IFPRI Modeling Systems

Informing future pathways and priorities

Applying Foresight Analysis in National Agrifood System Investment Planning

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International Food Policy Research Institute

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Introduction: Current State of Foresight Approaches for Agrifood System Investment Planning

National governments, particularly in low- and middle-income countries, face considerable complexity in long- and midrange agrifood system development planning. These processes must translate political priorities and commitments into credible investment strategies, while coordinating across ministries, engaging diverse stakeholders, and mobilizing domestic and external financing. At the same time, planners must contend with deep uncertainty around climate change, technological change, market dynamics, and demographic and nutrition transitions, often under conditions of constrained analytical capacity and limited resources.

In practice, agrifood system development planning is context specific and does not follow a singular pattern. It is typically an iterative, multistage process that incorporates evidence-based analysis within political realities. This process often begins with a stocktaking exercise to establish a shared baseline and the articulation of goals and targets that reflect both national development priorities and external commitments. In some countries, these steps occur within broader policy frameworks, such as the Comprehensive Africa Agriculture Development Programme (CAADP) in Africa, which provides common reference points, targets, and accountability mechanisms (Box 1). Governments then work with technical partners to identify, refine, and prioritize investment options within fiscal and institutional constraints. Resulting plans are then consolidated into strategy or investment documents intended to guide budgeting, mobilize finance, and signal priorities to domestic and external stakeholders.

Box 1. Comprehensive Africa Agriculture Development Programme

Since the early 2000s, the Comprehensive Africa Agriculture Development Programme (CAADP) has provided a common framework for African countries to develop National Agricultural Investment Plans, and more recently, under the Kampala Declaration, National Agrifood Systems Investment Plan. Over time, CAADP has helped strengthen coherence, investment readiness, and accountability across and within countries by promoting shared reference points, results frameworks, and review processes, while remaining sufficiently flexible to allow for country-specific adaptation and implementation (Bahiigwa et al. 2025).

Foresight analysis is "a structured and systematic approach of exploring plausible futures to anticipate and better prepare for change" with the aim of improving the effectiveness and robustness of policies and investments.[1] Foresight analysis has been used to address agrifood system strategies and planning using both model-based and participatory approaches. Model-based approaches use quantitative simulations to test assumptions and generate numerical scenarios of how agricultural and food systems may evolve. Participatory approaches rely on narrative storylines and structured stakeholder engagement processes to explore drivers, uncertainties, and alternative future pathways (Reilly and Willenbockel 2010;

[1] https://www.oecd.org/en/about/programmes/strategic-foresight.html

Wiebe et al. 2025). Both approaches offer complementary tools and methods that can help governments wrestle with uncertainty, stress-test assumptions, incorporate targeted data and insights, and articulate plausible future pathways. In recent years, some foresighting efforts have emerged that use combined approaches to address agro-environmental issues (Box 2).

Box 2. Combination of participatory and model-based foresight approaches

Participatory and model-based foresight approaches were combined under several multi-year projects to address topics at the intersection of agriculture and the environment.

AgMIP**:** The Agricultural Model Intercomparison and Improvement Project (AgMIP) combines participatory climate-risk and adaptation dialogues between farmers, researchers, and policymakers with coordinated ex ante crop, climate, and economic modeling to assess agricultural impacts and adaptation pathways under future climate scenarios.

CCAFS**:** The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS, 2009-2022) combined participatory scenario planning with ex ante climate, crop, and economic models to evaluate agricultural adaptation and policy options under alternative climate and food-system futures before implementation.

Foresight for Food**:** The Foresight for Food initiative integrates inclusive, country-led foresight dialogues with selective quantitative analysis to explore long-term food-system transformation pathways, explicitly addressing cross-cutting issues such as nutrition and diets, equity and livelihoods, environmental sustainability, resilience to shocks, innovation, and governance trade-offs.

While model-based and participatory foresight approaches have been combined in various programs to address agricultural development issues, they have not been integrated in a structured, replicable way for agrifood system development planning. This gap is becoming more consequential as planning shifts from agriculture to agrifood systems, increasing the need for rigor and transparency in assessing trade-offs among multiple desired outcomes.

The purpose of this note is to articulate how model-based and participatory approaches can be used in combination, drawing on the International Food Policy Research Institute's (IFPRI's) model-based foresight work and RTI International's participatory-based foresight work, as well as global foresight practice and lessons learned. This note provides practical guidance and options to help guide governments, foresight practitioners, ex ante modeling teams, and donors supporting national agrifood system investment planning processes. It focuses specifically on the role of combining the approaches within the context of the African agrifood system investment planning process while also generating insights and practical lessons that are broadly applicable to national agrifood system planning in low- and middle-income countries.

Two Complementary Fields of Foresight: Informed Planning

Ex Ante Modeling

Model-based foresight analysis in agriculture, including ex ante modeling, comes from a quantitative tradition and has been used to inform scenario-based planning processes. It is distinct from "forecasting," which focuses on predicting future outcomes (Riera et al. 2025). There are many examples of global and national-level organizations that use quantitative models to inform investment planning for the agriculture sector and agrifood systems. Some well-established models include IFPRI's IMPACT model[2] and RIAPA,[3] ENVISAGE,[4] the Asia-Pacific Integrated Model (AIM) model,[5] GLOBIOM,[6] and the Common Agricultural Policy Regionalised Impact Modelling System,[7] among others. These modeling processes typically involve defining scenarios based on explicit assumptions (such as population, climate, and technology), and analyzing their implications through dynamic interactions among production, trade, and consumption systems over time (Wiebe et al. 2025; Gupta et al. 2025). IFPRI's RIAPA model has been developed to support country-level analysis of agrifood system policy options and shocks within such foresight frameworks and has been used extensively to inform national-level planning.

Participatory Foresight

Participatory foresight has its roots in scenario planning and stakeholder-informed processes to identify pathways forward amid complexity. The Foresight4Food Initiative provides many examples of how participatory methods have been applied to agriculture and food systems, including efforts to unlock the economic potential of Lake Turkana through multistakeholder scenario development,[8] explore future opportunities for youth in Africa's agrifood systems,[9] and facilitate systemwide transformation processes across African agrifood systems.[10] Typical process elements include scoping and framing the problem to be solved, scanning trends and identifying key uncertainties, exploring plausible futures through scenarios, and identifying "no regrets" actions. Recently, RTI implemented a participatory foresight-driven process with the Ministry of Agriculture in Belize (see Box 4).

Comparison of the Two Approaches

Model-based foresight and participatory foresight approaches have distinct strengths and limitations (see Table 1) and are often applied in isolation due to differences in methods, data

[2] https://www.ifpri.org/project/ifpri-impact-model/
[3] https://www.ifpri.org/project/riapa-model/
[4] https://www.gtap.agecon.purdue.edu/models/envisage.aspx
[5] https://www-iam.nies.go.jp/aim/
[6] https://iiasa.ac.at/models-tools-data/globiom
[7] https://www.capri-model.org/
[8] https://foresight4food.net/project/unlocking-the-economic-potential-of-lake-turkana/
[9] https://foresight4food.net/project/foresight-for-the-future-of-youth-in-africas-agri-food-systems/
[10] https://foresight4food.net/project/facilitating-foresight-for-agri-food-systems-change-in-africa/

sources, technical expertise, and other resource requirements. We propose that these approaches are more effective when integrated, combining analytical rigor with structured stakeholder engagement to support holistic, evidence-based planning and broader stakeholder buy-in. When used together, model-based and participatory foresight approaches can help address the limitations each faces when applied individually.

Table 1. Comparison of model-based and participatory foresight approaches

	Model-based foresight	Participatory foresight
Strengths	▪ Quantifies outcomes and trade-offs (such as gross domestic product, poverty, jobs, emissions) ▪ Enables comparison across policy and investment scenarios ▪ Assesses the feasibility of targets under economic and biophysical constraints ▪ Provides testability and comparability ▪ Produces consistent, evidence-based metrics for decision-making	▪ Builds shared vision and consensus among diverse stakeholders ▪ Surfaces contextual knowledge, assumptions, and political economy considerations ▪ Encourages creative exploration of futures beyond existing data or model structures ▪ Strengthens ownership and legitimacy of planning processes
Limitations	▪ Has high data and technical requirements ▪ Requires clearly defined scenarios and assumptions upfront ▪ Can often be slow and resource-intensive due to iterative modeling cycles ▪ Has limited ability to capture institutional feasibility and political dynamics, or other considerations not explicitly included in the model ▪ Can be difficult to downscale national models to regional or local realities	▪ Lacks quantitative estimates of impact and trade-offs ▪ Can be difficult to prioritize among options without analytical backing ▪ Can be resource-intensive to facilitate well at scale ▪ May be harder to translate results directly into formal plans or targets

Source: Authors.

Complementarity Between the Two Approaches

Both foresight approaches offer distinct but mutually reinforcing strengths. Qualitative methods are particularly well suited to surfacing values, power dynamics, and social processes that are not easily captured in formal models, while quantitative approaches generate numerical evidence and test internal consistency in ways that narrative-based analysis cannot (Wiebe et al. 2025; Woodhill et al. 2025). In practice, qualitative engagement often plays a critical role in setting the frame for analysis: early stakeholder processes help identify which futures are most relevant, which uncertainties matter most to decision-makers, and which assumptions are considered plausible, ensuring that modeling efforts address the right questions rather than simply those that are most tractable (Wiebe et al. 2025). Qualitative-based scenario development also plays an essential role in managing deep uncertainties, such as political disruptions or technological breakthroughs, for which limited or no historical data exist, and which simulation models are therefore ill-equipped to address in isolation. Taken together, these

approaches contribute to a more comprehensive foresight practice that moves fluidly between methods, with qualitative approaches building shared understanding and quantitative tools testing systemic implications and generating actionable evidence (Wiebe et al. 2025; Woodhill et al. 2025; Riera et al. 2025).

Toward an Integrated Foresight Approach for Agricultural Development Planning

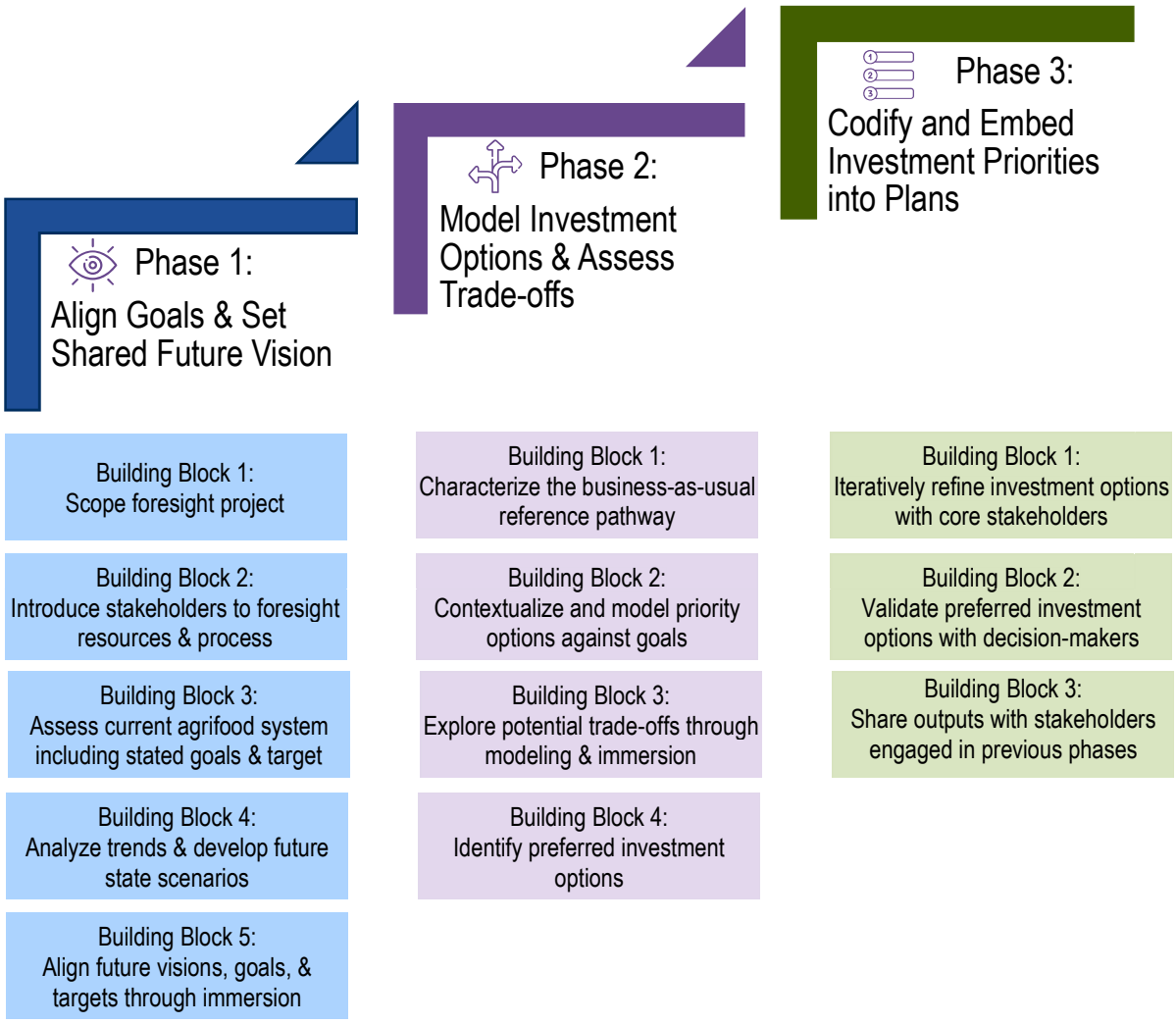
Our hypothesis is that integrating model-based and participatory foresight approaches into a more complete and cohesive approach can amplify their respective strengths and address key limitations of prevailing foresight practices in national agrifood system investment planning. By combining these approaches, the integrated framework helps resolve bottlenecks that arise at different stages—particularly early in the process, when priorities are shaped in ways that can make later adjustments more difficult.

We propose an integrated foresighting approach for agrifood system investment planning. The three phases of this approach focus on (see Box 3 for further description):

1. Aligning goals and setting a shared future vision
2. Modeling investment options and assessing trade-offs
3. Codifying and embedding investment priorities into plans (see Figure 1)

Within these phases, we outline “building blocks,” which are typical areas of engagement and analysis that characterize important steps in a typical foresight-informed agricultural development planning process. The phases and their building blocks are represented in a modular way. No one approach will work across all contexts. The lines depicted in Figure 1 between the proposed phases and building blocks are not necessarily hard divisions, nor do they represent a linear sequence of steps. They can be combined, reordered, or bundled depending on country context, time availability, and whether the engagement is more model-led or participatory, as demonstrated in the implementation considerations section in each phase. This framing is meant to characterize a set of options that can guide government stakeholders toward a more structured, holistic foresight approach.

Figure 1. Phased approach for using integrated foresight for agrifood system investment planning



Source: Authors.

Box 3. Overview of Phased Approach

The integrated foresight approach addresses key limitations that arise when ex ante modeling or participatory foresight are applied in isolation by intentionally combining their complementary strengths across three phases.

- In **Phase 1,** integration supports early alignment on goals, assumptions, and the use of foresight tools while exploring multiple plausible futures, reducing the risk of narrow assumptions, unrealistic targets, weak stakeholder buy-in, or late-stage rejection of the analysis. Participatory foresight approaches feature prominently in Phase 1, reflecting the importance of stakeholder engagement for building early alignment and generating the shared understanding and inputs needed for subsequent analytical modeling.
- In **Phase 2**, integration supports assessment of investment options as packages rather than stand-alone actions, making trade-offs explicit and reducing the likelihood of overlooking interaction effects or prioritizing options without a clear analytical basis. This phase strongly emphasizes model-based foresight approaches, with selective use of participatory foresight approaches to help stakeholders interpret results, stress-test assumptions, and compare alternative investment pathways.
- In **Phase 3**, integration supports validation, clear communication, and handoff of prioritized investment options into formal planning and budgeting processes, reducing the risk that analytically robust recommendations fail to influence real-world decisions. This phase relies most heavily on the structured engagement approaches that underpin participatory foresight to build shared understanding and support uptake, with analytical evidence used to reinforce and document recommendations.

Together, the integrated foresight approach improves credibility, relevance, and uptake by linking analytical rigor with structured deliberation and institutional decision-making across the full planning cycle. These phases can be implemented flexibly to reflect the needs, preferences, timelines, and intended outputs of a specific integrated foresight engagement. In practice, implementation typically combines a series of virtual and in-person consultative meetings between a core team—including the sponsoring government agency or department and the technical foresight team—with workshops and collaborative sessions involving broader stakeholders. These key interaction points are complemented by asynchronous, iterative feedback on draft analyses and final outputs to support refinement and alignment over time. Depending on the emphasis of the phase, ex ante modeling may lead, with participatory foresight supporting, or the reverse may occur. Detailed descriptions of the phases, building blocks, and implementation options are provided in the next section.

Phase 1: Align Goals and Set a Shared Future Vision

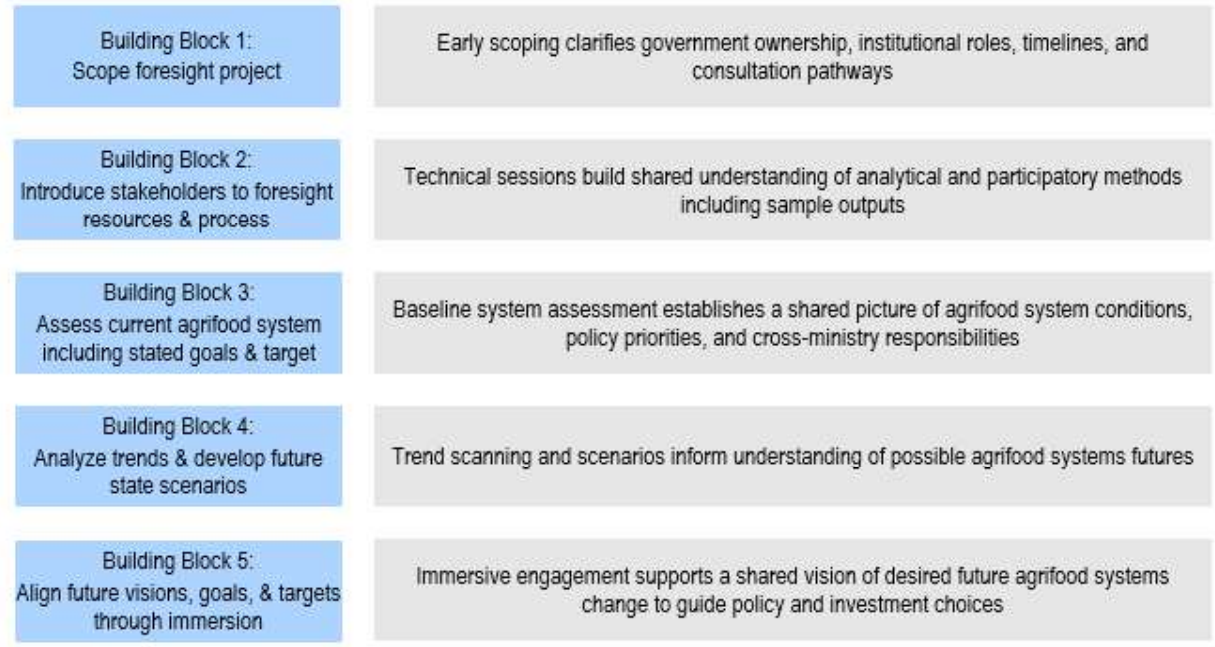
From current state realities to future visions

Focus: Phase 1 establishes a shared foundation for foresight-informed agrifood system investment planning by clarifying the scope, introducing government stakeholders to foresight tools and processes, and grounding discussions in current agrifood system conditions, policy goals, and climate considerations. This phase relies heavily on participatory foresight approaches, drawing on current state and future trend analysis to support an immersive, collaborative exploration of plausible future scenarios. Through this process, stakeholders align on priority goals and targets that reflect a shared future direction and provide clear inputs for subsequent analytical modeling and investment prioritization.

Stakeholders engaged: The foresight team engages key government stakeholders (such as the Ministries of Agriculture and Planning) who serve as the core advisory team; key decision-makers responsible for translating final outputs (that is, investment priorities) into concrete National Agricultural Investment Plans; and broader agrifood system stakeholders with a vested stake in informing and delivering on national agrifood systems goals.

Expected outputs: Phase 1 delivers a stakeholder-informed shared future vision for the agrifood system, a prioritized set of goals and targets to guide subsequent ex ante modeling, and a preliminary set of investment options consistent with the desired future state. Together, these outputs establish a coherent foundation for subsequent analytical and prioritization work.

Figure 2. Phase 1 building blocks



Phase 1 Building Blocks in Detail

Building Block 1

Key activities include:

- Anchoring the foresight process in a clear government request and intended use, establishing ownership and demand-driven engagement
- Clarifying institutional leadership and coordination needs, including roles of agriculture, planning, and finance ministries
- Setting realistic expectations for timing, milestones, and stakeholder consultation, allowing space for iteration and analytical rigor
- Agreeing on project scope, consultation approach, and planning horizon to guide subsequent foresight and analysis

Core engagement asset: The introductory briefing and process overview orients government stakeholders to the integrated foresight approach, clarifying its objectives, structure, and sequencing. It outlines expected outputs and how they will inform national planning and investment decisions, helping establish shared expectations from the outset.

Building Block 2

Key activities include:

- Providing an overview of ex ante model-based foresight tools to build shared understanding of how agrifood system components interact, including linkages with the broader economy

- Introducing participatory foresight approaches and their role to explain how qualitative methods (such as scenario narratives, visioning, and structured engagement) complement model-based analysis
- Using illustrative, generic investment options and example outputs to demonstrate what stakeholders can expect and the nature of insights that foresight outputs produce
- Clarifying the scope and limits of both ex ante modeling and participatory foresight tools, including how quantitative data and stakeholder input will be combined
- Engaging appropriate institutional counterparts for sustained use, especially planning and finance ministries, given their central role in ongoing development planning and budgeting

Core analytical asset: A generic set of broad agrifood system investment areas to illustrate the types of options that can be examined through ex ante modeling. It serves as a practical starting point for discussion before options are adapted to country priorities and conditions, helping move from shared direction to more focused analysis.

Building Block 3

Key activities include:

- Taking stock of policy goals, targets, and institutional responsibilities to distinguish binding targets from broader objectives
- Conducting an initial agrifood system diagnostic to establish a shared understanding of system structure and performance
- Engaging industry stakeholders through key informant interviews to ground the assessment in current sector realities
- Defining the central foresighting question that is aligned with national priorities and the planning horizon

Core analytical asset: The agrifood system diagnostic provides a clear snapshot of how the agrifood system contributes to national economic outcomes, considering agriculture alongside processing, trade, and transport. It highlights key structural features, performance patterns, and constraints shaping system outcomes, offering an evidence-based foundation for considering policy and investment options (Source: IFPRI).

Building Block 4

Key activities include:

- Assessing major trends and drivers of change across economic, technological, environmental, political, and social domains
- Engaging industry stakeholders through key informant interviews to identify locally observed trends and drivers of change
- Benchmarking national agricultural development goals and quantitative targets (such as rate of poverty reduction) against historical and cross-country experiences to ground high-level ambitions for future change
- Developing plausible and contrasting future scenarios about how future change may happen to inform immersive foresight engagement and subsequent ex ante modeling

Core engagement asset: Distinct future scenarios are developed by combining insights on trends, key uncertainties, and current system conditions. Each scenario describes a plausible way that the agrifood system could change over time. Together, the scenarios help stakeholders discuss what a desirable future looks like and consider how policy and investment choices may shape future outcomes (Source: Rydeen et al., 2025).

Building Block 5

Key activities include:

- Developing scenario artifacts (such as timelines, short narratives, visuals, or audio) that make the alternative futures from Building Block 3 concrete and easy to engage with
- Convening a time-bound, in-person immersion workshop with key decision-makers and diverse stakeholders to explore scenarios and discuss implications from multiple perspectives
- Using structured discussion to identify common direction—including "investment areas"—and to surface key trade-offs or points of disagreement early
- Translating workshop outputs into a short list of broad, generic investment areas that reflect common ground and are sufficiently defined to inform subsequent modeling and analysis

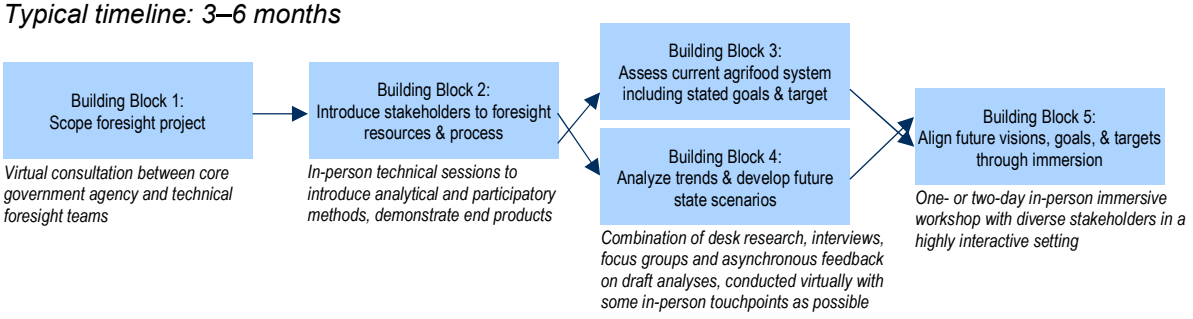
Core engagement asset: The alternative futures immersion workshop convenes government, industry, and other key stakeholders to explore plausible future directions for the agrifood system from multiple perspectives. By jointly examining future scenarios and their implications, the workshop helps surface trade-offs, test assumptions, and build shared understanding to inform coherent direction-setting for planning (Source: Rydeen et. al., 2025).

Phase 1 Implementation Options and Considerations

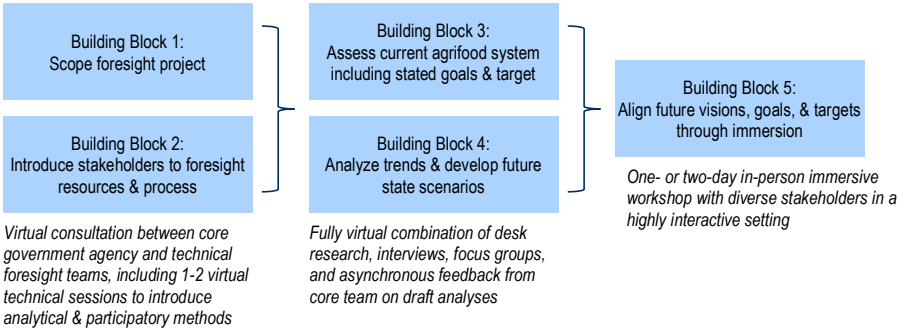
Phase 1 can be implemented in various ways depending on the needs and preferences of the sponsoring government agency, as well as the timeline and resources available to support the foresight process. In practice, Phase 1 typically involves a mix of virtual and in-person engagement with a core government team, supplemented by targeted consultations and immersive workshops with diverse stakeholders. While in-person engagement is not required, some in-person interaction can accelerate alignment and shared understanding, especially among the core team. The scenarios outlined in Figure 3 illustrate two ways that Phase 1 building blocks could be sequenced and layered to achieve decision-ready outputs.

Figure 3. Ways to sequence and layer Phase 1 building blocks

Example: Emphasis on iterative consultation and stakeholder engagement
Typical timeline: 3–6 months



Example: Emphasis on parallel activities and primarily virtual engagement
Typical timeline: 2–4 months (see Box 4 for an example of how this was implemented in Belize).



Box 4. Phase 1 Case Study: Belize Climate Foresight Workshop

Context: RTI, in partnership with IFPRI and the Caribbean Community Climate Change Centre (the 5Cs), engaged Belize's Ministry of Agriculture, Food Security and Enterprise (MAFSE) to support the integration of agrifood systems into Belize's Nationally Determined Contributions (NDCs). The participatory foresight engagement was guided by a central question: Over the next 10 years, what proactive steps can Belize take to plan for more climate-resilient agriculture, food systems, and food security while achieving the adaptation priorities and mitigation co-benefits outlined in the NDCs?

Approach: This guiding question was developed through a scoping engagement with MAFSE (building blocks 1 and 2). Interviews with agricultural stakeholders across Belize provided insights on country context, emerging trends, and agrifood system planning priorities. These insights, combined with global trends analysis and climate vulnerability assessments, were used to develop three plausible future scenarios (see visual representation of Scenario 1 in the photo) underpinned by two critical drivers of change: the level of agricultural investment and the pace of climate change (building blocks 3 and 4). Scenario timelines and podcasts supported in-person immersive workshops, where participants explored implications, articulated preferred future characteristics, and translated insights into actionable opportunities (building block 5). Stakeholders prioritized 11 no-regrets opportunities, which were further developed during a second workshop day into draft action plans outlining a 10-year vision, priority actions, key drivers, and risks.

Results: The participatory foresight process took place within a few months. Building blocks 1–4 occurred remotely, and building block 5 occurred during an in-person workshop that built alignment across stakeholders while surfacing trade-offs under uncertain futures. The resulting no-regrets priorities provided a foundation for NDC-aligned planning decisions by MAFSE, the Ministry of Sustainable Development, Climate Change, and Disaster Risk Management, and more.

Phase 2: Model Investment Options and Assess Trade-offs

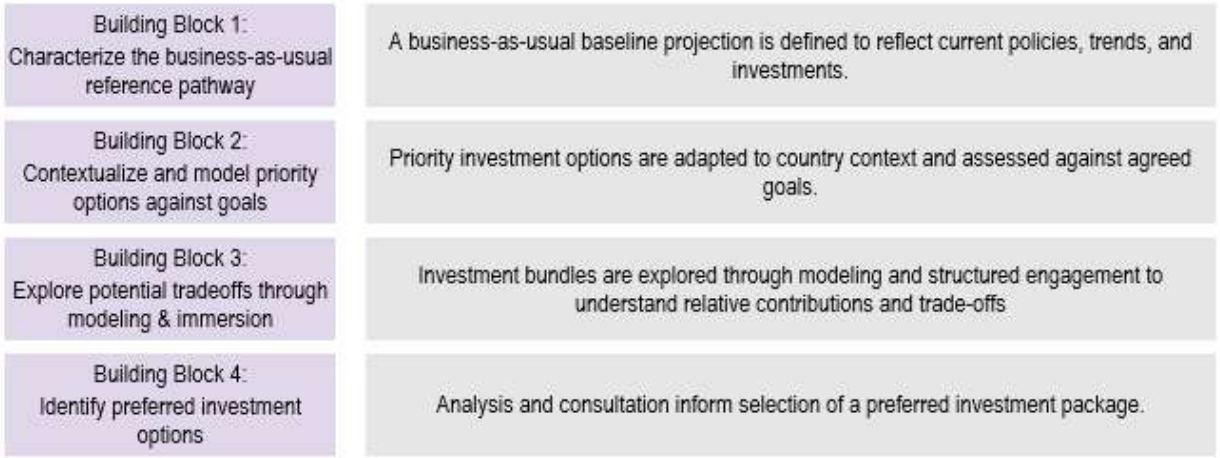
Testing alternatives to inform choices

Focus: Phase 2 builds on the shared foundation established in Phase 1 by translating aligned goals, targets, and broad investment areas to country realities and representing them in analytically robust formats. This phase relies heavily on model-based foresight approaches to examine how alternative bundles of investment options perform against agreed goals and targets, including comparisons with a business-as-usual (BAU) reference pathway. Participatory foresight methods are used selectively to support stakeholders in interpreting model results, examining trade-offs across objectives, and supporting convergence toward preferred investment packages.

Stakeholders engaged: The foresight team works with a core government technical team (typically agriculture, planning, and finance counterparts) through iterative engagement to contextualize options, refine assumptions, and interpret preliminary modeling results. Phase 2 also engages key decision-makers responsible for selecting and endorsing investment priorities, with targeted involvement of other stakeholders as needed to support interpretation and convergence.

Expected outputs: Phase 2 delivers a modeled comparison of alternative investment packages, showing how different combinations contribute to agreed goals and targets, a clear articulation of trade-offs across objectives, and a recommended investment package suitable for inclusion in national agricultural or agrifood system investment plans. Together, these outputs translate shared priorities into analytically grounded and decision-ready investment options.

Figure 4. Phase 2 building blocks



Phase 2 Building Blocks in Detail

Building Block 1

Key activities include:

- Establishing a quantifiable BAU projection that builds on the shared vision from Phase 1, namely a baseline reference pathway reflecting what happens if current policies, investment patterns, and macroeconomic assumptions are carried out
- Documenting assumptions to provide a clear evidence base for future reference
- Using the BAU to frame realistic expectations about future performance, absent major policy or investment shifts

Core analytical asset: The BAU projection provides a transparent, documented baseline that describes how the agrifood system is expected to evolve under current policies, investment patterns, and structural constraints, given historical performance. It quantifies the shared vision of the future described at the end of Phase 1, represents what might realistically happen in the absence of major policy change, and provides a common benchmark for comparing alternative investment bundles.

Building Block 2

Key activities include:

- Identifying a manageable set of country-specific investment options derived from Phase 1
- Adapting model inputs to reflect country realities, including data availability and implementation context
- Applying ex ante modeling to compare estimated relative impacts of individual investments with agreed goals and targets
- Engaging government technical teams through iterative check-ins to validate assumptions, refine model parameters, and support interpretation

Core analytical asset: The contextualized investment options represent a set of country-relevant investment choices that reflect national priorities, policy context, and implementation realities. By clarifying what can reasonably be examined and compared, it provides a practical basis for modeling investment bundles and interpreting results in Phase 2.

Building Block 3

Key activities include:

- Analyzing different bundles of contextualized investments to examine complementarities and interactions across options, compare how different investment packages perform across multiple objectives, and highlight trade-offs

- Engaging government counterparts to identify diverse stakeholders who can interpret results and assess trade-offs from multiple vantage points and identify context- and policy-relevant insights through a structured foresight immersion workshop
- Translating analytical findings into accessible visuals or narratives to support decision-making

Core engagement asset: The foresight immersion workshop on trade-offs convenes government and selected stakeholders to consider how different investment bundles contribute to agreed goals and targets. Through a facilitated discussion of model results, the workshop helps clarify trade-offs and relative strengths of alternative pathways, supporting convergence toward a preferred investment package.

Building Block 4

Key activities include:

- Supporting government partners in distilling insights from modeling and immersion that compare alternative investment bundles, given different contributions and complementarities
- Facilitating prioritization of a set of preferred investment options through iterative analytical refinement and stakeholder consultation
- Clearly articulating the rationale, trade-offs, and assumptions underlying the prioritized investment package

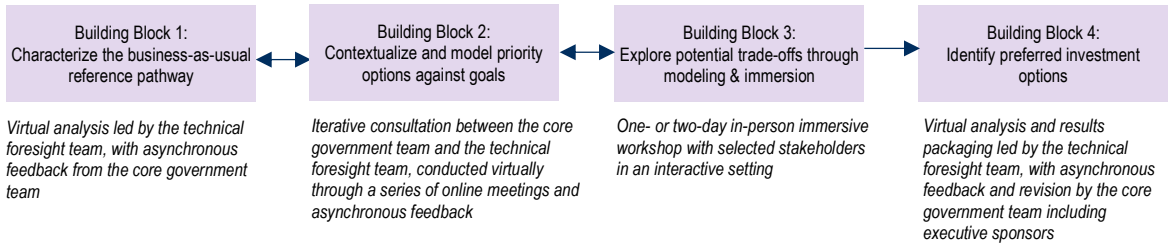
Core analytical asset: The prioritized investment package presents a clear set of investment recommendations and budget requirements for planning decision-makers, drawing on Phase 2 analysis and immersion. It summarizes how the selected package is projected to contribute to agreed-upon future state goals and targets, and identifies practical considerations for implementation, providing a clear basis for national investment decisions.

Phase 2 Implementation Options and Considerations

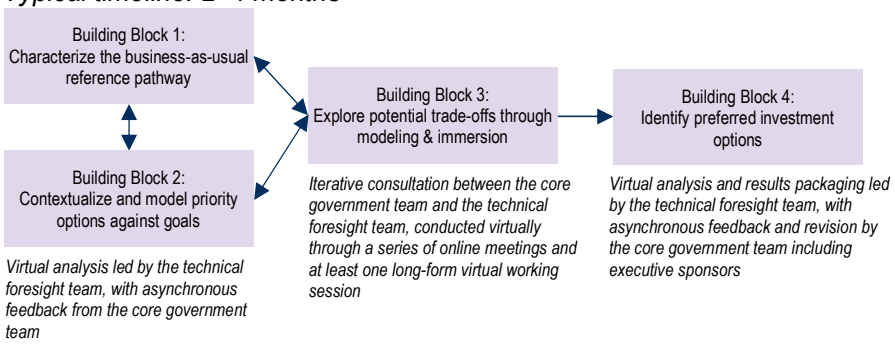
The implementation of Phase 2 varies based on the sponsoring agency's interest in iterative engagement around the analytical modeling effort, including expectations for model refinement and stakeholder input. In practice, Phase 2 centers on a set of model development and testing cycles, supported by structured check-ins with a core government team to review assumptions, results, and emerging trade-offs (see example from Rwanda in Box 5). Selective stakeholder engagement—such as through an interactive immersion session—supports interpretation of findings and a comparison of alternative investment options. The scope and pace of Phase 2 can be adjusted to balance analytical depth with decision timelines and convergence needs. Figure 5 presents two illustrative options for how these phases might be operationalized.

Figure 5. Ways to sequence and layer Phase 2 building blocks

Example: Emphasis on iterative consultation and stakeholder engagement
Typical timeline: 4–6 months

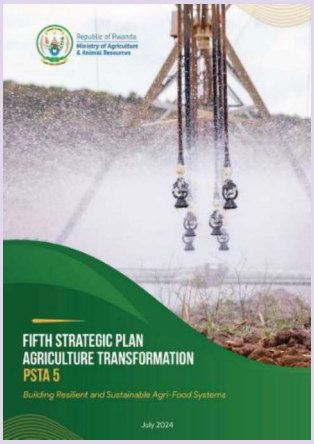


Example: Emphasis on virtual-only engagement and tight feedback loops
Typical timeline: 2–4 months



Box 5. Phase 2 Case Study: Rwanda's Strategic Plans for Agriculture Transformation

Context: Since 2018, IFPRI has worked with Rwanda's Ministry of Agriculture and Animal Resources (MINAGRI) on successive agricultural strategies, which are called Strategic Plans for Agriculture Transformation (PSTA). The plans aim to strengthen agriculture's contribution to growth, food security, and poverty reduction. IFPRI supported the midterm evaluation of PSTA-4 and the overall focus of PSTA-5.



Approach: IFPRI's early engagement used the RIAPA model to produce a baseline growth outlook and a small set of generic investment scenarios designed to stimulate dialogue and allow MINAGRI to shape the direction of the analysis in line with national priorities (building blocks 1 and 2). The initial investment scenarios were then refined to reflect government priorities, such as targeting specific crops or types of livestock, and the availability of better data on investment costs and benefits (building block 3). The number of model scenarios expanded from a small set of 10–20 investments to more than 150 tailored scenarios targeting diverse value chains with more specific, complex interventions (building block 4). A generic irrigation investment scenario, for example, was separated into irrigation for small-scale, marshland, and large-scale farming systems. Rwanda-specific investments were also modeled, such as soil conservation measures through progressive and radical terracing. The main output was a list of investment options, which were ranked according to their cost-effectiveness in driving a range of outcomes prioritized by the government. The combined impact of all investments under PSTA-5 was also simulated. Model assumptions and results were regularly updated based on stakeholder feedback and presented at validation workshops in Kigali (see building blocks in Phase 3).

Results: The modeling process generated evidence that directly informed the design of PSTA-5. Unlike earlier work focused on the PSTA-4 midterm review, results were integrated into the planning process from the outset. The analysis assessed economywide impacts under full implementation and compared alternative budget scenarios, including more ambitious and resource-constrained pathways. Iterative engagement improved the relevance and transparency of the analysis and strengthened stakeholder understanding and uptake. Overall, Rwanda's experience demonstrates how close collaboration between modelers and policymakers can enhance the usefulness of model-based foresight for designing agricultural development plans.

Phase 3: Codify and Embed Investment Priorities into Plans

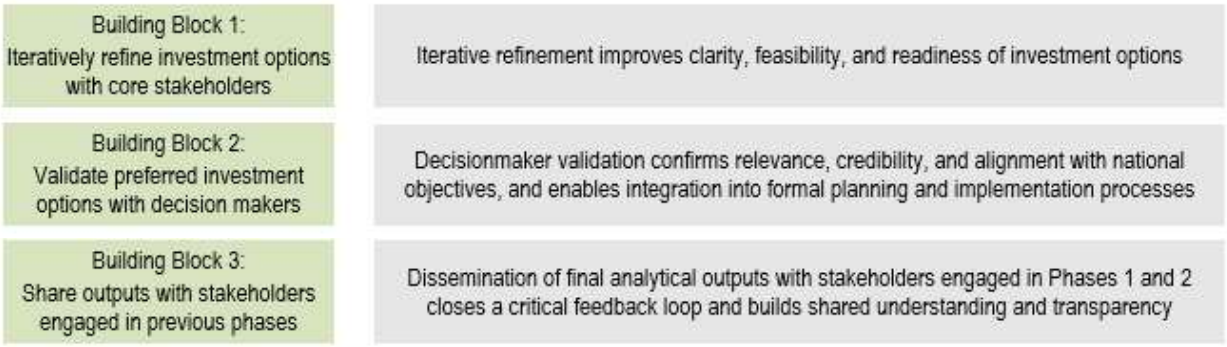
Embedding priorities into planning and decision processes

Focus: Phase 3 builds on the analytical convergence achieved in Phase 2 by validating, formalizing, and embedding the preferred investment options into national agrifood system investment planning processes. This phase relies primarily on the structured engagement methods of participatory foresight to support clear communication, build shared understanding, and secure institutional ownership of analytically grounded priorities. Through validation and dissemination activities, government counterparts translate agreed-upon priorities into planning documents, budgets, and implementation frameworks, supporting effective uptake in real-world decision-making.

Stakeholders engaged: Phase 3 primarily engages government counterparts with formal responsibility for planning, budgeting, and plan approval, including senior officials in agriculture, planning, and finance ministries. The phase may also involve broader stakeholders and decision-makers—such as cross-ministry actors or high-level endorsement bodies—as needed to validate priorities, support uptake, and facilitate transition from analysis to implementation.

Expected outputs: Phase 3 delivers validated and documented investment priorities ready for incorporation into national agricultural or agrifood system investment plans, along with supporting materials that clarify assumptions, trade-offs, and intended use. Together, these outputs ensure that priorities identified in Phase 2 are translated into actionable, institutionally owned plans.

Figure 6. Phase 3 building blocks



Phase 3 Building Blocks in Detail

Building Block 1

Key activities include:

- Engaging core government counterparts to refine and finalize the scope, sequencing, and specification of investment options to reflect policy priorities, implementation realities, and planning constraints
- Preparing refined options in formats suitable for senior-level validation, aligned with national planning and budgeting requirements
- Disseminating final analytical outputs to industry and other stakeholders who provided input in previous phases

Core analytical asset: The refined investment options brief reflects updates to proposed investment options and budget requirements based on iterative engagement with core government stakeholders. It clarifies scope, assumptions, and feasibility considerations, ensuring options are clearly articulated and ready for decision-level review.

Building Block 2

Key activities include:

- Presenting refined investment options to senior decision-makers in a concise, decision-focused format
- Incorporating decision-maker feedback to finalize the set of validated investment options
- Finalizing foresight analytical outputs and summary materials for key decision-maker validation and integration into formal plans
- Documenting key assumptions, trade-offs, and limitations to support appropriate interpretation and follow-on implementation
- Supporting formal handovers to designated government teams, thereby clarifying the transition to full government ownership

Core engagement asset: The decision-maker briefing materials present preferred investment options in a concise, decision-focused format for senior officials. They summarize expected contributions to agreed goals, key trade-offs, and considerations for how options are taken forward in national planning and budgeting processes.

Building Block 3

Key activities include:

- Communicating finalized priorities and supporting evidence in accessible formats to support understanding and transparency
- Closing feedback loop with ministries, private sector, and civil society actors who provided input to Phases 1 and 2 to build awareness and support for implementation

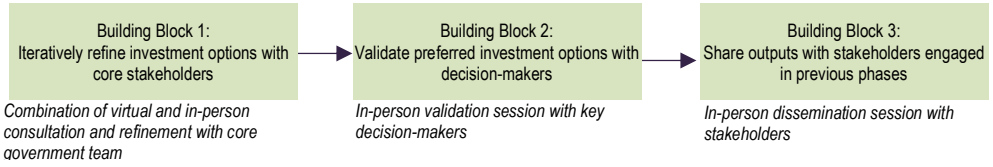
Core engagement asset: A virtual stakeholder dissemination session provides a structured opportunity to share validated investment priorities and their rationale with a broader set of stakeholders. It supports transparency and shared understanding of how priorities align with national goals and planning decisions.

Phase 3 Implementation Options and Considerations

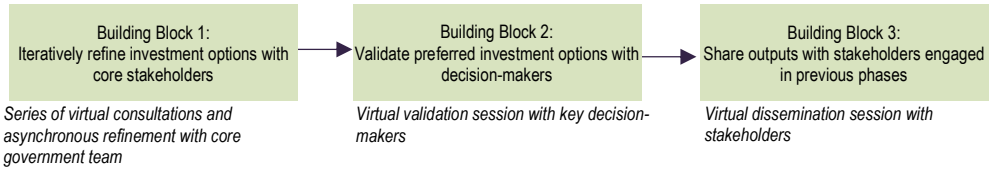
Phase 3 implementation primarily differs based on whether engagement is conducted virtually or in person. In many cases, Phase 3 can be delivered through a focused set of virtual briefings with senior decision-makers and core government counterparts to validate priorities and support handover. Where feasible, in-person engagement can strengthen shared understanding, legitimacy, and uptake, particularly during dissemination or endorsement moments. Figure 7 presents alternative ways of operationalizing Phase 3 through virtual or in-person sessions. Box 6 reflects on a highly engaged process to develop Tanzania's Agriculture Master Plan.

Figure 7. Ways to sequence and layer Phase 3 building blocks

Example: Emphasis on in-person validation and dissemination
Typical timeline: 2–3 months



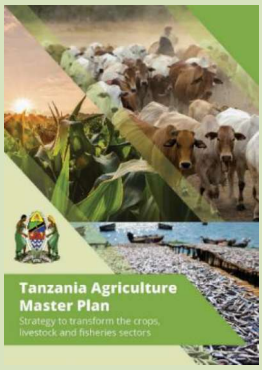
Example: Emphasis on virtual validation and dissemination
Typical timeline: 1–2 months



Box 6. Phase 3 Case Study: Tanzania's Agriculture Master Plan

Context: In 2024, IFPRI worked with the African Agricultural Transformation Initiative (AATI) to support the Ministry of Agriculture in Tanzania in preparing their Agriculture Master Plan (AMP). The AMP identified policy and investment priorities for the entire agriculture sector, including crops, livestock, forestry, and fisheries. Before IFPRI joined the design process, AATI and Tanzania's Ministry of Agriculture (MINAG) had identified five strategic goals that included raising smallholders' productivity and incomes, promoting commercial farms and agricultural exports, and creating an enabling environment for inclusive agricultural transformation. They conducted a series of stakeholder engagements to identify flagship investment areas to align with the strategic goals.

Approach: IFPRI used its RIAPA model to simulate Tanzania's business-as-usual future growth path and to evaluate the potential impacts of implementing the flagship investments. The scenarios measured how cost-effective the different flagships would be in achieving a range of outcomes. These included the AMP's five strategic goals, as well as outcomes such as gross domestic product, job creation, poverty reduction, and diet quality. The final model scenarios simulated actual government spending plans (levels) across the flagships.



Modeling results were presented alongside the draft AMP at workshops involving government, donor, and private sector partners. Over a period of four to six months, AATI and IFPRI refined the flagship investments and updated the scenarios based on feedback from MINAG and other stakeholders (building blocks 1 and 2). The AMP policy document cited the results of the final model scenarios (building block 3) and described the modeling approach undertaken during the AMP design process.

Results: The modeling revealed important trade-offs between flagship investment choices. For example, overinvesting in irrigation infrastructure for larger commercial farms reduced how much of the AMP's benefits accrued to poorer smallholder farmers. Refinements to the AMP led to a more balanced portfolio of flagship investments.

The Path Forward

Foresight can play a more effective, efficient, and sustained role in national agrifood system investment planning when model-based and participatory approaches are used together instead of in isolation, and when integrated foresight approaches are purposefully embedded into the planning cycle. This note has outlined a practical, modular approach for integrating participatory foresight and ex ante modeling to support goal setting, transparent assessment of trade-offs, and alignment between analytical evidence and planning decisions. Governments and their partners can apply this integrated approach flexibly, tailoring sequencing, depth of analysis, and stakeholder engagement to country context, institutional capacity, and planning timelines.

The value of structured, integrated foresight extends beyond the production of a single plan or investment package. When national counterparts are meaningfully engaged throughout the process, foresight builds institutional familiarity with future-oriented thinking, strengthens the use of evidence in policy dialogue, and creates a foundation for updating priorities as conditions change. Combining participatory and model-based approaches also mirrors the shift in agriculture sector investment planning to consider the entire agrifood system—demanding an approach that is more holistic, without putting strain on tight timelines and limited budgets. Continued collaboration among governments, analytical organizations, and donors can help reinforce this shift by linking structured foresight outputs to formal planning and budgeting processes, supporting capacity development for sustained use of models and scenarios, and ensuring that foresight remains a living input to agricultural transformation.

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