



APPLYING PARTICIPANT FINANCIAL ANALYSIS TO THE REFINEMENT PERIOD

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A Series of How-To Notes for Participant Financial Analysis

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ACRONYMS

BHA	Bureau for Humanitarian Assistance
IGA	Income Generating Activity
IP	Implementing Partner
IPTT	Indicator Performance Tracking Table
kg	kilogram
M&E	Monitoring and Evaluation
RFSA	Resilience Food Security Activities
USD	U.S. Dollar

I.0 BACKGROUND

This is a series of How-To notes to help implementing partners (IPs) apply the Participant Financial Analysis of on-farm and off-farm livelihood activities they completed as part of their Request for Applications submissions or other solicitation documents towards design questions during their refinement period for Resilience Food Security Activities (RFSAs). While updating this analysis during the refinement period may be valuable, it is not a requirement of the Bureau for Humanitarian Assistance (BHA).

This series builds off of the Participant Financial Analysis Technical Guidance, located here, that explains how to build a Participant Financial Analysis for each intervention during the RFSAs application phase. That document also outlines where IPs can find data that may be relevant to these How-To notes.

During the refinement phase, specific questions may arise that the Participant Financial Analysis can answer in whole or in part. Those questions are:

- How do I compare among intervention or design options?
- What is the right level of treatment or dosing for this intervention?
- What is required to scale this intervention?
- How can the Participant Financial Analysis inform M&E indicator targets?
- How do I consider the exposure to risk in these interventions?
- Will there be issues of affordability over time or access to finance?
- What is the impact on the household if they are engaging in multiple interventions?

The analysis completed in the RFSAs application phase can be modified or updated to answer these questions. Each question is discussed below, with tips and best practices.

These questions can be answered using a sophisticated and detailed approach to Participant Financial Analysis.¹ However, the objective of this document is to keep the analysis simple so that it can be widely understood and applied by all activity designers and implementers. There are limitations to a simple analysis; however, the hope is this document can help answer some of these questions or provide a starting point if IPs decide to engage in deeper analysis.

WHEN TO USE THESE HOW-TO NOTES

This series of How-To notes is to help IPs answer questions in their formative and implementation research plans during the refinement period. Some of these questions may be easily answered at the

¹ Guidance for a such an analysis can be found in Gittinger, James Price. Economic Analysis of Agricultural Projects. No. Edn 2. John Hopkins University Press, 1982.

beginning of the refinement period, whereas others may rely on the data collected during this period and might be answered at any point during the refinement period, or even later during activity implementation.

HOW DOES THIS COMPARE TO OTHER REFINEMENT PHASE ANALYSIS?

The basic Participant Financial Analysis is complementary to other analyses IPs may be considering as part of their refinement phase, such as value chain analysis or other market analyses. This section discusses two other common analyses in the refinement period and how information from these analyses could help in updating the Participant Financial Analysis to understand the profitability of the intervention for the target participants.

A **value chain analysis** is one of several market systems approaches that has a much broader focus than the Participant Financial Analysis. Value chain analysis seeks to understand the firms that operate within an industry—from input suppliers to end market buyers; the support markets that provide technical, business and financial services to the industry; and the business environment in which the industry operates. This is compared to the Participant Financial Analysis that focuses only on the farmer or worker/entrepreneur, which is of course just one stakeholder in the value chain. However, the farmer/worker/entrepreneur is influenced by the prices along this value chain and the value chain analysis can help understand if there will be sufficient supply of inputs in the market in order to scale the intervention and if there will be sufficient demand in the end market for an increased supply of the commodities, products, or services; this information can be tied into the Participant Financial Analysis. Additionally, power dynamics along the value chain will influence the price the farmer or worker/entrepreneur will receive for their commodities, products, or services. A value chain analysis can help inform the price structure of inputs and sales for the target participants, and therefore their profitability in the basic Participant Financial Analysis; for more information on how to tie these analyses together, see How-To note 4.0 on considerations for scaling the intervention in this document.

IPs may also consider a **market systems resilience study**. These studies tend to be similar to the value chain analysis explained above, but with a heavier focus on the interconnections along the value chain and their vulnerability to shocks and stresses. As with the value chain analysis, this is a much broader focus but the results of this study may be useful for understanding the risks that are unique to the commodities, products, or services promoted in each intervention and how that might affect the profitability and vulnerability of the farmer or worker/entrepreneur. For more information on how to tie information from a market systems resilience study to the basic Participant Financial Analysis, see How-To note 6.0 on how to understand risk to the farmer or worker/entrepreneur.

2.0 HOW TO COMPARE AMONG OPTIONS?

IPs may be debating among several interventions; perhaps they want to consider which intervention might give them the most value for money or to prioritize which interventions to select. IPs may also be weighing different designs or technologies and would like to compare them head-to-head. An important criterion for prioritizing interventions is if they have the highest return for the money invested in them.

There are two ways to approach this analysis:

- **From the perspective of the implementing partner:** Implementation funds are scarce resources, and the more people IPs can help for the fewest dollars, the higher the overall impact of the intervention. It is important to compare interventions by including the implementation costs. The Participant Financial Analysis completed in the RFSA application phase only considers costs from the farmer or worker's perspective; however, IPs will need to consider implementation costs to compare the value of each intervention to its total cost. Specifically, IPs need to add in the costs the organization expects to incur per person. For this perspective, please proceed to "Additional Data Needs".
- **From the perspective of the farmer/worker:** At this step, IPs may only be interested to know which intervention will most likely increase the food security situation of the household, regardless of how much it costs for implementation. This might be the case if IPs want to examine different intensities of the intervention, or compare different possible technologies. In this case, skip to the How-To note 3.0 on "What is the right level of treatment or dosing?"

ADDITIONAL DATA NEEDS

- **Implementation costs per intervention:** This includes estimated direct implementation costs such as staff time developing training materials and training farmers or workers, technical assistance to these participants, any materials provided directly to participants, and any subsidies provided as part of the intervention (e.g., subsidizing the cost of irrigation systems).
- **Anticipated number of participants for each intervention:** It is likely easier to estimate the total costs of designing and implementing an intervention (see first bullet point), and then dividing those costs by the number of targeted participants. If so, estimate the total number of direct participants of this intervention.

Dividing the implementation costs per intervention by the anticipated number of direct participants for each intervention will provide the estimated **implementation costs per participant**.

UPDATING THE PARTICIPANT FINANCIAL ANALYSIS

For each intervention, IPs should already have a net incremental revenue from the Economic Guidance for Resilience Food Security Activities for the revenues and costs from the farmer or worker's perspective as well as their investment costs. The recommended approach in this section is only relevant if the net

incremental revenue is positive. To compare options, add the farmer or worker investment costs to the implementation costs per participant for a total investment cost.

Total investment costs = investment costs (for farmer or worker) + implementation costs per participant

Total investment costs can be compared with the net incremental revenues that were previously calculated. We suggest doing this using a simplified approach to estimate a payback period. **Payback period** can be calculated by dividing the total investment cost by the net incremental revenue.

Payback period = Total investment cost / net incremental revenue

This payback period is an indication of how many years (or seasons if the net incremental revenues were calculated on a seasonal basis) it will take for the revenues to exceed the costs of the intervention.

INTERPRETING THE RESULTS

IPs can compare all options directly to each other using their payback periods. Payback periods across multiple interventions, or alternative designs of the same intervention, can help find which interventions will recover the total investment cost soonest. Given that many of these interventions will continue to earn positive net incremental revenues for many years, it is reasonable to assume that those investments with the soonest payback periods might return more value per dollar spent than those investments with longer payback periods.

3.0 WHAT IS THE RIGHT LEVEL OF TREATMENT OR DOSING?

The impact of interventions often depends on the intensity or length of their operation. For instance, if the objective of an intervention is to improve the skills of participants, its success might be a function of the intensity, length, and other design parameters. Training programs can be full-time or part-time, remote or in-person, and short or long in length. Furthermore, the class size can be large or small, affecting the cost per participant and the trainee per trainer ratio.

Finding the optimal level of intensity might not be straightforward. There are trade-offs between cost and effectiveness. A longer program might result in higher revenues, but it will also cost more and can reduce enrollment. Participant Financial Analysis can expand to quantify these trade-offs and help in optimizing the design.

ADDITIONAL DATA NEEDS

IPs will need to understand how the costs or revenues change depending on different intensities and lengths of the intervention. In other words, each design alteration can be treated as a new intervention: the estimated investment costs and net incremental revenues are calculated for each.

The first step is to narrow down all the design decisions related to intensity and length of one intervention into a limited set. For instance, IPs can consider the following options for a hypothetical maize intervention:

- Introduce drought-tolerant seeds to the farmer and training in improved production practices
- In addition to the first option, farmers will be encouraged to purchase a jab/row planter

Data is needed for comparing how the costs and revenue implications change from one option to another. In this hypothetical scenario, the intervention without the jab/row planter will be less expensive for the farmer than with it. However, the farmer may get higher yields with the jab/row planter. Reasonable estimates are needed for the costs and the potential benefits/revenues with all options.

UPDATING THE PARTICIPANT FINANCIAL ANALYSIS

Introducing some of the trade-offs discussed above are relatively easy. To show the change in the investment cost, it may be possible to simply change an estimate for one data point. Alternatively, IPs might need to construct a new Participant Financial Analysis for any design option; if so, please follow the Participant Financial Analysis Technical Guidance [here](#).

Once all design options are clear and all investment costs and net incremental revenues have been calculated, measure the payback period for each. Please note that the estimation of payback period is only relevant if the net incremental revenue is positive. Unlike in the How-To note on “How to Compare Options?”, there is no need to calculate the total investment costs for the implementing partner, only the

investment costs for the farmer or worker. Using a simplified approach, the payback period can be calculated by dividing the investment cost by the net incremental revenue.

$$\text{Payback period} = \text{Investment cost} / \text{net incremental revenue}$$

This payback period is an indication of how many years (or seasons if the net incremental revenues were calculated on a seasonal basis) it will take for the benefits to exceed the costs of the intervention.

INTERPRETING THE RESULTS

Compare all design alternatives directly to each other using their payback periods. Ultimately, the question is whether the revenues from increasing the intensity or length justify their additional cost. Payback periods across multiple interventions, or alternative designs of the same intervention, can help see which interventions will recover the total investment cost soonest. Given that many of these interventions will continue to earn positive net incremental revenues for many years, it is reasonable to assume that those investments with the soonest payback periods might return more value per dollar spent than those investments with longer payback periods. These designs should be considered an optimal level of treatment/dosing from a financial perspective for the farmer or worker/entrepreneur.

4.0 WHAT IS REQUIRED TO SCALE THIS INTERVENTION?

The Participant Financial Analysis was done from the perspective of one farmer or worker/entrepreneur for each intervention. IPs can also build on this analysis by scaling it to include all direct participants of each intervention. Reasons to do this may be to understand the number of inputs needed for an intervention to reach this scale, logistics or timing to scale an intervention, to ensure that surplus commodities or products will have buyers, or to inform the monitoring and evaluation (M&E) targets (see next How-To note). Additionally, over-supply of any product in the market is important to think about as it may change some of the original assumptions in the intervention from the “typical” participant’s perspective. For example, a sizable increase in the supply of the product or service in one area may decrease its market price for all participants, reducing their overall revenues. Information from a complementary value chain analysis may be helpful with this analysis.

ADDITIONAL DATA NEEDS

In order to scale each intervention, IPs will need:

- **Anticipated number of participants for each intervention:** Estimate the total number of direct participants of each intervention. These figures may come directly from the annual monitoring targets in the Indicator Performance Tracking Table (IPTT) if IPs have already completed that step, specifically:
 - **M 17 INDICATOR:** Number of full-time equivalent off-farm jobs created with USG assistance
 - **M 1 INDICATOR:** Number of individuals participating in USG food security program (relevant disaggregations by the type of individual might include: Laborers (non-producer diversified livelihood participants); Producer: Smallholder (i.e., farmers, fishers, pastoralists, ranchers); and Producer: Non-smallholder (i.e., farmers, fishers, pastoralists, ranchers); and Producer: Aquaculture)
- **Timing of the intervention roll-out to all direct participants:** Activity designers or the annual targets in the M&E plan may provide a sense for how key aspects of the technical assistance and other livelihood activities will be sequenced. This will help estimate the number of participants that will be reached in each year of the activity.

UPDATING THE PARTICIPANT FINANCIAL ANALYSIS

The starting point is the Participant Financial Analysis performed in the RFSA application phase, which focused only on the key inputs and outputs that will change (and the associated change in the costs and revenues). For this analysis, the quantity of inputs and outputs are the most important figures to focus on (and less so on the revenues and costs).

Let's use a climate-smart intervention for maize farmers as an example (accompanying calculations can be found here). An implementing partner is proposing to encourage farmers to use drought-tolerant maize seeds instead of local varieties. Farmers working on 0.4-hectare plots should increase yields in an average year by 80 kg. Farmers will use the same number of seed (10 kg) but costs will increase for the improved seed. The net incremental revenue calculations may look something like this:

Data Parameters	Current Practices Scenario	Intervention Scenario
Yields (kg)	320	400
Local seed (kg)	10	0
Improved seed (kg)	0	10
Sales (USD)	860.8	1,076

Next, examine the data on scaling the intervention and the timing. Determine how many new participants will be reached each year and how many total farmers will demonstrate new practices or use improved inputs. For example:

	Year 1	Year 2	Year 3	Year 4	Year 5
New farmers	500	1,000	2,000	2,000	2,000
Farmers reached each year (cumulative)	500	1,500	3,500	5,500	7,500

Finally, in order to understand how many inputs and outputs are expected at scale, multiply the inputs and outputs expected on a per farmer basis by the total amount of farmers expected to be benefiting from the intervention each year (cumulative farmers).

Inputs/Outputs per farmer	Inputs/Outputs at Scale				
	Year 1	Year 2	Year 3	Year 4	Year 5
Farmers reached each year (cumulative)	500	1,500	3,500	5,500	7,500
Total maize yield (kg) <i>(400 kg per farmer * farmers reached)</i>	200,000	600,000	1,400,000	2,200,000	3,000,000
Incremental maize yield (more than with current practices) (kg) <i>(80 kg per farmer * farmers reached)</i>	40,000	120,000	280,000	440,000	600,000
Total improved seed (kg) <i>(10 kg per farmer * farmers reached)</i>	5,000	15,000	35,000	55,000	75,000
Total annual sales with the intervention scenario (USD) <i>(1,076 USD per farmer * farmers reached)</i>	538,000	1,614,000	3,766,000	5,918,000	8,070,000

INTERPRETING THE RESULTS

This information provides activity designers with information that may help them think through some of the market dynamics in local communities. Understanding how many inputs the intervention needs and how many outputs/yields it may generate provides data for tough questions about the intervention. These questions are often: are there enough buyers for this many individuals to start selling this service/product? Is there enough of the raw material available in local markets (and will the assumptions about the price of input remain the same at the intended scale)?

Using the example above, this information can prompt key questions such as:

- **Improved seeds:** Will local input providers be able to supply an additional 35 MT of improved seed by Year 3, or an additional 75 MT per year starting in Year 5? How much are they able to sell now and do they run into any issues with this current level of supply throughout the year? IPs might examine issues with wholesale providers, seed distribution systems, etc.
- **Incremental Yield:** Total production of maize is expected to increase by 600 MT more per year by Year 5 (and total 3,000 MT from these farmers). Although some of that will be consumed by the households, much of that will end up on the market. Is there demand for that much more maize and will the market players be able to absorb that much additional maize in those local communities? Will that affect the market price? Do IPs need to work with buyers in order to absorb that extra yield? These questions may be more easily answered in combination with a value chain analysis.

5.0 HOW CAN PARTICIPANT FINANCIAL ANALYSIS INFORM THE M&E INDICATOR TARGETS?

The Participant Financial Analysis and M&E plan rely on many of the same indicators. The previous examples demonstrated how annual indicator targets in the IPTT can inform and update data points in the Participant Financial Analysis, for example:

- **M 17 INDICATOR:** Number of full-time equivalent off-farm jobs created with USG assistance
- **M 1 INDICATOR:** Number of individuals participating in USG food security programs
- **M 9 INDICATOR:** Number of hectares under improved management practices or technologies with USG assistance

Similarly, the Participant Financial Analysis can inform the M&E plan. There are two M&E indicators that can be directly informed from the results in the Participant Financial Analysis models of each intervention. This is best done if the Participant Financial Analysis is first scaled (see previous How-To note). Once the Participant Financial Analysis of the intervention has been scaled, input targets for the following two required RFSA monitoring indicators into the M&E plan²:

- **M 15 INDICATOR:** Yield of targeted agricultural commodities among program participants with USG assistance - total production/unit of production

As seen in the previous How-To note on scaling, IPs can directly estimate total production from the Participant Financial Analysis when the analysis is scaled. To estimate total production this, IPs need the total number of farmers reached each year (cumulative), which may come from the M 1 indicator. And they need the total yield (or intervention scenario yields) from the Participant Financial Analysis. See table below, using the maize Participant Financial Analysis example located here.

Inputs/Outputs per farmer	Inputs/Outputs at Scale				
	Year 1	Year 2	Year 3	Year 4	Year 5
Farmers reached each year (cumulative)	500	1,500	3,500	5,500	7,500
Total maize yield	200,000 kg	600,000 kg	1,400,000 kg	2,200,000 kg	3,000,000 kg

² Reference source is: Food for Peace Indicators Handbook (2019). Part II: Food for Peace (FFP) Monitoring Indicators for Development Food Security Activities. USAID. Source: https://www.usaid.gov/sites/default/files/documents/1866/Handbook_Part_II_Annual_Monitoring_Indicators_Aug19_FINAL.pdf

Note: targets are not required for total production by commodity although IPs will have that data as show above. But yield targets should be entered in the IPTT at the commodity level, which IPs also have in their Participant Financial Analysis as 400 kg per farmer (or 1,000 kg per hectare).

IPs also need to enter the **base year** value into the IPTT; base value data reflects the yield of targeted commodities in the year prior to programming. This figure can also come directly from the Participant Financial Analysis using the figures from the current practices’ scenario. In our maize farmer example as part of the Participant Financial Analysis, we know that yields are 320 kg per farmer (or 800 kg per hectare) with current practices.

- **M 33 INDICATOR:** Value of annual sales of producers and firms receiving USG assistance

The other indicator targets in the IPTT that can come directly from the Participant Financial Analysis are the total annual sales, for both on-farm and off-farm interventions. Relying again on the maize farmer example, we know what their annual maize revenues are expected to be in the intervention scenario (i.e., 1,076 USD per farmer) and we know how many maize farmers we expect to reach each year on a cumulative basis (see next table). Multiplying these two figures allows us to easily estimate the value of total annual sales for direct participants attributable to the USG intervention.

Inputs/Outputs per farmer	Inputs/Outputs at Scale				
	Year 1	Year 2	Year 3	Year 4	Year 5
Farmers reached each year (cumulative)	500	1,500	3,500	5,500	7,500
Total annual sales with the intervention scenario (USD) <i>(1,076 USD per farmer * farmers reached)</i>	538,000	1,614,000	3,766,000	5,918,000	8,070,000

IPs are also required to input a base value for annual sales in their IPTT. Again, this information is available from the current practices’ scenario (860.80 USD per farmer).

These indicators are reported with much more disaggregation than discussed here. More details can be found in [BHA’s annual monitoring indicator requirements here](#).

6.0 HOW DO I CONSIDER EXPOSURE TO RISK IN THESE INTERVENTIONS?

RFSA target populations tend to be very vulnerable to risks from weather, climate, pest/disease, and other shocks and stresses that can directly influence their livelihoods. In fact, many of the interventions specifically aim to reduce or prevent these risks associated with chronic and recurrent hazards. IPs may find that it would be useful to measure this risk, or risk reduction, in the Participant Financial Analysis. IPs may wonder if the costs for risk mitigating interventions are worth the benefits. This How-To note explains how to conduct a simple analysis of the risk to start to understand some of the trade-offs.

Some examples of risks that could be examined include:

- Is the cost for drought-tolerant seed worthwhile to populations living in areas that only have a drought every 10 years on average?
- An intervention is encouraging skills building but there are uncertainties about whether newly trained individuals will find employment.
- An off-farm intervention focuses on increasing the sales of a product that has had large price fluctuations in recent years and it is unclear if individuals will be able to manage this price volatility.
- An intervention encourages increased crop productivity but it is not yet clear if a large crop surplus in this region will fully be absorbed by the market.
- Unstable government policies can result in hyperinflation in some economies. Is the intervention sensitive to such instabilities that can result in limited access to cash or shocks to the demand, supply, or price of specific commodities?

ADDITIONAL DATA NEEDS

IPs likely have some kind of risk in mind. This could be the risk of lower yields, or price spikes, or limited supply of key inputs. For each of these risks, try to estimate what the range of outcomes could be under pessimistic scenarios.

This data could come from literature, historical price indices, or reasonable estimates based on the advice of experts or previous activity experience. A market systems resilience study may be useful for understanding these risks, their likelihood, and their possible magnitudes. For example:

- Yields - how much lower could the yields be if there is a shock or extreme weather event?
- Prices - what kind of price fluctuations might be expected in a given year for either the inputs or the commodities/products?

UPDATING THE PARTICIPANT FINANCIAL ANALYSIS

Before beginning, it is important to think about if the risk is external to the intervention or internal. For example, an extreme weather event will affect yields in the absence of the intervention (i.e., the current practices scenario) as well as the yields in the intervention scenario. Alternatively, IPs may wonder what happens if farmers do not adopt all the practices that are promoted or if people trained are not able to find employment (for example); these are internal risks that would only influence the assumptions in the intervention scenario.

We can estimate the impact of a more pessimistic scenario should there be some kind of shock or stress using a simple **scenario analysis**. In this analysis, change the values in the model under a scenario with more pessimistic outcomes and see what happens to the net incremental revenues. If it is an external risk, change the relevant value in both the current practices and the intervention scenarios. If it is an internal risk, change the relevant value in only the intervention scenario.

Example: Let's imagine that the drought tolerant maize seed exhibits yield advantages over local varieties in growing conditions with limited water, somewhat similar to the conditions that farmers might be experiencing in current practices. The Participant Financial Analysis modeled a 25 percent increase from 320 kg per hectare to 400 kg per average plot size (0.4 hectares). However, other extreme weather events are not uncommon in this area and heavy rains or hail could reduce yields. Local experts suggest that maize yields will decrease by 10-20 percent in a year with heavy rainfall. How much of a risk is this to the drought-tolerant seed intervention for maize farmers?

In our example, yields need to be reduced for both the current practices and the intervention scenarios since this is an external risk. As a next step, measure what happens to the net incremental revenues under these more pessimistic assumptions. Below is an example of modeling more pessimistic scenarios and the impact on the net incremental revenues for the average farmer:

	Participant Financial Analysis	10% Reduction in Target Yields	20% Reduction in Target Yields
Yields (kg)	Current Practices: 320 kg Intervention: 400 kg	Current Practices: 288 kg Intervention: 360 kg	Current Practices: 256 kg Intervention: 320 kg
Net Incremental Revenues (USD)	164	143	121

INTERPRETING THE RESULTS

In the example above, the net incremental revenues remain positive. This suggests that the risk of heavy rainfall and losing crops still suggests that farmers are more profitable than they would be with current practices. This is good news for the farmers, and suggests that farmers will continue to see value in the drought-tolerant seeds even if they have a year with lower revenues due to heavy rains.

It may be that net incremental revenues become a negative number. This suggests that should a more pessimistic scenario occur, the farmer will not be better off compared to their current practices. This could indicate that they may abandon the practices promoted by the intervention. In this case, IPs may want to reexamine the intervention to identify ways to mitigate these risks to the extent possible.

7.0 WILL THERE BE ISSUES OF AFFORDABILITY OVER TIME AND CAN IT BE FINANCED?

Interventions require the participation of farmers/workers/entrepreneurs, which is often associated with an investment cost. The investment cost can be in cash (e.g., the purchase of an equipment) and/or in time (e.g., the time it takes to learn a new skill). During the RFSA application phase, IPs may have already completed the Participant Financial Analysis for the intervention, which quantifies the investment cost (guidance on how to do that is part of the Participant Financial Analysis Technical Guidance found here). IPs may have also answered the RFSA solicitation's key question about how the farmer/worker might be able to afford these investment costs.

However, comparing the investment costs to the net incremental revenues does not tell the whole story of affordability. A new farming technique or business might appear lucrative when looking at all costs and revenues over a year in aggregate. However, it is very often the case that costs occur well before revenues within that year and individuals have to find a way to afford this gap. Additionally, individuals may need to take out a loan to manage this gap between costs and revenues, which adds costs to the intervention. This is especially important to consider in environments with high or volatile rates of inflation.

If there are concerns about the feasibility of affording the initial investments or the operation of a business, especially in the early years, IPs may want to examine their revenues and costs in greater detail to understand if it is affordable. To determine if the investment is affordable, start with an understanding of the investment costs from the farmer or worker/entrepreneur's perspective, including cash and time investment, as well as income during their operations. Only look at the costs and revenues in the intervention scenario; the incremental analysis is not relevant to this How-To note. Once the investment needs are known, assess whether the participant can finance these investments through their own means (savings or other revenue) or credit (borrowing).

ADDITIONAL DATA NEEDS

Based on the Participant Financial Analysis from the RFSA application phase, IPs already know the investment costs for the farmer or worker. For a more detailed analysis of affordability, start with an understanding of their financing options, in order to know how to structure the analysis:

- **Financing options:** Survey the targeted farmers/workers/entrepreneurs to learn about their ability to use their savings, other income, or debt to finance the investment or short-term operational financing needs. If they will rely on loans, try to learn if individuals might be expected to take out a long-term loan (perhaps over several years) to cover the initial investment costs of the intervention or, rather, short-term loans to cover their operating expenses between the time when they buy their inputs and when they are able to sell their products/services. For either long- or short-term loans, try to understand the prevailing interest rate from the most common sources of loans and the typical borrowing period. It would also be relevant to know if individuals might rely on multiple loans.

If individuals will rely on loans: look at the timing of their **cash flows**, and specifically when they will have costs and when they will have revenues. This requires an understanding of what time period makes the most sense. If farmers are repaying their loans on an annual basis, then IPs need to understand their annual cash flows. If farmers are repaying their loans on a monthly basis, then IPs need to understand their monthly cash flows. We refer to this as a **period**, or the time period for the cash flow analysis. This could be annual, monthly, quarterly, weekly, etc.

If the IP is operating in an environment with high or volatile inflation, the interest rate that participants are receiving will already reflect what the lender expects inflation to be. Do not worry about this if the loans are short-term or less than one year. For loans that are longer than one year, we suggest subtracting the expected rate of inflation from the interest rate and use that adjusted rate in the calculations instead.

Once the time period for the loans is known, the following additional information is needed:

- **Net cash flows (NCF) for each period in the intervention scenario:** The NCF is the income a farmer or worker/entrepreneur has at the end of the period after all revenues have come in and subtracting all costs. To calculate the NCF, more detail is needed for the intervention scenario in the Participant Financial Analysis:
 - **Revenue:** Estimate expected gross revenues in each period for the product or service promoted in the intervention scenario. **Gross revenue** is the sum of all money generated by a business (e.g., sales), without taking into account any part of that total that has been or will be used for expenses.
 - **Costs:** Estimate the total costs in each period associated with this product/business in the intervention scenario, not only the costs that are affected by the intervention. This may mean extra data collection with potential direct participants of the intervention.

Note: The NCF analysis is similar, but not quite the same, as the gross margin analysis commonly seen with on-farm investments. Gross margin analysis only considers variable costs to produce the commodity, but IPs will also want to consider other fixed costs that contribute to that commodity such as land rent or taxes in each period.

UPDATING THE PARTICIPANT FINANCIAL ANALYSIS

If farmers/workers have sufficient savings or alternative revenue sources to easily pay for the gap between initial investment and operating costs and their revenues, there may be no need to do any further analysis. This does suggest that the investment and any other upfront costs will be affordable.

However, if farmers/workers will need to take out a loan to finance these costs, construct a simple cash flow statement. This analysis is done with a series of cash flows to estimate the costs (or cash outflows) and revenues (or cash inflows) of an intervention, for each period (e.g., on an annual basis for loans to cover the costs of investments or possibly a monthly/quarterly basis for short-term operating financing needs). A cash flow model is the basic tool that helps us do this in a standardized and transparent way. A simplified cash flow model for a maize farmer is presented below, on an annual basis.

	Period 1	Period 2	Period 3	Period 4	Period 5
Gross Revenues - Intervention Scenario	890	970	1,076	1,076	1,076
Costs - Intervention Scenario <i>(all costs to produce maize, not only the costs affected by the intervention)</i>	800	800	800	800	800
Investment	50.5				
Net Cash Flow - Intervention Scenario <i>(=Revenue - Costs - Investment)</i>	39.5	170	276	276	276

The bottom-line calculation of a financial cash flow model is the NCF. A negative NCF means the stakeholder has lost value during that period, while a positive value implies that the stakeholder has earned cash within that period.

Next, calculate the loan repayments each period. Calculate the repayment schedule to 1) estimate the loan repayments (interest and principal) in each period and 2) compare the loan repayments with net cash flow from the previous table to ensure financing is feasible. See an example in the table below.

Then calculate the **Debt Service Coverage Ratio (DSCR)** for each period using the following calculation:

$$\text{DSCR} = \text{Net Cash Flow} / \text{Loan Repayment}$$

The table below shows the DSCR for each period of the loan (periods 1 - 3).

	Period 1	Period 2	Period 3	Period 4	Period 5
Net Cash Flow - Intervention Scenario <i>(Revenue - Annual Costs - Investment)</i>	39.5	170	276	276	276
Loan repayment	30	30	130		
Debt Service Coverage Ratio (DSCR)	1.3	5.6	2.1		

INTERPRETING THE RESULTS

If the DCSR is less than one in a given year, then the borrower does not generate enough cash in that period, after paying for their expenses, to meet their loan repayment for that year. If the DSCR = 1 then the borrower has exactly enough remaining cash to repay the loan in that period. However, if an DSCR is close to one, then the loan is very risky because if anything goes wrong for the borrower, they may not be able to repay. Usually, DSCRs of 1.2 or higher for each period the loan is in repayment signifies that the borrower will have enough cash to cover the periodic loan repayment. The example in the table above suggests that the borrower is likely to be able to repay the loan in each period; this is a strong indication that this intervention will be affordable over time.

8.0 WHAT IS THE IMPACT ON THE HOUSEHOLD IF THEY ARE ENGAGING IN MULTIPLE INTERVENTIONS?

It is likely that IPs are planning to promote livelihood interventions that will affect multiple members of a household, or one individual may benefit from more than one intervention. In this case, it may be worthwhile to understand how much the whole household income will increase, and compare it to any change in their costs. This may be useful if IPs want to examine how a combination of interventions may affect household financial poverty, if IPs are concerned about the increase in total costs initially, or what the total impact may be on labor requirements.

ADDITIONAL DATA NEEDS

IPs will need an understanding of all livelihood interventions that the average household will participate in within the target population. IPs are working with many different types of households and it is likely there will be many permutations of the types of interventions households will engage with. Try to imagine the most common permutations and focus on those household combinations.

For each household combination, all economic analyses need to be completed for each intervention that the household will participate in. This means both the estimates for both the investment costs and the net incremental revenue, as explained in the Participant Financial Analysis Technical Guidance here.

UPDATING THE PARTICIPANT FINANCIAL ANALYSIS

For each household combination:

1. **Combined Total Investment Costs:** Add all the investment costs together. Take care to note if these expenses are expected to happen in the same year.

Add together the net incremental revenues for each intervention. However, here it will be useful to look at the specific line items that went into the analysis for both the intervention scenario and the incremental analysis. This can be done with the following steps:

1. **Combined Gross Revenues in the intervention scenario:** Add all the gross revenues together from all intervention scenarios for an estimate of the revenue the household will have from all livelihood interventions.
2. **Combined Net Incremental Revenues:** Add all the net incremental revenues together from all interventions for an estimate of the total net incremental revenue the household will have from all livelihood interventions.

Let's assume households will be introduced to climate smart agriculture and drought-tolerant maize seeds for their maize production and another family member will move from petty trading to investing in a

beekeeping enterprise (Excel examples for these interventions can be found here). The Participant Financial Analysis is already complete for each of those interventions separately and both interventions can be added together (gray column):

	Climate smart maize	Beekeeping enterprise	Combined Household Budget
Investment Costs - Year 1 (USD)	50.5	82.3	132.8
With intervention gross revenue (USD)	1,076	563	1,639
Net Incremental Revenues (USD)	164	181	345

INTERPRETING THE RESULTS

This analysis results in three pieces of information now, here's how to understand each of them:

- **Combined Investment Costs:** Looking at the combined total investment costs, IPs will want to consider if the average household can afford all interventions. Perhaps this will help IPs to think about sequencing the interventions in a certain area if it might make it more affordable for those investment costs to be spread over a number of years.
- **Combined Total Gross Revenues with intervention:** The total household revenues from these two interventions will now be 1,639 USD. IPs may be able to look at this figure and see if it is enough to help these families become more food secure, or perhaps it is not enough to reduce their vulnerability.
- **Combined Net Incremental Revenues:** This is a direct measure of how much better off the household will be because of all interventions, compared to their current practices. Similar as with the combined total gross revenues, IPs may be able to look at this figure and see if it is enough to help these families become more food secure, or perhaps it is not enough to reduce their vulnerability.

IPs may also want to look at some of the input costs - and specifically labor costs. Labor can be a sparse commodity for households, especially during busy times of year such as harvest or festival seasons. If the combined interventions increase the labor demands on the household, and especially on just one or a few members of the household, IPs may find that these households will be reluctant to adopt all interventions. From the example analyses, the maize intervention is expected to increase labor by an incremental 10 days and the beekeeping enterprise will increase labor by 50 days. IPs would want to consider if 60 more total days of work each year is feasible for these households.

GLOSSARY OF KEY TERMS AND CONCEPTS

Base year: This term is used for Indicator Performance Tracking Tables and is often defined as the year before a USAID activity begins. For the purposes of tying Participant Financial Analysis to monitoring indicators, we equate the base year to the current practices scenario.

Cash flow: A movement of money or resources to or from a stakeholder. Expenditures or costs are cash outflows, while revenues or benefits are cash inflows.

Current practices scenario: The scenario that is assumed to occur if an investment is not undertaken. In the context of this Participant Financial Analysis, we are measuring this based on current practices. Other common terms for this are the counterfactual or the without-intervention scenario.

Debt Service Coverage Ratio: This is a calculation that divides the net cash flow of a period by the loan repayment in that period. This is an indication of whether a stakeholder's cash flows are sufficient to ensure repayment of a loan. This ratio should be higher than 1.2 for all years in which a loan repayment is due.

Gross revenue: The sum of all money generated by a business, without taking into account any part of that total that has been or will be used for expenses.

Intervention scenario: The scenario that is assumed to occur if an investment is undertaken as proposed.

Incremental analysis: The net financial difference between the farmer/worker's budget with USAID's intervention compared to the farmer/worker's budget in current practices (without USAID's intervention). Participant Financial Analysis compares the projected costs and revenues (or benefits) of an intervention with the costs and revenues of the current practices, or a status-quo scenario where USAID does not invest in that intervention. The incremental analysis allows analysts to determine if the intervention makes key stakeholders better off compared to their expected situation without USAID involvement.

Investment cost: The initial investment costs required of the farmer or worker/entrepreneur to engage in this intervention, including both their own and time.

Net cash flow: The NCF is the end-result of a farmer or worker's operations for each year of the analysis. It is calculated by subtracting total annual operating costs from the gross revenue.

Net incremental revenue: This is the key metric of the incremental analysis. This is measured as the incremental difference between the revenues and costs in the intervention scenario and the revenues and costs in the current practices' scenario. This should ideally be a positive number.

Opportunity cost of labor: In this context, this is the value of people's time in unpaid tasks that directly contribute to the intervention such as time in training or time spent harvesting increased yields. This can be valued using the market price of labor.

Period: The unit of time for looking at revenues and costs. This could be an annual time period or a shorter time period such as monthly or quarterly.

Scenario analysis: This is a “what if” scenario test that highlights how a change in variables (e.g., an uncertain cost, revenue, or key assumption) would alter the outcome of our analysis (in this case, the net incremental revenue).

Typical year: When an operation is at maturity; such as when the farmer or worker has fully adopted all changes from the intervention and their investments as productive as expected.

Ramp-up period: The time period between the start of the intervention and the typical year, or when the operation is at maturity.

Implementation cost per participant: This is the total amount of money the implementing partner is expected to invest in an intervention, divided by the total amount of participants expected to engage with the intervention. This builds an understanding of the implementation costs on a per person basis.

Payback period: A calculation to determine how many years (or seasons if the net incremental revenues were calculated on a seasonal basis) it will take for the revenues to exceed the costs of the intervention. It is calculated by dividing the total investment cost by the net incremental revenue.