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Integrated Natural Resource Management (INRM)

HEARTH Monitoring and Evaluation Toolkit:

*Conservation Knowledge, Attitudes, and
Practices*

APRIL 2022

Integrated Natural Resource Management (INRM)

Sound management of natural resources is central to long-term development and resilience. Faced with an urgent need to reduce environmental degradation while improving human well-being, solutions that effectively integrate investments in natural resource management with economic and social development are increasingly urgent. INRM promotes integrated programming across environment and non-environment sectors and across the Program Cycle. INRM supports USAID to amplify program impacts, strengthen gender equality and social inclusion, and identify best practices for integration.

For more information:

<https://land-links.org/project/integrated-natural-resource-management-inrm-activity/>

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Front Cover photo:	Agricultural development and the associated clearing of the land pushes right up to Bwindi Impenetrable National Park's boundaries. Eastern edge of Bwindi Impenetrable National Park. Photo by Jason Houston for USAID.

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Acronyms

CCP	Conservation and Communities Project
DHS	Demographic and Health Surveys
EPA	Environmental Protection Agency
FTF	Feed the Future
HEARTH	Health, Ecosystems, and Agriculture for Resilient Thriving Societies
INRM	Integrated Natural Resource Management
KAP	Knowledge, Attitude and Practices
MERL	Monitoring, Evaluation, Research, and Learning
NRM	Natural Resource Management
STARR II	Strengthening Tenure and Resource Rights II
USAID	United States Agency for International Development

Overview

Together, Health, Ecosystems, and Agriculture for Resilient Thriving Societies (HEARTH) and INRM have created the HEARTH Monitoring and Evaluation Toolkit, a suite of indicators and guidance that will help United States Agency for International Development (USAID) Missions and implementing partners (IPs) monitor progress and aggregate common metrics to build the evidence base around the effectiveness of integrated strategic approaches. This document is an individual module from the toolkit, presented separately to facilitate use by individual HEARTH activities. Before using this module, we recommend first accessing the full toolkit and reviewing the list of sectors covered by each module, and determining which are most relevant for your activity:

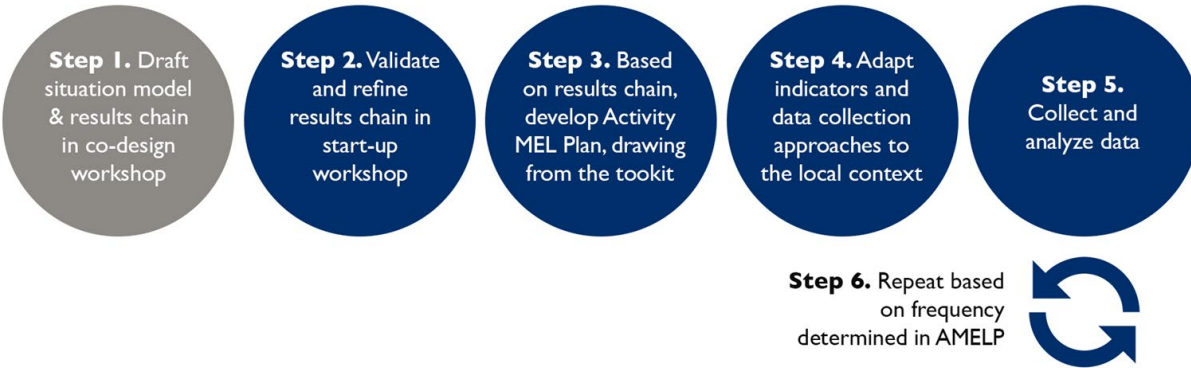
[Access Full Toolkit on Biodiversity Links Here.](#)

How To Use This Toolkit

This toolkit presents a **menu of options** for outcomes and recommended indicators across the HEARTH activities. Before using this toolkit, activities should have developed a robust theory of change – through first drafting their situation model and results chains during the co-design workshops, many of which have been completed already, and then validating and refining those results chains during start-up workshops.

Based on the activity theory of change, HEARTHS should develop their Activity Monitoring, Evaluation, Research, and Learning (MERL) Plan, which should draw directly from the toolkit. It is not expected that all outcomes or indicators will be relevant for all activities, but that activities should select those in line with their results chains and activity theory of change. Additionally, there might be activity-specific outcomes not included in this toolkit because they were not generally applicable across the HEARTH portfolio, and Missions and IPs should therefore include additional indicators in their MERL plans, as relevant.

When developing activity MERL plans, the indicators in this toolkit are intended to be used both to **standardize reporting for monitoring data, as well as a basis for evaluation data collection**. While monitoring trends in these indicators over time may be important for some activities, USAID anticipates that Missions and IPs will also identify important questions about the causal impact of their activities during the start-up activities, best answered using evaluation approaches. Which indicators will be part of monitoring systems, and which will be used to answer evaluation questions, will affect how the toolkit is operationalized. In addition, it is expected that MERL plans will likely include **qualitative data sources**, important to further explaining monitoring and evaluation results and exploring learning questions in more depth, in addition to the quantitative data collected using the approaches from the toolkit.



Indicator Guidance and Core Household Questionnaire

This document contains guidance for defining and collecting data for each of the recommended indicators for Missions and IPs, including Performance Indicator Reference Sheets throughout. This guidance draws heavily on established best practices, such as the Demographic and Health Surveys (DHS) and Feed the Future programs. In addition to this guidance, INRM developed a core questionnaire to provide a basis for household surveys to facilitate ease of take-up. It should be emphasized that it is important for Missions and IPs to adapt the questionnaire to their local country context – which might include adding/removing answer choice options, updating question text or translations, etc. Areas where edits for local context are typically required are identified in the tool and following guidance. The full toolkit includes additional guidance on respondent identification and inclusion of household rosters, as well as more in-depth discussions on sampling approaches, data collection administration and frequency, data management, privacy, and ethics, which should be considered.

Outcomes and Indicators for Conservation Knowledge, Attitudes, and Practices

Table 1: Overview of Outcomes and Recommended Indicators for the Conservation Knowledge, Attitudes, and Practices Sector.

Outcomes	HEARTH Portfolio Indicators
Improved knowledge and attitudes towards conservation and natural resource management (NRM)	<ul style="list-style-type: none"> • Average score measuring the perceived importance of protecting nature and the environment
Reduced unsustainable use of resources	<ul style="list-style-type: none"> • Percent of households who engaged in unsustainable use of ecosystem resources in the past year • Percent of households that cleared land for cultivation in the past year

Conservation Knowledge, Attitudes & Practices (KAP)

Pathways To Change

For many other HEARTH outcome areas, improved conservation knowledge and attitudes are prerequisites for behavior change. This may occur through strategic approaches which focus on awareness raising or otherwise demonstrating the benefits of conservation and NRM. Improved conservation knowledge/attitudes should result in reduced unsustainable use of resources and other threat reduction. This outcome area is a key link between the people and prosperity outcomes and realizing biophysical impacts.

Recommended Outcomes and Indicators

Outcome	Description	Recommended Indicator & Duration
Improved knowledge and attitudes towards conservation and NRM	<p>To measure the perceived importance of benefits of conservation and ecosystem services, this indicator includes a set of custom questions which ask (1) how important respondents believe it is to protect nature and the environment to receive 14 different types of ecosystem benefits (e.g., provide wild food sources, filter clean water, provide clean air, protect from storm surges, cultural benefits, etc.), and (2) perceptions of the biggest threats to ecosystems in their community. An average score across all 14 ecosystem benefits will then be created for each household and averaged across the sample.</p> <p>A variety of standard approaches to conservation valuation were explored, including willingness to pay for ecosystem services, contingent valuation, and choice experiments, but ultimately these approaches are not recommended given that they would need to be tailored specifically to each HEARTH activity and local context,</p>	<p>Indicator: Average score measuring the perceived importance of protecting nature and the environment</p> <p>Source: Adapted from the USAID Madagascar Conservation and Communities (CCP) Baseline Survey¹</p> <p>Duration: 5-7 minutes</p>

¹ "USAID/Madagascar CCP Project Baseline Household Survey Final Report." United States Agency for International Development, 2020. https://pdf.usaid.gov/pdf_docs/PA00WK75.pdf.

Outcome	Description	Recommended Indicator & Duration
	and therefore not comparable across the portfolio. Please see Annex I . Conservation Valuation for more details.	
Reduced unsustainable use of resources	<p>Each HEARTH is recommended to develop a custom list of activities related to ecosystem resources/extraction, which should be threats to the biophysical environment outcomes identified from the results chains and situation models. Then for each threat that the household self-reports engaging in, a set of 6 questions would be asked regarding for what purpose, its level of importance, how frequently they engage in the activity, if their engagement has changed over the past year and why, and their perception of the ecosystem status in the future. Suggestive activities/threats based on a review of HEARTH results chains include the following but should be adapted for each context: collecting timber and non-timber forest products, wildlife hunting, and forest clearing (for agriculture or other purposes).</p> <p>If it is important for the HEARTH activity theory of change, additional questions on who in the household makes decisions on engaging in the activity and who engages most in the activity itself can be added to allow for disaggregations by gender.</p>	<p>Indicator: Percent of households who engaged in unsustainable use of ecosystem resources in the past year</p> <p>Source: Adapted from custom Feed The Future (FTF) Cambodia indicator.²</p> <p>Duration: 5-10 minutes (depending on how many activities the household engages in)</p>
	To measure the extent to which households are engaging in land conversion (i.e., clearing forests, fallow agricultural land, or mangroves), this indicator includes a set of custom questions which ask (1) whether the household cleared any land for cultivation in the past year, (2) how much land was cleared, (3-4) the type and location of land cleared, and (5-6) plans for clearing land in the future. The indicator is constructed based on the percent of households who self-report clearing land to allow for cultivation/livestock, and the additional questions will	<p>Indicator: Percent of households that cleared land for cultivation in the past year</p> <p>Source: Adapted from the USAID Madagascar CCP Baseline Survey³</p> <p>Duration: 2-3 minutes</p>

² 2019 USAID/Cambodia Food Security and Environment Population Based Survey (final report forthcoming).

³ “USAID/Madagascar CCP Project Baseline Household Survey Final Report.” United States Agency for International Development, 2020. https://pdf.usaid.gov/pdf_docs/PA00WK75.pdf.

Outcome	Description	Recommended Indicator & Duration
	provide descriptive information on the amount/type of land conversion.	

Performance Indicator Reference Sheets

INDICATOR TITLE: Average score measuring the perceived importance of protecting nature and the environment

DEFINITION:

The core HEARTH questionnaire includes a set of questions that asks respondents how important they believe it is to protect nature and the environment for each of 14 ecosystem services. The 14 ecosystem services are: provide wild food sources such as plants and/or fungi; provide wild meat; provide energy sources such as fuelwood, solar power, etc.; provide clean, safe water; provide clean air; keep soil fertile and productive; protect communities and property from storm impacts; provide raw materials for making and building things; pollinate plants and crops to produce food; reduce or control the spread of many diseases; provide raw materials for most medicines; for cultural benefits; and for the benefit, use, or enjoyment of future generations.

Answer choice options are on a scale of 1 to 5, with 1 being strongly disagree and 5 being strongly agree. To construct the scale for analysis, answer choice options should be recoded as follows, so that disagreement is counted negatively, agreement is counted positively, and neutral responses do not contribute to the score:

Strongly disagree = -2

Somewhat disagree = -1

Neither agree nor disagree = 0

Somewhat agree = 1

Strongly agree = 2

For each household, an average score should be calculated across all ecosystem services/benefits for which the respondent provided answers for, and then averaged across the sample for reporting.

In addition, follow-up questions are asked regarding (1) whether there are any perceived threats to the ecosystems in their community, and (2) if yes, what the biggest ecosystem threats are to the community. Descriptive analysis of these responses will provide further insights into threats facing the community ecosystems.

ADAPTATION:

The set of ecosystem services/benefits should be adapted for the local context as appropriate. For example, “protect communities and property from storm impacts” may only be appropriate for

INDICATOR TITLE: Average score measuring the perceived importance of protecting nature and the environment

coastal communities. This may include adding/removing services that are/not relevant, as well as adapting the question text for local conditions. HEARTH activities may also choose to add open-ended questions to further explore the relationship between perceptions and conservation actions. For example, “Under what circumstances might the needs of your household or community come into conflict with protecting natural resources?” could provide insights into why support for protection does not lead to conservation action.

In addition, it is possible that the order of ecosystem services/benefits may potentially influence or bias responses. Ideally, HEARTH activities will be able to randomize question order to help mitigate this bias. If this is not possible, it is recommended that teams put more directly salient/important benefits (e.g., those that are the targets of awareness raising campaigns) first, so that these responses are less influenced by order effects.

Finally, for the follow-up question on the perceived biggest threats to ecosystems, it is important that HEARTHs adapt the answer choice options for the local context as well. For example, “slash-and-burn agriculture” might not be appropriate in many contexts and may need to be adapted along with appropriate translations into local languages.

<p>UNIT: Score ranging from -2 to 2</p>	<p>DISAGGREGATE BY: N/A</p>
<p>TYPE: Outcome</p>	<p>DIRECTION OF CHANGE: Higher is better</p>
<p>MEASUREMENT NOTES</p>	
<p>INTENDED RESPONDENT:</p>	<p>Primary household decision-maker (male or female) from sample households. If this person is not available, another adult from the household may be used for reporting.</p>
<p>REPORTING NOTES</p>	
<p>In addition to reporting the average score, the number of participant households of the conservation knowledge/attitude-sensitive activity must be reported, to allow a weighted average to be calculated across HEARTH activities for reporting. Additionally, activities should report on the total sample size (including any disaggregation for participant households vs.</p>	

INDICATOR TITLE: Average score measuring the perceived importance of protecting nature and the environment

comparison/control households if an evaluation is being conducted). Finally, activities should also report on the standard deviation.

INDICATOR TITLE: Percent of households who engaged in unsustainable use of ecosystem resources in the past year

DEFINITION:

Each HEARTH is recommended to develop a custom list of activities related to ecosystem resources/extraction, which should be threats to the biophysical environment outcomes identified from the results chains and situation models. Then for each activity/threat identified, questions would be asked about (Q1) whether the household engages in this activity, (Q3) for what purpose, (Q4) its level of importance, (Q5) how frequently they engage in the activity, (Q6) if their engagement has changed over the past year (and Q7, why) and (Q9) their perception of the ecosystem status in the future. Suggestive activities/threats based on a review of HEARTH results chains include the following but should be adapted for each context: collecting timber and non-timber forest products, wildlife hunting, and forest clearing (for agriculture or other purposes). If the household engages in none of these activities/threats, a follow-up question is asked regarding drivers for why not (Q2).

If it is important for the HEARTH activity, additional questions on who in the household makes decisions on engaging in the activity (Q8a) and who engages most in the activity itself (Q8b) can be added to allow for disaggregations by gender.

The indicator is constructed based on the percent of households who self-report engaging in ANY of the custom activities/threats (Q1), and the additional questions will provide descriptive information to help explain changes over time and motivations, as well as guide programming.

This indicator is intended to measure threat reduction from within communities. Additionally, there may be external threats (e.g., poaching, resource extraction, pollution from non-community members), which could be measured directly, particularly if monitoring systems are set up. However, external threats are expected to be HEARTH activity/context specific and would require specific data collection approaches not covered by this indicator. Questions regarding perceptions of ecosystem threats are included in the indicator measuring the perceived importance of protecting nature and the environment and may be adapted to specify internal vs. external threats if of interest to HEARTH activity teams.

The timeframe of one year is used for this indicator, so that information is captured for all seasonal activities, as well as activities that might be engaged in less frequently or less regularly (e.g., activities only engaged in during times of shocks/stress). Using the standard timeframe of one year will facilitate comparison across HEARTH activities, and given the nature of questions (i.e., respondents are not asked about the intensity of their engagement, specific amounts of resources harvested, etc.) concerned with reductions in precision, which would normally be impacted for longer recall periods, are mitigated.

For illicit activities (e.g., illegal poaching or land clearing) it should be recognized that respondents may under report behavior. Overall, whether accurate/reliable data on illegal behaviors can be collected will depend on how taboo the behavior is, and so it is important for the local context to

INDICATOR TITLE: Percent of households who engaged in unsustainable use of ecosystem resources in the past year

be considered. For example, poaching may be illegal, but if practiced widespread in a community, respondents will be more likely to report on the behavior accurately. If under-reporting is of concern, there is an extensive literature on a variety of approaches to encourage more truthful self-reporting, including randomized response, list randomization, and asking about peers. These approaches tend to be more complicated to implement and effectiveness has been shown to be context dependent, but additional guidance/support can be provided for HEARTH activities upon request. Additionally, when asking about any illegal activities, it will be important for Missions and IPs to ensure appropriate data protection/security measures to appropriately protect respondents from any potential adverse risks.

ADAPTATION:

As mentioned above, the list of activities related to ecosystem/resource extraction or threats should be tailored to each HEARTH activity, and the list of activities provided in the core HEARTH questionnaire (collecting non-timber forest products, collecting timber products, wildlife hunting, and forest clearing) are meant to be suggestive.

Additionally, the purpose for engaging in the activity (Q3) and drivers for not engaging in any activities (Q2) or engaging less in activities (Q7) should be adapted for the local context as well. For example, suggested answer choices for Q2 and Q7 include “over exploitation/limited resources” whereas some activities might choose to define this further by adding separate answer choices for competition for resources vs. other drivers that limit resources (e.g., pesticides reducing bee populations, limiting honey available for collection).

Q8a (who makes decisions on engaging) and Q8b (who most engages in) should only be asked for activities where gender disaggregation is important for threat reduction in line with the theory of change, as these questions will increase the time to complete this module.

Finally, if hunting or poaching is of particular concern for a given HEARTH, activities may want to add follow-up questions regarding which species of animals households hunt.

UNIT:

Percent

DISAGGREGATE BY:

Threat Type: Collecting NTFPs, Collecting Timber Products, Wildlife Hunting, Forest Clearing (list to be adapted)

Conservation KAP Score: Positive, Negative

Sex of Decision-Maker (if included): Female, Male

INDICATOR TITLE: Percent of households who engaged in unsustainable use of ecosystem resources in the past year

<p>TYPE:</p> <p>Outcome</p>	<p>DIRECTION OF CHANGE:</p> <p>Lower is better</p>
<p>MEASUREMENT NOTES</p>	
<p>INTENDED RESPONDENT:</p>	<p>Primary household decision-maker (male or female) from sample households. If this person is not available, another adult from the household may be used for reporting.</p>
<p>REPORTING NOTES</p>	
<p>In addition to reporting the percent value, the number of participant households of the conservation knowledge/attitude-sensitive activity must be reported, to allow a weighted average to be calculated across HEARTH activities for reporting. Additionally, activities should report on the total sample size (including any disaggregation for participant households vs. comparison/control households if an evaluation is being conducted).</p>	

INDICATOR TITLE: Percent of households that cleared land for cultivation in the past year

DEFINITION: To measure the extent to which households are engaging in land conversion, this indicator includes a set of custom questions which ask (Q1) whether the household cleared any land for cultivation in the past year (yes/no), (Q2) how much land was cleared (in hectares), (Q3-Q4) the type and location of land cleared, and (Q5-Q6) plans for clearing land in the future. The indicator is constructed based on the percent of households who self-report clearing land to allow for cultivation/livestock (Q1), and the additional questions will provide descriptive information on the amount/type of land conversion, as well as motivations to guide programming.

Note that the suggested answer choice options for Q6 include to “grow different crop types (diversification)” as well as to “grow more crops to sell” and to “grow more crops to consume”, to identify different motivating factors related to increasing agricultural production, important for many HEARTH activity theories of change.

ADAPTATION:

HEARTH activities should adapt the answer choices for Q3 (type of land), Q4 (location of the land), and Q6 (reasons for intending to clear more land in the next year) to local contexts as appropriate, as the answer choices provided in the core HEARTH questionnaire are suggestive.

UNIT:

Percent

DISAGGREGATE BY:

Conservation KAP Score: Positive, Negative

TYPE:

Outcome

DIRECTION OF CHANGE:

Lower is better

MEASUREMENT NOTES

INTENDED RESPONDENT:

Primary household decision-maker (male or female) from households participating in conservation knowledge/attitude-sensitive activities. If this person is not available, another adult from the household may be used for reporting.

REPORTING NOTES

In addition to reporting the percent value, the number of participant households of the conservation knowledge/attitude-sensitive activity must be reported, to allow a weighted average to be calculated across HEARTH activities for reporting. Additionally, activities should report on the total sample size (including any disaggregation for participant households vs. comparison/control households if an evaluation is being conducted).

Annex I. Conservation Valuation

Background

Over the last few decades, economists and environmentalists have turned to several different methods to measure the value of ecosystem services – which includes a wide variety of services such as (1) provisioning goods and services such as food, fuel, etc., (2) regulating services such as flood protection or climate regulation, (3) cultural services, including spiritual or recreational benefits, and (4) supporting services necessary for other ecosystem services, such as crop pollination or photosynthesis.⁴ The valuation of these biodiversity and ecosystem services is challenging as these services are often “non-market goods” – meaning that most resulting products or goods are not bought/sold in markets, and the underlying services are not often commercialized.⁵

Because the value of these ecosystem services is not captured completely by market prices, approaches such as revealed and stated preferences are often used to infer or estimate the value of ecosystem services.⁶ **Revealed preference valuation**, while the more rigorous, is limited in that it does not measure “non-use values” which are either ethically or intrinsically based - for example, “the value that people assign to the survival of endangered species or the preservation of inaccessible landscapes may have nothing to do with uses they might make of them, the possibility that they might see them, or the possibility that their descendants or other people might use or see them.”⁷ **Stated preference valuation**, while limited in that it is not based on real choices people make, allow for estimating non-use values and are (relatively) less time consuming/less costly to implement.⁸

Attitudes towards conservation and behavioral intention are important intermediate outcomes in the HEARTH results chains, which might explain why activities do or do not see changes in conservation or

⁴ Kashi, B., Simpson, D., Simón, C., Higgins, M., Manion, N., & Bruner, A. (2018). Integrating Ecosystem Values into Cost-Benefit Analysis: Recommendations for USAID and Practitioners. USAID. <https://biodiversitylinks.org/projects/completed-projects/bridge/bridge-resources/integrating-ecosystem-values-cost-benefit-analysis>

⁵ Ibid.

⁶ Benefit transfer is not discussed here given that it is very unlikely that activities can identify estimates of value derived at one place/time to be used to estimate value elsewhere/at another time, which are in any way standard or reasonably applicable across the HEARTH portfolio given the variety of ecosystem services and country contexts covered.

⁷ Ibid.

⁸ For a more in-depth discussion on ecosystem services and market failures, and ecosystem service valuation, please see “Annex I: Key Concepts” in Kashi, et al. (2018).

threat reduction behaviors, but attitudes and intentions are not perfect predictors of behavior.⁹ Survey methods to measure willingness and behavioral intention and thereby stated preference valuation include **contingent valuation surveys and discrete choice experiments**. However, it is ultimately not recommended for HEARTHs to use these methods given their site-specific nature and that they are costly and time consuming to implement accurately. Instead, HEARTH activities are recommended to use direct questions on attitudes and practices related to conservation. Although these approaches may be less rigorous and more prone to bias, they are much more feasible to implement, particularly in the context of a multi-sector, global initiative.

Stated Preference Survey Options

Contingent valuation surveys ask the respondent a series of yes-or-no questions regarding the delivery of an environmental service for a specific price. They are useful when the researcher does not need information on actual behavior and when trying to price non-market goods. Contingent valuation surveys are intended to reveal willingness-to-pay for provisions of a non-market ecosystem service, such as environmental services and they are “useful for assessing impacts of program design and implementation.”¹⁰ However, contingent valuation study instruments have complex designs and can be costly compared to other survey methods. The Environmental Values Reference Inventory, maintained by Environment Canada and the US Environmental Protection Agency (EPA), catalogs environment-related contingent valuation studies, but the willingness-to-pay estimates are very context specific (e.g., estimating farmer willingness-to-pay for ecosystem services in Lake Naivasha watershed, Kenya).¹¹

With choice experiments survey respondents are asked to make choices between varying, often randomly assigned, bundles of attributes and statistical methods are used to value marginal changes in attributes based on respondents’ choices. For example, choice experiments have been used to assess farmer preferences for the design of agri-environmental programs, including agreement length, conservation practices, and level of paperwork.¹² Choice experiments can overcome some of the weaknesses of contingent valuation studies as they can value marginal changes or trade-offs that are more difficult to assess with revealed preference approaches and generally capture more information. Designers of choice experiments have flexibility in the number of alternatives and attributes assessed in each survey, which can be very extensive.

⁹ Hagger, Martin S. “The Reasoned Action Approach and the Theories of Reasoned Action and Planned Behavior.” *Psychology*, 2019. <https://doi.org/10.1093/obo/9780199828340-0240>.

¹⁰ Floress et al. Measuring farmer conservation behaviors: Challenges and best practices. *Land Use Policy* 70 (2018). https://www.fs.fed.us/nrs/pubs/jrnl/2018/nrs_2018_floress_001.pdf

¹¹ “Evri.” Environmental Valuation Reference Inventory, n.d. <https://www.evri.ca/en>.

¹² Ruto, E., & Garrod, G. (2009). Investigating farmers' preferences for the design of agri-environment schemes: a choice experiment approach. *Journal of Environmental Planning and Management*, 52(5), 631-647. <https://doi.org/10.1080/09640560902958172>.

Common Limitations

- The largest and most significant limitation to contingent valuation and choice experiment surveys is they are intended to be specific to the context of an individual intervention and are generally not intended for comparison across contexts. Given the variety of environmental services targeted by different HEARTH activities, different scenarios would need to be set up for each, rather than being able to set up a generic set of scenarios that could be used across the portfolio.
- Survey design and analysis can be time-consuming and challenging. Effective contingent value survey designs usually required an extensive development process with cognitive interviews, pretests, and pilot studies, and the analysis of choice experiments is also complex.¹³ Optimal sample sizes for choice experiments can also be difficult to calculate, as it depends on the true value of unknown parameters.¹⁴

Choice experiment and contingent valuation studies are best used for program *development*, compared to program *evaluation*, as intentions do not always translate into behavior. If using these methods for evaluation, researchers should consider other data sources (such as observations) for triangulation to overcome potential measurement error and social desirability bias.

¹³ Carson, Richard. Contingent valuation: A practical alternative when prices aren't available. *Journal of Economic Perspectives* 26 (4): 2012, pp. 27-42.

¹⁴ Hoyos, David. The state of the art of environmental valuation with discrete choice experiments. *Ecological Economics*. 69 (2010): pp. 15959-1603.