additional Perspectives



HOW CLM ADDS VALUE: CONTEXTUAL FACTORS AND MULTIPLE PERSPECTIVES PROVIDE A "REALITY CHECK" FOR THE PROJECT DESIGN

Addressing contextual factors and capturing multiple perspectives enables staff to respond adaptively and steer the project in a desired direction.

Including contextual factors increases the likelihood that the most relevant conditions for achieving outputs and outcomes will be included in the design and monitored during implementation.

Depending on their relationship to the project, different actors may see the project's intended results and their causes differently. Capturing multiple perspectives provides insight into the ways that different actors engage with the project and may highlight barriers to achieving results and point to options for overcoming challenges.

STEP 4 TIPS

Select areas of observation for their strategic importance over the life of the project. Priorities will evolve as project implementation progresses.

Prioritize causal links which are subject to low certainty and agreement. Collect information reflecting diverse perspectives.

Add areas of observation as new information needs arise.

Integrate CLM and performance monitoring to provide data on both desired results and critical causal links.

Step 4. Prioritize Areas of Observation

IIPA project staff selected areas of observation based on two considerations:

- Causal links that are the most *strategic* for success
- Causal links where there is *less certainty* or agreement.

IIPA project staff prioritized monitoring to reflect the sequencing of project activities and the predicted pace of change. During the project's first phase, monitoring would focus on causal links between activities and outputs, and any contextual factors affecting those causal links. Later in the life of the project, the monitoring focus should shift to the causal links between outputs and outcomes and the relevant contextual factors.

Since initial progress hinges on the results of the climate change assessment, this was highlighted as an early priority, alongside public and private partners' subsequent use of technical assistance to build their capacity to develop new technologies. At a later stage, staff will monitor both causal links contributing to the outcome, *Increased adoption of improved agricultural practices.*

Because of uncertainty surrounding government incentives for agricultural inputs, IIPA staff will monitor whether those incentives continue to support partners to use agricultural inputs to grow demonstration plots.

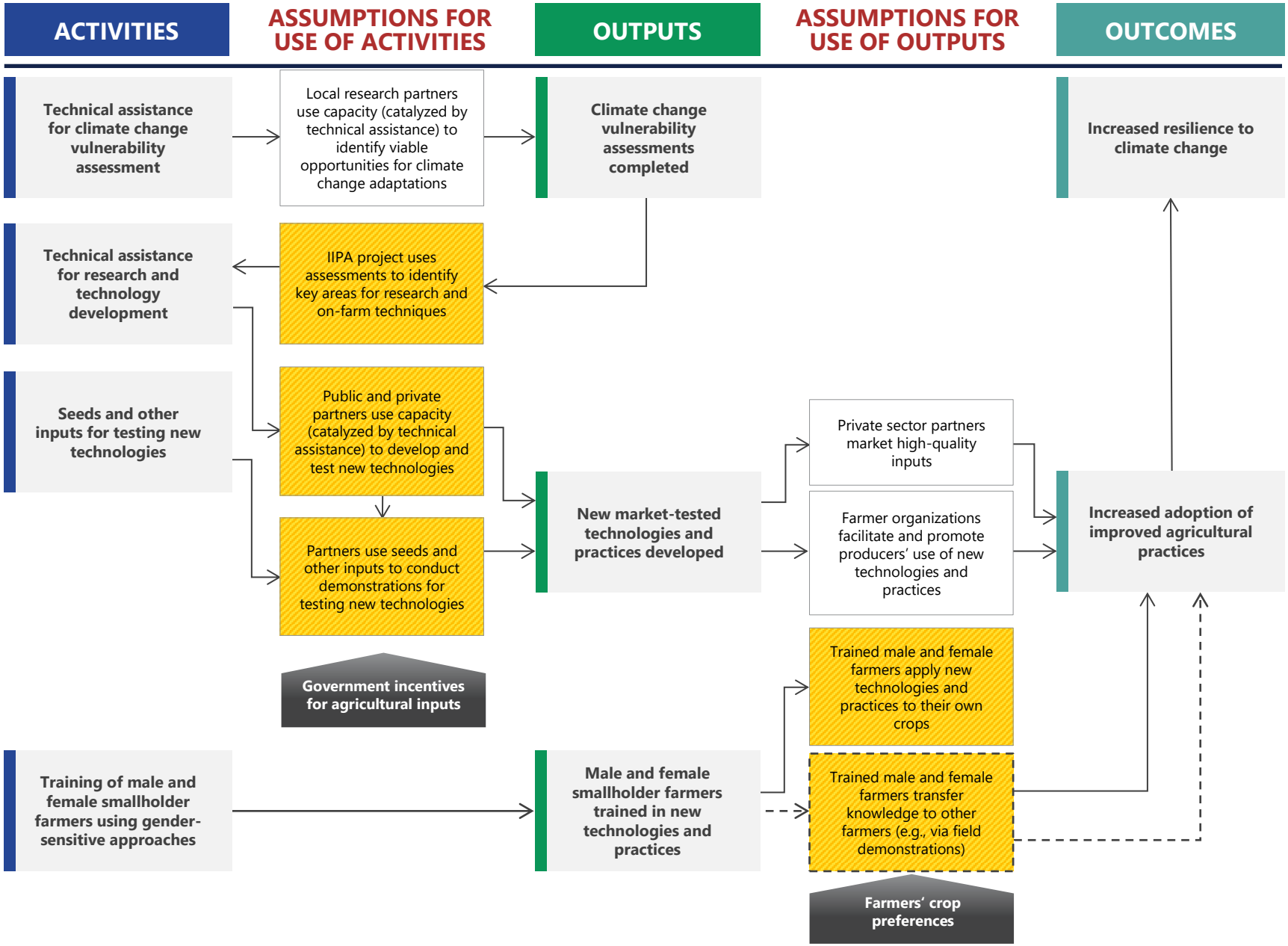
Staff prioritized the area of observation related to trained farmers' application of new technologies and practices because this causal link is characterized by uncertainty and low agreement, especially regarding farmers' crop preferences. This area of observation

includes two results-producing processes (farmers apply new technologies, and farmers transfer knowledge to other farmers) and a contextual factor (farmers' crop preferences). To aid monitoring, staff further specified the expected change in the casual link by setting a target of 50 percent of trained farmers applying at least one new practice to their own crops during the next agricultural cycle.

In summary, project staff selected the following areas of observation for monitoring (indicated by shading in *Figure 7*).

1. IIPA project uses assessments to identify key areas for research and on-farm techniques
2. Public and private partners use capacity (catalyzed by technical assistance) to develop and test new technologies
3. Partners use seeds and other inputs to conduct demonstrations for testing new technologies; with context government incentives (context factor).
4. Trained male and female farmers apply new technologies and practices to their own crops; trained male and female farmers transfer knowledge to other farmers (e.g., via field demonstrations); with farmers' crop preferences (context factor)

Figure 7. CLM Logic Model Highlighting Areas of Observation

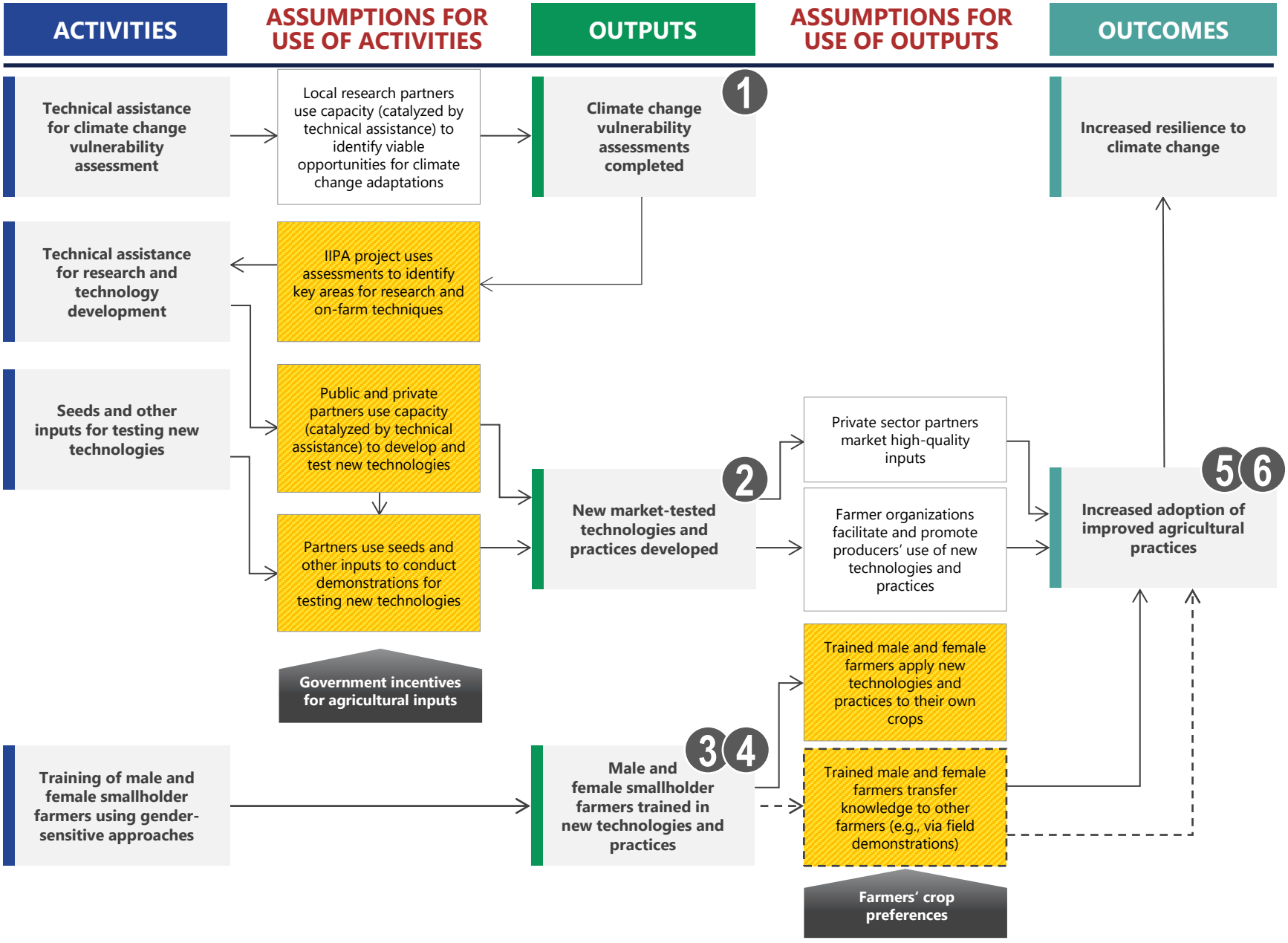


In addition to the CLM areas of observation, the IIPA project uses performance monitoring to provide information on the outputs and outcomes specified in the project logic model below. Because CLM and performance monitoring address different elements of the logic model, together they provide a more complete picture of the project's implementation. The indicator numbers in the table below correspond to the indicators listed in *Figure 8*, which demonstrates the complementarity of the two types of monitoring.

Performance Monitoring Indicators

INDICATOR	OUTPUT AND OUTCOME MEASURED
1. **Number of recommendations for climate change adoption tested**	Climate change vulnerability assessments completed
2. **Number of key commodity technologies under development**	New market-tested technologies/ practices developed
3. **Number of farmers trained in new technologies and practices** 4. **Average score from training participants on quality of training**	Male and female smallholder farmers trained
5. **Number of farmers who adopt new technologies and practices** 6. **Number of hectares under improved technologies and practices**	Increased adoption of improved agricultural practices

Figure 8. CLM Logic Model with Performance Monitoring Indicators



HOW CLM ADDS VALUE: MONITORING REFLECTS STRATEGIC PRIORITIES AND PROJECT PROGRESS

Together, performance monitoring and causal link monitoring provide a more complete and useful picture of the project. Performance monitoring indicators provide data on activities, outputs, and outcomes. Causal link monitoring tracks planned and emerging processes, linking those elements of the logic model.

With CLM, areas of observation track strategic points in the design that shift as implementation progresses. Unlike performance monitoring, which is based on a fixed set of indicators that are defined at the start, teams may add or drop areas of observation depending on project progress or contextual changes.

With CLM, areas of observation track points in the design where there is less certainty or agreement. It is not necessary to reach consensus or give preference to certain perspectives from the start of the project. Instead, information collected during monitoring is used to substantiate or disprove different perspectives, thus facilitating evidence-based decision-making.

STEP 5 TIPS

For each area of observation, use suitable data collection methods to answer the following questions:

Are the planned result-producing processes taking place?

What unplanned result-producing processes are taking place?

What contextual factors are influencing result-producing processes?

Where possible, integrate monitoring with project implementation to minimize the time and resources needed to complete the analysis.

Schedule monitoring when result-producing processes are observable. Draft data collection timetables in sync with the implementation work plan and the projected pace of change. Be aware that active areas of observation will shift over the life of the project.

CLM does not require a baseline and can be conducted on projects that are already underway.

Step 5. Collect Monitoring Data

Once project staff prioritized the areas of observation, monitoring staff ensured that the data were collected. The IIPA monitoring officer drafted a monitoring plan that integrated performance monitoring and CLM. The plan outlined how results would be measured, as well as causal links and contextual factors. The monitoring plan also specified how and when data should be gathered and who should be involved.

The CLM components of the monitoring plan were implemented differently than the performance monitoring components. The first difference was in the data collection schedule. The performance monitoring indicators were scheduled for data collection and reporting at the baseline, midline, and end of the project. In contrast, each causal link was scheduled for monitoring when results-producing processes were expected to take place according to the sequence of project activities and the pace of change. For example, performance monitoring indicators supplied data on the training provided to farmers, but it would be quite some time before data would be available on the outcome *Increased adoption of improved practices.* Using CLM, project staff monitored a sample of participating farmers to determine whether they were applying new agricultural practices and sharing knowledge about those practices with other farmers (results-producing process). If uptake by trained farmers is low or knowledge transfer is uneven, these problems can be observed and addressed in a timely manner.

Second, CLM monitoring evolved during project implementation to address new information needs. For example, IIPA managers called for further information about farmers' decision-making processes when fewer than expected adopted pesticides.

Third, CLM monitoring captured different perspectives on the project—in particular, those of the target beneficiaries and other key partners. For instance, project staff interviewed female farmers who participated in training to find out whether the training delivery facilitated their participation. Interviews with private traders and farmer organizations were intended to learn about their respective contributions to the project, and also their views on farmers' attitudes toward agricultural inputs or government incentives for using those inputs. An opinion poll carried out through the local agricultural extension program collected data on the attitudes of farmers who had opted out or were unable to participate in the program.

Based on the monitoring plan, the monitoring officer designed data collection tools and oversaw data collection by staff or independent monitoring teams. She compiled and analyzed the data and then shared the findings with colleagues, partners, and the donor as data became available.

STEP 6 TIPS

When possible, review performance monitoring data and CLM data together to interpret what is occurring.

Pay attention to differences among stakeholders, which can contribute to a more complete picture of the project's operational situation.

Be aware of changes in contextual factors and their actual influence on causal pathways. Identify unexpected or emerging results.

Focusing on deviances from intended routes is a good way to capture emergence in monitoring, provided those deviances are treated as sources of information for learning and improvement.

HOW CLM ADDS VALUE: DATA COLLECTION IS FLEXIBLE

With CLM, monitoring is in sync with project progress. Monitoring tasks are scheduled to reflect the sequencing of project activities and the pace of change.

CLM can address new information needs as they emerge in response to changes in the context or deviations from the project implementation plan.

CLM attends to different perspectives on the project, helping to cross-check data and identifying emerging results and conditions during implementation.

Step 6. Interpret and Use Monitoring Data for Adaptive Management

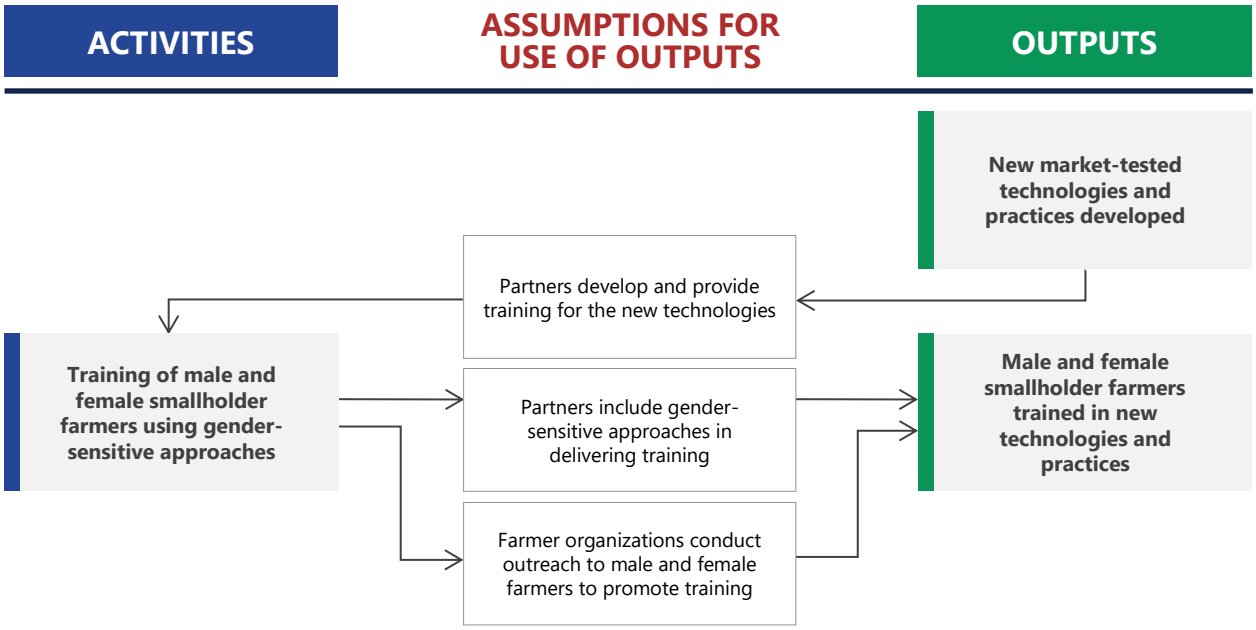
Project staff collaboratively reviewed the data provided by the monitoring officer, and discussed ways to adapt and improve project implementation based on the data. The monitoring officer reported both performance monitoring and CLM data related to training. Performance monitoring data indicated that training attendance was quite low. Performance monitoring data related to the activity *Training of male and female smallholder farmers using gender-sensitive approaches* included feedback from female farmers. These data revealed that, although trainers paid attention to the specific

needs of women farmers, few women had heard about the training. In addition, several female trainees mentioned that the training was "not practical."

The IIPA manager asked the monitoring officer to review this feedback further before the start of the next training course. Working with very little time, she reviewed the evaluations of training for both men and women, conducted a quick poll, and convened two focus groups (one with male participants and one with female participants) to explore training solutions. The new data showed that male farmers echoed the complaints of their female counterparts—they did not find the trainers credible, and they considered their newly acquired knowledge impractical. Both male and female farmers suggested that farmer organizations should be involved in the trainings.

When the IIPA team reviewed these findings, they concluded that the project's training component needed a significant modification. They scratched their current approach, in which the project staff designed and provided the training directly. Instead, staff decided that the project partners developing the new technologies and practices should take the main role in designing the content and delivering the training. Farmer organizations would conduct outreach to encourage their members to attend the training. In Step 7, IIPA staff modified the project design to reflect these changes *(see Figure 9)*.

Figure 9. Modified Causal Links and Assumptions for Training Activity



Monitoring data collected later in the project showed significant differences in men's and women's use of pesticides. Fewer female farmers purchased pesticides than did men, but more women used pesticides properly than their male colleagues, who often disregarded the safety instructions. Farmers who did not participate in the project or who had land adjacent to that farmed by participants complained about damage to their crops or water, and they expressed the opinion that pesticides had caused the damage.

A closer look at the data revealed that male respondents reported that they had heard about government incentives for pesticide purchase through their organizations, while female respondents did not describe incentives as a primary reason for purchasing pesticides. Since fewer women join farmer organizations or attend their meetings, they might be less aware of government incentives. However, this disparity did not explain women farmers' higher rates of proper use. Program staff convened a focus group of female farmers to clarify this point. Participants explained that they regularly receive public health and safety messages through schools and clinics, and that those messages remind them to heed chemical safety instructions.

These findings alerted staff to two emergent situations not foreseen in the initial design, and that could have negative implications for the project in the future. If more farmers who receive pesticides start to use them but fail to apply them safely, this could result in threats to the farmers, the environment, or other crops, depending on the pesticide. Also, if pesticide use is a critical factor in increasing crop yields, and if female smallholders lack equitable access, then economic benefits will not be inclusive. Therefore, these can be considered negative unexpected outcomes and measures should be taken to avoid them or curb their effects.

Later in the life of the project, IIPA team measured the performance indicator for *increased adoption of improved agricultural practices* by the farmers in the target area. The sample size was quite limited, and data collection struggled under other constraints; these factors lowered confidence in the indicator data. Reviewing performance indicator data in light of data on the results-producing process improved the overall quality of data for decision-making.

HOW CLM ADDS VALUE: MONITORING PROVIDES TIMELY AND ACTIONABLE DATA

CLM monitoring provides information in time for project staff to adjust the design. Tracking causal assumptions and contextual factors makes it possible to identify early warning signals that the project is not on track. With CLM, it is not necessary to wait until outputs or outcomes are achieved to assess whether the project will be successful. By paying attention to the process that leads to outputs and outcomes, makes it possible to obtain information much earlier than through performance monitoring.

Monitoring also informs decisions about whether adjustments are needed in the way activities are implemented or outputs are used. When monitoring data signals deviance from the project design, information about the results-producing processes taking place, and multiple perspectives on the project **design helps identify the reasons for deviance.**

STEP 7 TIPS

Eliminate or revise all causal assumptions and links that are not validated, and insert new ones if appropriate.

Enhance the design with updated information about diverse perspectives and contextual factors.

Highlight all items in the revised logic model that are still characterized by low certainty and low-agreement causal links representing different perspectives that have not yet been validated.

Transform unexpected outcomes into causal assumptions that can contribute to curb their effects—or avoid them altogether.

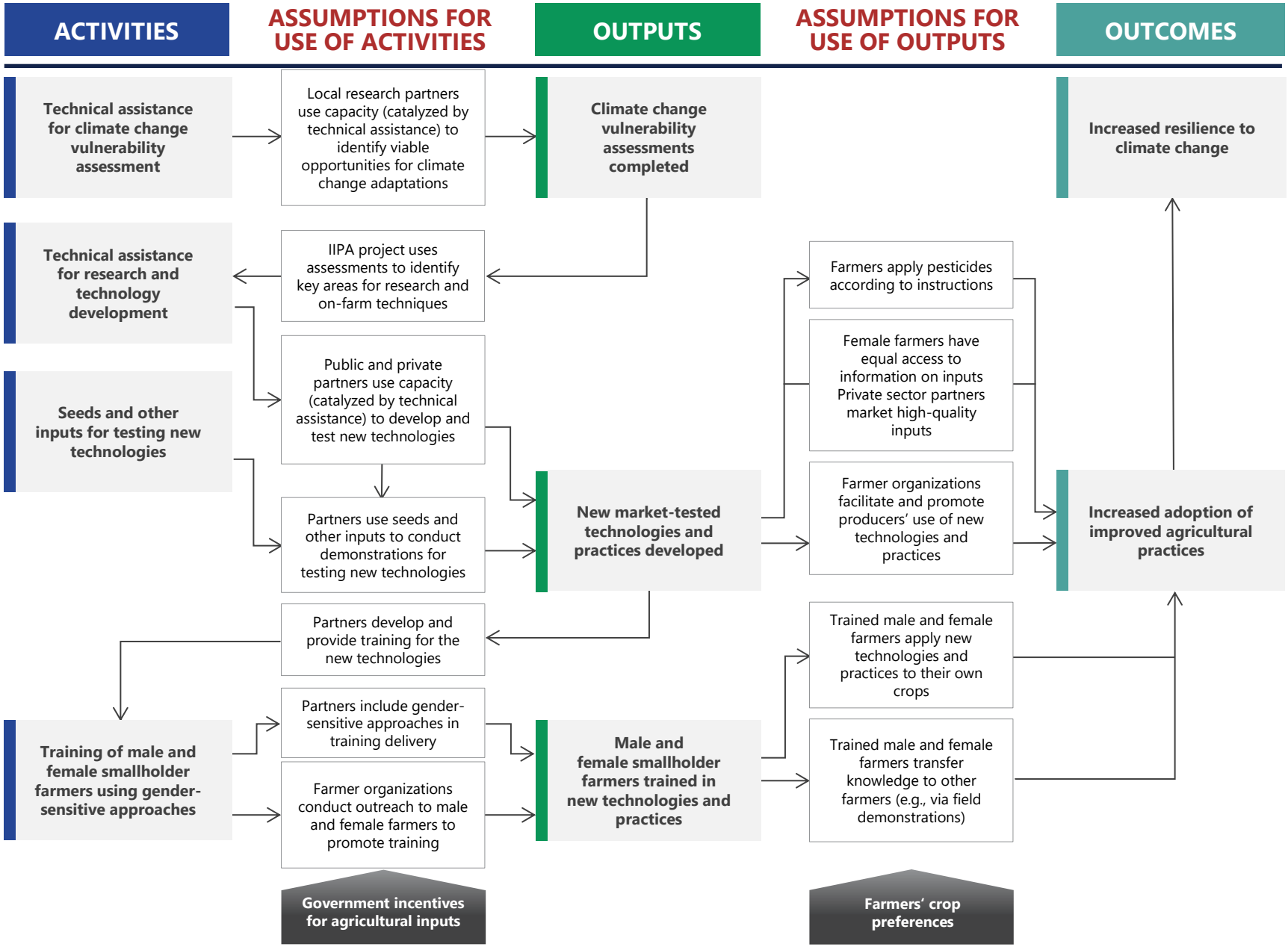
Step 7. Revise the Logic Model

The IIPA team revised the logic model to reflect project modifications *(see Figure 10)*. In the revised design, all project outputs are now connected and must be delivered sequentially. Consequently, the effect of the contextual factor *Government incentives for agricultural inputs* on all causal links between activities and outputs is clear. Because data collection confirmed two assumptions about gender-sensitive training and farmers' involvement in knowledge transfer, the dotted lines were removed. In view of the two negative unexpected outcomes identified in step 6, staff revised the logic model to include two new: *Farmers apply pesticides according to instructions*, and *Female farmers have equal access to information on inputs*. Monitoring these assumptions will provide staff the information they need to mitigate against possible negative outcomes.

Project staff used the revised logic model to communicate and negotiate changes to project partners and the donor. They adjusted project implementation in keeping with the modified design, especially in the sequencing of activities.

CLM is an iterative process with several monitoring and review cycles. The updated logic model marks the beginning of another sequence of CLM Steps 4, 5, and 6. Building on what was learned, IIPA staff will confirm priority areas of observation or select new ones, collect data, and use the findings to inform management decisions. This will lead to further adjustments to the design to reflect new information, and changes in the project and its context.

Figure 10. Revised CLM Logic Model



HOW CLM ADDS VALUE: MONITORING SUPPORTS ADAPTIVE MANAGEMENT

CLM monitoring supports adaptive management. Monitoring and (re)design inform each other iteratively throughout implementation.

After the first monitoring cycle, **the CLM logic model captures a more nuanced and richer picture of the project** and its context than the initial result framework. Additionally, it includes new causal assumptions and links to be tested in the next round. Thus, during each cycle, CLM monitoring is based on an increasingly refined and evidence-based logic model and provides management more realistic and up-to-date information. This facilitates decisions about whether adjustments are needed in the way activities are implemented or outputs are used. When monitoring data signals deviance from the project design, information about the results-producing processes taking place, and multiple perspectives on the project design helps identify the reasons for deviance.

Causal Link Monitoring Tips

STEP 1: Build a logic model

- Illustrate the project's theory of change in a logic model format that includes space for causal links between activities, outputs, and outcomes (see Figure 10 for an example).
- When using the horizontal CLM format, group results by causal sequence from left to right, starting with activities. Depending on the required level of detail, it may also be useful to include inputs.
- As much as possible, arrange activities in the order in which they will be implemented, from the top to the bottom of the model.

STEP 2: Identify assumptions about causal links

- Specify the assumptions for each causal link using the following formula:

  [Actor] *uses* ***result X*** *in order to achieve* ***result Y.***

- Each causal link may require more than one result-producing process.
- To describe the result-producing processes, refer to the project design narrative, logframe or other logic model, experience, local knowledge, and logical reasoning.
- Where useful and possible, specify the extent or duration of change expected for each result-producing process by setting targets or milestones.

STEP 3: Diverse perspectives and contextual factors

- Focus on contextual factors that are most likely to influence achievement of results. Insert these factors into the logic model alongside the causal links they affect.
- Include different opinions on causal assumptions in the logic model by using separate boxes or varying colors or fonts, or a different line style (as in Figure 6, where italics and dotted lines mark the addition of gender-sensitive training and farmer field demonstrations).
- If a perspective represents a framing of the situation (with different intended outcomes), include it as a contextual factor.
- If a perspective implies a different pathway to an intended result, consider drafting a separate logic model.

STEP 4: Prioritize areas of observation

- Select areas of observation for their strategic importance over the life of the project. Priorities will evolve as project implementation progresses.
- Prioritize causal links that are subject to low certainty and agreement. Collect information reflecting diverse perspectives.
- Add areas of observation as new information needs arise.
- Integrate CLM and performance monitoring to provide data on both desired results and critical causal links.

STEP 5: Collect monitoring data

- For each area of observation, use suitable data collection methods to answer the following questions:

  Are the planned result-producing processes taking place?

  What unplanned result-producing processes are taking place?

  What contextual factors are influencing result-producing processes?
- Where possible, integrate monitoring with project implementation to minimize the time and resources needed to complete the analysis.
- Schedule monitoring when result-producing processes are observable. Draft data collection timetables in sync with the implementation work plan and the projected pace of change. Be aware that active areas of observation will shift over the life of the project.
- CLM does not require a baseline and can be conducted on projects that are already underway.

STEP 6: Use monitoring data for adaptive management

- When possible, review performance monitoring data and CLM data together to interpret what is occurring.
- Pay attention to differences among stakeholders, which can contribute to a more complete picture of the project's operational situation.
- Be aware of changes in contextual factors and their actual influence on causal pathways. Identify unexpected or emerging results.
- Focusing on deviances from intended routes is a good way to capture emergence in monitoring, provided those deviances are treated as sources of information for learning and improvement.

STEP 7: Revise the logic model

- Eliminate or revise all causal assumptions and links that are not validated, and insert new ones if appropriate.
- Enhance the design with updated information about diverse perspectives and contextual factors.
- Highlight all items in the revised logic model that are still characterized by low certainty and low-agreement causal links representing different perspectives that have not yet been validated.
- Transform unexpected outcomes into causal assumptions that can contribute to curb their effects—or avoid them altogether.