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Integrated Natural Resource Management (INRM)

HEARTH Monitoring and Evaluation Toolkit: *Agriculture and Land*

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 fields seen from the Mt. Muhabura Campsite near the border of Mgahinga Gorilla National Park. Near Kisoro, Uganda. Photograph by Jason Houston for USAID.

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Acronyms

A-WEAI	Abbreviated Women’s Empowerment in Agriculture
CCP	Conservation and Communities Project
DHS	Demographic and Health Surveys
FTF	Feed the Future
HEARTH	Health, Ecosystems, and Agriculture for Resilient Thriving Societies
INRM	Integrated Natural Resource Management
IP	Implementing Partner
IM	Instrument Measure
MERL	Monitoring, Evaluation, Research, and Learning
SDG	Sustainable Development Goals
STARR II	Strengthening Tenure and Resource Rights II
USAID	United States Agency for International Development
USG	United States Government

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:

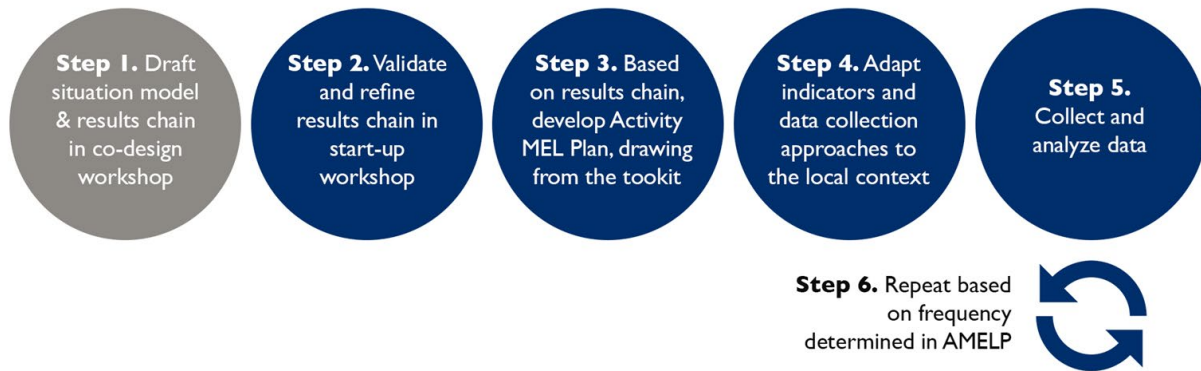
[Access Full Toolkit on Biodiversity Links Here.](#)

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 implementing partners, including Performance Indicator Reference Sheets throughout. This guidance draws heavily on established best practices, such as the Demographic and Health Surveys 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 Agriculture and Land

Table 1: Overview of Outcomes and Recommended Indicators for the Agriculture and Land Sector.

Outcomes	HEARTH Portfolio Indicators
<u>Increased agricultural productivity</u>	<ul style="list-style-type: none"> ● <u>Average crop production, by targeted crop</u> ● <u>Average crop yield, by targeted crop</u> ● <u>Percent of households participating in farmer groups</u>
<u>Increased use of sustainable/regenerative practices</u>	<ul style="list-style-type: none"> ● <u>Percent of households using HEARTH promoted technologies/practices</u> ● <u>Number of hectares under improved management practices or technologies</u>
<u>Increased land tenure and security</u>	<ul style="list-style-type: none"> ● <u>Percent of households with legally recognized land tenure/rights</u> ● <u>Percent of households with perceived tenure security</u>

Agriculture & Land

Pathways To Change

Agricultural productivity, measured by crop production and yield, may increase through several different pathways, including from greater agricultural investment, use of improved practices (e.g., improved seed varieties), membership/participation in farmer groups, as well as from biophysical improvements in ecosystems and strengthened natural resource management. Specifically, many HEARTH activities will directly promote the use of sustainable/regenerative practices, leading to their increased use and an increase in hectares under improved management practices or technologies. Moreover, livelihoods from agricultural production may also improve through a variety of pathways, including diversification or focus on high value crops, increased use of post-harvest processing, and connections to buyers or other actors in the value chain. Additionally, several HEARTH activity strategic approaches focus on strengthening governance, including land tenure and security, mostly through community planning and mapping activities and securing resource rights.

Recommended Outcomes and Indicators

Outcome	Description	Recommended Indicator & Duration
Increased agricultural productivity	<p>Crop production is defined as the amount of target crops harvested by each household or producer. We recommend limiting questions about crops to no more than three target crops of interest to each HEARTH activity, instead of collecting detailed information about all crops grown by each household. This would quickly add time to the survey, with less value added the more uncommon crop types are.</p> <p>To report on annual production more accurately, we recommend asking questions about each target crop cultivated for each season in the past year (as opposed to asking about the past season only, as is done in Feed the Future). If the target crops are trees or other types of crops with non-seasonal products, this approach may be modified accordingly.</p> <p>We recommend identifying a single lead farmer per household to answer all agriculture related questions, instead of identifying lead farmers for each crop type of plot. The latter approach, while potentially increasing accuracy, would add time and complexity to the survey. If</p>	<p>Indicator: Average crop production, by targeted crop</p> <p>Source: Adapted from Feed the Future (FTF) indicators EG.3-10, -11, -12 [Instrument Measurement (IM)-level] Yield of targeted agricultural commodities among program participants with U.S. Government (USG) assistance</p> <p>Duration: 5 minutes per targeted crop (up to 15 minutes total)</p>

	<p>agricultural production is a key outcome for a specific activity, HEARTHs can add additional farmer respondents if their budgets for data collection allows for increased accuracy.</p>	
	<p>Crop yield is the amount of target crops grown/harvested per unit area of land.</p> <p>For plot area, we recommend using self-reported data, but an alternative option is to walk the perimeter and enter the land area in hectares. This is more accurate, but more costly, both in terms of requiring additional training/supplies and more time. The additional time required depends on the number of plots and the distance to plots, which is context dependent. Nonetheless, we would expect that walking the plots would roughly double the length of the survey (including time to walk to plot) or require an additional field staff member.</p> <p>The same recommendations as above for season specific information and lead farmer identification apply for crop yield.</p>	<p>Indicator: Average crop yield, by targeted crop</p> <p>Source: FTF indicators EG.3-10, -11, -12 [IM-level] Yield of targeted agricultural commodities among program participants with USG assistance</p> <p>Duration: 1 minute for each plot. Note that this time is in addition to the time for crop production above.</p>
	<p>Farmer groups often consist of a number of smallholder farmers in a similar geographic area that work collectively to overcome challenges and increase their productivity/profitability.¹</p> <p>This indicator measures the percent of households that are active members of farmer groups. We recommend a very brief set of questions about group participation from the larger Abbreviated Women’s Empowerment in Agriculture (A-WEAI) module on group participation, focusing on participation in farmer groups as well as water user and forest user groups (as these are of interest for other outcome sectors).</p>	<p>Indicator: Percent of households participating in farmer groups</p> <p>Source: Subset of FTF A-WEAI module 6.4B</p> <p>Duration: 2 minutes</p>

¹ IFAD. “Farmer Organizations: Resources and bargaining power for rural producers.” <https://www.ifad.org/en/farmer-organizations>.

Outcome	Description	Recommended Indicator & Duration
	<p>Ideally, questions about participation would be asked to both the primary adult male and female decision-maker, to be able to disaggregate by sex.</p>	
<p>Increased use of sustainable/regenerative practices</p>	<p>This indicator measures the percentage of households who have applied improved management practices and/or technologies promoted by the <u>HEARTH</u> activity.</p> <p>Given that the specific practices or technologies promoted by each HEARTH activity will be different, we recommend that each activity develop a custom list of target practices/technologies. Then for each, questions would be asked about whether the household uses the target practices/technology. Where feasible/relevant, enumerators would be asked to follow-up self-reported data with direct observations to mitigate potential biases (recall, social desirability, etc.).</p> <p>We recommend including in the custom list of target practices/technologies not just practices that the activities hope to increase (e.g., integrated pest management) but also those that they hope to decrease (e.g., use of pesticides).</p> <p>Time to administer this module will depend on the number of target practices, so we recommend limiting it to <i>no more than five practices</i>.</p> <p>We recommend asking these questions at the plot/crop level, as we expect practices to be crop specific, although this may add time to the survey.</p>	<p>Indicator: Percent of households using HEARTH promoted technologies/practices</p> <p>Source: Custom, based on FTF indicator EG.3.2-24 [IM-level] Number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance</p> <p>Duration: 1 minute for each technology/practice</p>
	<p>In addition to knowing whether each of the above technologies or practices were used, it may be important to know the extent to which each is being used on households' agricultural plots.</p> <p>After each question regarding the use or adoption of target practices/technologies identified above, we recommend asking if this is used on all of the household's crops/plots. If not, activities can ask what percent of the plot area with</p>	<p>Indicator: Number of hectares under improved management practices or technologies</p> <p>Source: Custom, based on FTF indicator EG.3.2-25 [IM-level] Number of hectares under improved</p>

Outcome	Description	Recommended Indicator & Duration
	<p>the target crop they use the given practice or technology. We can then calculate the hectares accordingly from the plot size.</p>	<p>management practices or technologies with USG assistance</p> <p>Duration: 1 minute for each technology/practice</p>
<p>Increased land tenure and security</p>	<p>Secure access to land is a critical input for increasing agricultural productivity and food security. Land tenure/rights can improve productivity and conservation by encouraging behavior that fosters long term benefits. This may include higher levels of investment in productive land and improved access to credit.²</p> <p>We recommend questions adapted from (1) the Feed the Future questionnaire on agricultural land ownership/use rights, (2) Sustainable Development Goals (SDG) standard questions on agricultural land rights and security, and (3) Demographic and Health Surveys (DHS) questions on women’s home and land ownership.</p> <p>We recommend asking these questions both to the primary male and primary female decision-maker. We also recommend collecting data at the household rather than plot level and focusing questions on agricultural land.</p> <p>For more detail on considerations and assumptions underlying the recommendations for land-related target respondents, level (household vs. plot), and land type (agricultural vs. non-agricultural vs. combined), please see Annex I. An option for community land ownership, if relevant given the context of HEARTH activities, is also presented there.</p>	<p>Indicator: Percent of households with legally recognized land tenure/rights</p> <p>Source: Custom, based on FTF indicator EG.10.4-7 [IM-level] Number of adults with legally recognized and documented tenure rights to land or marine areas; SDG questions on rights/security (Version 5: Questions 3 and 7)</p> <p>Duration: 2 minutes each for male/female respondent</p>
	<p>Perception of tenure is a widely used means to measure tenure security. Improvements in tenure security perception can also lead to increased investment,</p>	<p>Indicator: Percent of households with perceived tenure security</p>

² MacCartee, Julie, and Katie West. “Feed the Future Indicator Handbook.” Agrilinks. Feed the Future, March 23, 2018. <https://agrilinks.org/post/feed-future-indicator-handbook>.

	<p>agricultural productivity, food security, child nutrition, and access to credit.³</p> <p>We recommend questions adapted from the USAID/Madagascar Conservation and Communities Project (CCP) baseline survey.⁴</p> <p>We recommend asking these questions both to the primary male and female decision-maker. We also recommend collecting data at the household rather than plot level and focusing questions on agricultural land.</p>	<p>Source: FTF indicator EG.10.4-8; USAID/Madagascar CCP Baseline.</p> <p>Duration: 2 minutes each for male/female respondent</p>

³ ibid

⁴ USAID Madagascar Conservation and Communities (CCP) Project Baseline Household Survey Final Report (2020).

Performance Indicator Reference Sheets

INDICATOR TITLE: Average crop production, by targeted crop

APPLICABILITY:

This indicator is applicable for HEARTH activities that have explicit agriculture-related objectives and/or outcomes. Use of this indicator is encouraged for activities that seek to increase the amount or value of agricultural crop production, promote improved crop management practices, or engage in other efforts expected to affect agricultural production (such as crop insurance, land tenure, etc.).

DEFINITION:

Crop production is measured by the total amount of a crop harvested by a given household or producer over the previous calendar year.

The preferred unit for crop production is metric tons.

If there is more than one production cycle in the prior calendar year, total production should be counted (and summed) each time the land is cultivated. If the target crops are trees or other types of crops with non-seasonal products, this approach may be modified accordingly.

Each HEARTH should identify a short (we recommend not more than three) list of targeted crops that should be the focus of the production module. Alternatively, if the HEARTH does not focus on a smaller list of crops, the HEARTH may elect to ask each household to report on the three crops most important for their livelihood. Each HEARTH may wish to ask about whether a household cultivated any of a longer list of crops (to be able to monitor diversification) but asking about production for a longer list of crops can become very time consuming, often with little additional value after the first three most important crops.

DATA COLLECTION:

Activities seeking to measure crop production should first identify up to three crops targeted by the HEARTH activity and the local production cycles or seasons for crops in each country.

Data collection should begin by asking the household's lead farmer whether anyone in their household cultivated crops in the last 12-months. Among those that respond 'yes,' lead farmers should be asked about each individual plot that their household uses for agricultural production. For each plot, respondents should indicate which of the targeted crops were grown on that plot and during which local season each crop was grown. For each crop grown on a given plot, respondents should report the total amount of that crop harvested in each season. To reduce the

INDICATOR TITLE: Average crop production, by targeted crop

recall burden on respondents, multiple units of measurement may be provided (such as ounces, kilograms, and tons).

During the analysis stage, the reported amount of each harvested crop should be converted into the preferred unit (metric tons) and summed across each plot and season. This will result in the total amount of each targeted crop harvested in the last year by a given household, which should then be averaged across households.

Data should be collected annually at the same time of year. When possible, data for this indicator should be collected in the postharvest/sale period when data for other indicators, such as crop yields, are collected.

In addition to the standard crop production indicator questions, follow-up questions have been added regarding the sale of and revenue earned from each harvested crop, the amount of each crop consumed by the household, as well as the amount stored, gifted, or used for other purposes.

ADAPTATION:

Each targeted crop should be selected by the HEARTH activity. The selected crops are expected to vary by country and region. Local production cycles or seasons should also be specified based on each country and type of crop grown. Seasons should coincide with the planting and/or postharvest/sale periods for crops within each country. The number and timing of seasons may vary by crop, country, and region.

For tree crops, which do not follow the standard seasonal cycles of many staple crops, this approach may need to be adapted accordingly. In particular, many tree crops are not harvested within the same year that they are planted, and farmers may need to cultivate trees for several years before their first harvest. In these cases, it may be necessary to use only one production cycle (the last 12-months) and keep in mind that the amount harvested will not necessarily reflect the amount cultivated.

UNIT:

Metric tons

DISAGGREGATE BY:

Farm size

Sex

Age

Commodity

INDICATOR TITLE: Average crop production, by targeted crop	
TYPE: Outcome	DIRECTION OF CHANGE: Stable and/or increasing is better
MEASUREMENT NOTES	
INTENDED RESPONDENT:	Activity-level, activity participants, targeted commodity products.
REPORTING NOTES	
If a sample survey of activity participants is used to collect crop production data points, the sample weighted estimate of the total across all participants or the full population should be calculated for each data point using appropriate sample weights.	

APPLICABILITY:

This indicator is applicable for HEARTH activities that have explicit agriculture-related objectives and/or outcomes. Use of this indicator is encouraged for activities that seek to increase the amount or value of agricultural crop production, promote improved crop management practices, or engage in other efforts expected to affect agricultural production (such as crop insurance, land tenure, etc.).

DEFINITION:⁵

Yield is a measure of the total output of production of an agricultural commodity divided by the total number of units in production (hectares planted of crops). Yield per hectare is a measure of productivity from that farm for USG-assisted producers.

Yield is calculated from the following data points:

- 1) Total Production (TP): metric tons by participants over the last calendar year.
- 2) Total Units of Production (UP): Area planted in hectares for participants over the last calendar year.

Yield is TP / UP per commodity.

If there is more than one production cycle in the reporting year, the data points for TP and UP should be counted (and summed) each time the land is cultivated. The sum of TP divided by the sum of UP will provide an estimate of the average yield achieved across the different production cycles.

TP is the amount that is produced, regardless of how it was ultimately used. It also includes any postharvest loss (i.e., postharvest loss should not be subtracted from total production).

For tree crops, Number of hectares harvested is recommended as UP; however, Number of trees or number of hectares cultivated may also be selected for UP.

DATA COLLECTION:

Activities seeking to measure crop yield should follow the process outlined above for average crop production as the measure of TP.

⁵ MacCartee, Julie, and Katie West. "Feed the Future Indicator Handbook." Agrilinks. Feed the Future, March 23, 2018. <https://agrilinks.org/post/feed-future-indicator-handbook>.

INDICATOR TITLE: Average crop yield, by targeted crop

In addition to total crop production by the household, data on UP can be collected as follows:

The lead farmer for each household should be asked about each individual plot that their household uses for agricultural production. For each plot, respondents should report the total area. To reduce the recall burden on respondents, multiple units of measurement may be provided (such as hectares, square meters, or other locally used units of measurement). During the analysis stage, the reported area of each plot should be converted into the preferred unit (hectares).

For each plot and season, respondents should also be asked which of the targeted crops are cultivated on that plot, and what percentage of the total plot area is used for cultivating each targeted crop.

For each plot and season, the total area should be multiplied by the percentage of that plot used for cultivating the targeted crop. This value should be summed across all plots and seasons that are used to grow each crop, resulting in the total area cultivated for each targeted crop, or UP.

Yield is then calculated for each household and crop by dividing TP by UP, which should then be averaged across households.

Data should be collected annually at the same time of year. When possible, data for this indicator should be collected in the postharvest/sale period when data for other indicators, such as crop production, are collected.

ADAPTATION:

Each targeted crop should be selected by the HEARTH activity. The selected crops are expected to vary by country and region. Local production cycles or seasons should also be specified based on each country and type of crop grown. Seasons should coincide with the planting and/or postharvest/sale periods for crops within each country. The number and timing of seasons may vary by crop, country, and region.

For tree crops, which do not follow the standard seasonal cycles of many staple crops, this approach may need to be adapted accordingly. In particular, many tree crops are not harvested within the same year that they are planted, and farmers may need to cultivate trees for several years before their first harvest. In these cases, it may be necessary to use only one production cycle (the last 12-months) and keep in mind that the amount harvested will not necessarily reflect the amount cultivated.

UNIT:

DISAGGREGATE BY:

INDICATOR TITLE: Average crop yield, by targeted crop	
TP: Metric tons	Farm size
UP: Hectares	Sex
	Age
	Commodity
TYPE: Outcome	DIRECTION OF CHANGE: Stable and/or increasing is better
MEASUREMENT NOTES	
INTENDED RESPONDENT:	Activity-level, activity participants, targeted commodity products.
REPORTING NOTES	
If a sample survey of activity participants is used to collect crop production data points, the sample weighted estimate of the total across all participants or the full population should be calculated for each data point using appropriate sample weights.	

INDICATOR TITLE: Percent of households participating in farmer groups

APPLICABILITY:

This indicator is applicable for HEARTH activities that have agriculture, livelihood, and/or empowerment-related objectives and/or outcomes. Use of this indicator is encouraged for activities that seek to promote agricultural production, collective action, empowerment, or livelihoods.

DEFINITION:

Farmer groups often consist of a number of smallholder farmers in a similar geographic area that work collectively to overcome challenges and increase their productivity/profitability. When smallholder agricultural producers work collectively, it becomes easier to access farming inputs and aggregate produce to reach larger markets. When successful, farmer groups allow smallholders to reduce costs and improve their bargaining power in markets.⁶

This indicator measures the percentage of households that participate in farmer groups at the time of data collection.

DATA COLLECTION:

We recommend a brief set of questions about group participation from the A-WEAI module on group participation, focusing on participation in farmer groups as well as water user and forest user groups (as these are of interest for other outcome sectors). At a minimum, this set of questions should ask households (i) whether the following groups are present in their community, and (ii) whether the respondent is an active member of the group:

- Agricultural/livestock/fisheries producer's group
- Water users' group
- Forest users' group

Although the module asks about existence and participation in a number of groups, only participation in agriculture, livestock or fisheries groups are counted for this indicator. The indicator is calculated by dividing the number who report participating in farmer groups divided by the total number of respondents (including those who report that such groups do not exist in the community).

Ideally, questions about participation would be asked to both the primary adult male and female decision-maker, to be able to disaggregate by sex.

⁶ IFAD. "Farmer Organizations: Resources and bargaining power for rural producers." <https://www.ifad.org/en/farmer-organizations>.

INDICATOR TITLE: Percent of households participating in farmer groups**ADAPTATION:**

HEARTH activities may be interested in asking about the presence and membership of a variety of groups, based on activity design and intended impacts. Additional groups may include (but are not limited to): credit/microfinance groups, mutual help or insurance groups, civic groups, local government, religious groups, and women's groups.

UNIT:

Percent

DISAGGREGATE BY:

Sex

TYPE:

Outcome

DIRECTION OF CHANGE:

Higher is better

MEASUREMENT NOTES**INTENDED RESPONDENT:**

Primary adult male and female decision-makers.

REPORTING NOTES

If a sample survey of activity participants is used to collect group membership data points, the sample weighted estimate of the total across all participants or the full population should be calculated for each data point using appropriate sample weights.

INDICATOR TITLE: Percent of households using HEARTH promoted technologies/practices

APPLICABILITY:

This indicator is applicable for HEARTH activities that have agriculture-related objectives and/or outcomes. Use of this indicator is encouraged for activities that seek to promote the use of improved agricultural technologies or practices.

DEFINITION:

This indicator measures the percentage of households who have applied improved management practices and/or technologies promoted by the HEARTH activity.

The indicator tracks those individuals who are changing their behavior while participating in HEARTH activities. Individuals who attended training or were exposed to a new technology do not count under this indicator unless the individual actually applies what she/he learned. For example, if an agricultural producer attends a training on the use of improved irrigation practices, they can only be counted under this indicator once they apply what was learned by using the improved irrigation practice.

Improved management practices or technologies are those promoted by the implementing partner as a way to increase agriculture productivity or support stronger and better functioning systems. The improved management practices and technologies are agriculture-related, including those that address climate change adaptation or climate change mitigation. Implementing partners promoting one or a package of specific management practices and technologies can report practices under categories of types of improved management practices or technologies. The indicator should count those specific practices promoted by the activities, not just any improved practice.

DATA COLLECTION:

Prior to data collection HEARTH activities should develop a custom list of target practices/technologies. We recommend including in the custom list of target practices/technologies not just practices that the activities hope to increase (e.g., integrated pest management) but also those that they hope to decrease (e.g., use of pesticides).

Depending on the focus of the HEARTH, the practices can be asked about generally or with reference to specific crops. Overall, the indicator should be counted if a farming household uses any practice on any crop (and be divided by the number of farming households, excluding any households that have not cultivated any crops or livestock). Disaggregation should be provided by the specific practice.

INDICATOR TITLE: Percent of households using HEARTH promoted technologies/practices

Management practice and technology type categories, with some illustrative (not exhaustive) examples, include:⁷

- Crop genetics: For example, improved/certified seed that could be higher-yielding, higher in nutritional content (e.g., through bio-fortification, such as vitamin A-rich sweet potatoes or rice, high-protein maize), and/or more resilient to climate impacts (e.g., drought tolerant maize, or stress tolerant rice); improved germplasm.
- Cultural practices: context specific agronomic practices that do not fit in other categories, e.g., seedling production and transplantation; cultivation practices such as planting density, crop rotation, and mounding.
- Livestock management: For example, improved livestock breeds; livestock health services and products such as vaccines; improved livestock handling practices and housing; improved feeding practices; improved grazing practices, improved waste management practices, improved fodder crop, cultivation of dual-purpose crops.
- Wild-caught fisheries management: For example, sustainable fishing practices; improved nets, hooks, lines, traps, dredges, trawls; improved hand gathering, netting, angling, spearfishing, and trapping practices.
- Aquaculture management: For example, improved fingerlings; improved feed and feeding practices; fish health and disease control; improved cage culture; improved pond culture; pond preparation; sampling and harvesting; management of carrying capacity.
- Natural resource or ecosystem management: For example, terracing, rock lines; fire breaks; biodiversity conservation; strengthening of ecosystem services, including stream bank management or restoration or re/afforestation; woodlot management.
- Pest and disease management: For example, Integrated Pest Management; improved fungicides; appropriate application of fungicides; improved and environmentally sustainable use of cultural, physical, biological, and chemical insecticides and pesticides; crop rotation; aflatoxin prevention and control.
- Soil-related fertility and conservation: For example, Integrated Soil Fertility Management; soil management practices that increase biotic activity and soil organic matter levels, such as soil amendments that increase fertilizer-use efficiency (e.g., soil organic matter, mulching); improved fertilizer; improved fertilizer use practices; inoculant; erosion control.
- Irrigation: e.g., drip, surface, and sprinkler irrigation; irrigation schemes.
- Agriculture water management -non-irrigation-based: e.g., water harvesting; sustainable water use practices; practices that improve water quality.
- Climate mitigation: technologies selected because they minimize emission intensities relative to other alternatives (while preventing leakage of emissions elsewhere). Examples

⁷ MacCartee, Julie, and Katie West. "Feed the Future Indicator Handbook." Agrilinks. Feed the Future, March 23, 2018. <https://agrilinks.org/post/feed-future-indicator-handbook>.

INDICATOR TITLE: Percent of households using HEARTH promoted technologies/practices

include low-or no-till practices; restoration of organic soils and degraded lands; efficient nitrogen fertilizer use; practices that promote methane reduction; agroforestry; introduction/expansion of perennials; practices that promote greater resource use efficiency (e.g., drip irrigation, upgrades of agriculture infrastructure and supply chains).

- Climate adaptation/climate risk management: technologies promoted with the explicit objective of reducing risk and minimizing the severity of the impacts of climate change. Examples include drought and flood resistant varieties; short-duration varieties; adjustment of sowing time; agricultural/climate forecasting; early warning systems; diversification, use of perennial varieties; agroforestry; risk insurance.
- Marketing and distribution: For example, contract farming technologies and practices; improved input purchase technologies and practices; improved commodity sale technologies and practices; improved market information system technologies and practices.
- Post-harvest handling and storage: For example, improved transportation; decay and insect control; temperature and humidity control; improved quality control technologies and practices; sorting and grading, sanitary handling practices.
- Value-added processing: For example, improved packaging practices and materials including biodegradable packaging; food and chemical safety technologies and practices; improved preservation technologies and practices.
- Other: For example, improved mechanical and physical land preparation; non-market-and non-climate-related information technology; improved record keeping; improved budgeting and financial management; Improved capacity to repair agricultural equipment; improved quality of agricultural products or technology.

Then for each custom technology/practice identified, questions should be asked about whether the household uses the target practices/technology. Where feasible/relevant, enumerators would be asked to follow-up self-reported data with direct observations to mitigate potential biases (recall, social desirability, etc.).

ADAPTATION:

Given that the specific practices or technologies promoted by each HEARTH activity will be different, this indicator should be customized for each activity and country as described above. We recommend limiting this to a maximum of five practices, though this should be determined based on the number and types of practices targeted by the HEARTH.

UNIT:

Percent

DISAGGREGATE BY:

Targeted Practice

INDICATOR TITLE: Percent of households using HEARTH promoted technologies/practices	
	Farm size Sex Age Commodity
TYPE: Outcome	DIRECTION OF CHANGE: Higher is better
MEASUREMENT NOTES	
INTENDED RESPONDENT:	Activity participants
REPORTING NOTES	
If a sample survey of activity participants is used to collect group membership data points, the sample weighted estimate of the total across all participants or the full population should be calculated for each data point using appropriate sample weights.	

INDICATOR TITLE: Number of hectares under improved management practices or technologies

APPLICABILITY:

This indicator is applicable for HEARTH activities that have agriculture-related objectives and/or outcomes. Use of this indicator is encouraged for activities that seek to promote the use of improved agricultural technologies or practices.

DEFINITION:

This indicator measures the area in hectares where households have applied improved management practices and/or technologies promoted by the HEARTH activity. The same considerations on the custom set of promoted practices and technologies outlined above apply to this indicator.

DATA COLLECTION:

Data collection for this indicator should directly follow the collection of the above indicator “Percent of households using HEARTH promoted technologies/practices.”

After asking about the use or adoption of target practices/technologies identified above, respondents should provide the total area of land that they have applied any of the improved practices/technologies to. Asking about the total area of land for which *any* improved practice/technology has been applied to is preferable to asking about the area for each practice/technology individually. The latter approach would increase survey length and lead to double-counting land that receives more than one improved practice/technology.

Similar considerations for disaggregations apply as above.

ADAPTATION:

Given that the specific practices or technologies promoted by each HEARTH activity will be different, this indicator should be customized for each activity and country as described above.

UNIT:

Hectares

DISAGGREGATE BY:

Farm size

Sex

Age

INDICATOR TITLE: Number of hectares under improved management practices or technologies	
	Commodity
TYPE: Outcome	DIRECTION OF CHANGE: Higher is better
MEASUREMENT NOTES	
INTENDED RESPONDENT:	Activity participants.
REPORTING NOTES	
If a sample survey of activity participants is used to collect group membership data points, the sample weighted estimate of the total across all participants or the full population should be calculated for each data point using appropriate sample weights.	

INDICATOR TITLE: Percent of households with legally recognized land tenure/rights

APPLICABILITY:

This indicator is applicable for HEARTH activities that have agriculture or land-related objectives and/or outcomes. Use of this indicator is encouraged for activities that seek to promote agricultural production and land tenure/security.

DEFINITION:

This indicator tracks the percent of households participating in a HEARTH activity who have legally recognized and documented tenure rights to land.

The indicator refers specifically to legally recognized tenure rights. Informal tenure systems are excluded. Importantly it does not limit tenure rights to individual ownership rights. Any legally recognized documentation of tenure rights counts under this indicator, regardless of

tenure type (e.g., individual, joint, communal, business, or other). Examples of legally recognized documentation may include certificates, titles, leases, or other recorded documentation issued by government institutions or traditional authorities at national or local levels. This indicator captures both statutory tenure rights and customary tenure rights that are legally recognized and also covers both tenure rights held by individuals (either alone or jointly) and tenure rights held by group members, such as members of communities or commercial entities. The indicator tracks the percent of households, not the number of titles issued. For example, if it is a joint title both parties would be counted.⁸

DATA COLLECTION:

Data collection for this indicator should begin by asking respondents whether they own any agricultural land (either alone or jointly with someone else). Respondents should then be asked whether they have any rights to use agricultural land (either alone or jointly with someone else) that they do not own.

Respondents will then be asked (i) whether they have a title deed or other government recognized document for any land the household owns or has use rights to, and (ii) whether their name appears on this document.

ADAPTATION:

⁸ MacCartee, Julie, and Katie West. "Feed the Future Indicator Handbook." Agrilinks. Feed the Future, March 23, 2018. <https://agrilinks.org/post/feed-future-indicator-handbook>.

INDICATOR TITLE: Percent of households with legally recognized land tenure/rights

HEARTHs should take into account considerations about local and national land tenure/rights for each activity. The framing of questions may need to be adjusted depending on land tenure systems in different countries or regions.

UNIT: Percent	DISAGGREGATE BY: Sex
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TYPE: Outcome	DIRECTION OF CHANGE: Higher is better
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MEASUREMENT NOTES

INTENDED RESPONDENT:	Activity participants; primary adult and female decision-makers
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REPORTING NOTES

If a sample survey of activity participants is used to collect group membership data points, the sample weighted estimate of the total across all participants or the full population should be calculated for each data point using appropriate sample weights.

INDICATOR TITLE: Percent of households with perceived tenure security

APPLICABILITY:

This indicator is applicable for HEARTH activities that have agriculture or land-related objectives and/or outcomes. Use of this indicator is encouraged for activities that seek to promote agricultural production and land tenure/security.

DEFINITION:

This indicator tracks the percent of households participating in a HEARTH activity who perceive their tenure rights as secure.

Tenure refers to how people have access to land, what they can do with the resources, and how long they have access to said resource. Tenure systems can range from individual property rights to collective rights, whether legally recognized or informal, and what is included in the bundle of rights within each system varies.⁹

Tenure security refers to land rights that are legitimate, enforced and recognized by others.

In alignment with the definition in the SDG indicator 1.4.2. Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure. tenure is perceived to be secure if an individual believes that he/she will not involuntarily lose their use or ownership rights to land due to actions by others (governments or other individuals).

DATA COLLECTION:

Data collection for this indicator should directly follow the questions described for the above indicator “Percent of households with legally recognized land tenure/rights.”

Respondents should be asked how likely they are to involuntarily lose ownership or use rights to any of the agricultural land mentioned above within the next five years. Response options for this question are:

1. Not at all likely
2. Slightly likely
3. Moderately likely
4. Very likely

⁹ MacCartee, Julie, and Katie West. “Feed the Future Indicator Handbook.” Agrilinks. Feed the Future, March 23, 2018. <https://agrilinks.org/post/feed-future-indicator-handbook>.

INDICATOR TITLE: Percent of households with perceived tenure security

5. Extremely likely

The percentage of households with perceived tenure security should be calculated as the total number of households that respond 'Not at all likely' or 'Slightly likely' divided by the total number of households with land ownership or use rights.

Additionally, we recommend asking households the following:

- Why they believe this could happen
- Whether the possibility that someone could try to take their land has increased, decreased, or stayed the same in the last year

ADAPTATION:

HEARTHs should take into account considerations about local and national land tenure/rights for each activity. The framing of questions may need to be adjusted depending on land tenure systems in different countries or regions.

UNIT:

Percent

DISAGGREGATE BY:

Sex

TYPE:

Outcome

DIRECTION OF CHANGE:

Higher is better

MEASUREMENT NOTES

INTENDED RESPONDENT:

Activity participants; primary adult and female decision-makers

REPORTING NOTES

If a sample survey of activity participants is used to collect group membership data points, the sample weighted estimate of the total across all participants or the full population should be calculated for each data point using appropriate sample weights.

Annex I. Land Measurement

The following presents details on considerations and assumptions underlying the recommendations for land-related target respondents, level (household vs. plot), and land type (agricultural vs. non-agricultural vs. combined). An option for community land ownership, if relevant given the context of HEARTH activities, is also presented.

Recommendations

Target Respondents The international best practice to capture accurate land-related information is to interview all adults about their personal land ownership and rights. It is recognized that the “business-as-usual approach of interviewing the most knowledgeable household member(s) ownership and rights leads to (1) higher rates of exclusive reported and economic ownership of agricultural land among men, and (2) lower rates of joint reported and economic ownership among women.”¹⁰ It is therefore recommended to ask questions to both the primary male and female decision-maker in the household. This will allow HEARTH activities to collect more accurate land information, as well as to disaggregate ownership, tenure formality, and security by sex.

Household vs. Plot level Recognizing that best practice is to collect plot-level information on land tenure and security,¹¹ it is recommended for HEARTH to ask questions at the household level. This is because changes in land-related outcomes are not expected to be of primary interest based on the HEARTH activities reviewed to date, and therefore the more time consuming and costly plot-level data collection would not justify the relatively small benefit (in comparison to having more time for other more important indicators).

Agricultural vs. Non-Agricultural Land It is recommended that land questions focus on agricultural land tenure and security, given that this will be the focus of most HEARTH activities’ land-related impacts. Alternatively, questions could be rephrased to ask about (1) any land (agricultural or non-agricultural), or (2) to ask the same set of questions once for agricultural land, and again for non-agricultural land. Asking about any land would not allow for disaggregation by land type (e.g., disaggregating land ownership for women by land type), while asking questions separately for agricultural and nonagricultural would add survey time (which could otherwise be given to other indicators). While asking only about agricultural land would exclude non-agricultural land related impacts, these would not be expected as a primary outcome.

Of additional consideration might be HEARTH activities’ ability to compare results to the SDGs on land rights:

¹⁰ Kilic, T., Moylan, H., and Joolwal, G. (2020). Getting the (Gender-Disaggregated) Lay of the Land: Impact of Survey Respondent Selection on Measuring Land Ownership and Rights. World Bank Policy Research Working Paper 9151. <https://documents1.worldbank.org/curated/en/737001582039166195/pdf/Getting-the-Gender-Disaggregated-Lay-of-the-Land-Impact-of-Survey-Respondent-Selection-on-Measuring-Land-Ownership-and-Rights.pdf>.

¹¹ Plot-level data collection allows researchers and evaluators to answer more detailed questions – for example, whether plots with formal rights or greater security have more/less investment than those without – than aggregate data at the household level.

- Indicator 1.4.2 “Proportion of total adult population with secure tenure rights to land, with (a) legally recognized documentation; and (b) who perceive their rights to land as secure, by sex and by type of tenure.” – Would only be possible if expanded questions to include any land, or asked for both agricultural/non-agricultural land
- Indicator 5.a.1 “(a) Proportion of total agricultural population with ownership or secure rights over agricultural land by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure.” This would be possible, as the suggested core questionnaire includes amended DHS questions (which are also part of the gender indicator for household decision-making) to ask about agricultural land only (originally, they asked about agricultural or non-agricultural land combined, which would not allow for this disaggregation).¹²

Community Land Ownership

UN-Habitat through Global Land Tool Network’s Global Land Indicators Initiative developed data collection tools for monitoring tenure security, including a community land ownership questionnaire.¹³ The questionnaire includes 13 questions focusing on what type of land is owned collectively by the community, what guarantees ownership rights, perceptions of security, and whether there have been issues or disputes related to the land. This module would be asked to a community leader from each area, and so would require additional respondent selection and separate survey administration. It is not expected that this will be common, and therefore do not recommend collecting data on community land ownership at this time.

¹² See questions 928 – 930 from the DHS Women’s module: “Demographic and Health Survey Module Woman’s Questionnaire.” Demographic and Health Survey. United States Agency for International Development, June 19, 2020. https://www.dhsprogram.com/pubs/pdf/DHSQ8/DHS8_Womans_QRE_EN_19Jun2020_DHSQ8.pdf.

¹³ “Monitoring Tenure Security, Data Collection Questionnaire Modules and Manual.” Global Land Tool Network. GILL Working Paper No 6, n.d. <https://glttn.net/tag/land-monitoring/>.