VOLUME 7: MEASURING NATURAL RESOURCES MANAGEMENT (NRM) AND CLIMATE SMART AGRICULTURE (CSA) UNDER FEED THE FUTURE

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The Purpose of Measuring NRM and CSA under Feed the Future

World populations are projected to reach 9 billion by 2050[1]. As populations grow and income levels rise, so does absolute demand for food worldwide[2].

In order to account for both the projected future for agricultural landscapes and the needs of a growing world population, food security strategies must address the *sustainable intensification* of agriculture to help eliminate producers' vulnerability to economic fluctuations and the impacts of climate change[3], increase efficient productivity of agriculture, and help mitigate ecological degradation and global climate change through climate smart agriculture[2]. Environmental degradation and climate change are critical cross-cutting issues that can affect the sustainability of Feed the Future investments in agricultural development and food security, impede long-term economic growth, and adversely affect livelihoods and wellbeing.

Sustainable intensification is achieved through the sound management of natural assets – including land, water, forests, and fisheries – which provide multiple benefits to food production, environmental health, and nutrition. Properly managed watersheds, rangelands, agricultural lands, forests, and fisheries enhance ecosystem functions that boost agricultural productivity, replenish aquifers, retain soil nutrients, mitigate damage from storms and floods, and reduce environmental vulnerability to the shocks and stresses associated with climate change. Integrated NRM, mitigation, and adaptation approaches are the best method to balance demands for resources for agriculture, people, and ecosystems.

Feed the Future integrates environmental and climate change concerns into programs and, therefore, appropriate methodologies for tracking performance in NRM and CSA proactive must be integrated into our monitoring, reporting, and evaluations. Efforts to address climate risk to food security comes with a commitment by Feed the Future to identify and apply practical performance monitoring tools and rigorous evaluation, which feed into improved implementation in the long term. This process may include cost-benefit analysis of monitoring options and outcomes-oriented measures of effectiveness. With evaluation, reporting, and capturing lessons, programs can be fine-tuned or overhauled as needed in order to maximize the long-term impact of investments in climate change adaptation for food security.

Performance Monitoring and Integration of NRM/GCC indicators into the Feed the Future Results Framework

[1] United Nations. Department of Economic and Social Affairs. *World Population to Reach 10 Billion by 2100 If Fertility in All Countries Converges to Replacement Level*. *Population Division, Population Estimates, and Projections Section*. 3 May 2011. Web. 20 May 2011. < http://bit.ly/1cFqAae >.

2 Climate-Smart Agriculture Sourcebook FAO doi: http://www.fao.org/climatechange/climatesmart/en/

[3] Impacts of climate change include increasing temperatures, more intense or frequent storms, and shifting rainfall patterns all leading to unpredictable weather variability.

Feed the Future has consulted with Global Climate Change (GCC), NRM, and Water experts to incorporate a preliminary set of indicators/definitions into the Feed the Future results framework to assist with tracking the performance of the sustainable and equitable land, water, fisheries, and resource management practices incorporated into Feed the Future investments at the country level. Missions that are investing in improved agricultural productivity are encouraged to integrate specific actions and indicators into their performance monitoring plan to best assist with tracking progress towards and impact on natural resources and climate change adaptation and mitigation.

(1) Monitoring for Climate Smart Technology Development

Feed the Future invests in research and technology development as part of its sustainable intensification efforts. Investment progress is tracked by the following indicator:

4.5.2-39: Number of technologies or management practices in one of the following phases of development:
- **Phase 1: under research as a result of USG assistance**
- **Phase 2: under field testing as a result of USG assistance**
- **Phase 3: made available for transfer as a result of USG assistance**

This indicator counts agriculture-related technologies and innovations including those that address climate change adaptation and mitigation and may relate to any of the products at any point on the supply chain. It does not disaggregate by research technology type. Operating Units reporting on this indicator should indicate in the Feed the Future Monitoring System or Performance Plan and Report narratives which type of CSA technologies are being researched.

(2) Measuring Adoption/Uptake of Climate Smart Technologies and Practices:

In 2011 and 2014, Feed the Future, in consultation with USAID GCC/NRM/Water experts, revised the following three indicator definitions to improve their application in tracking progress and impact of activities supporting natural resources management and climate change efforts. They are:

4.5.2-2: **Number of hectares under improved technologies or management practices as a result of USG assistance**

4.5.2-7 **Number of farmers and others who have applied improved technologies or management practices as a result of USG assistance**

4.5.2-42: **Number of private enterprises, producer~~s~~ organizations, water users associations, women's groups, trade and business associations and community-based organizations (CBOs) that applied improved technologies or management practices as a result of USG assistance**

Previously, the definitions did not include detailed explanation and examples of technologies supporting natural resource management and climate change efforts. As a result, NRM, CSA, and CC adaptation and mitigation technologies and practices were not "counted" nor monitored as important outputs and outcomes contributing to, in most cases, improved agricultural productivity.

As such, the most notable changes in the definitions are adjustments to include a broader list of technologies that address climate change adaptation and mitigation in four different categories:

- Mechanical and physical
- Biological
- Chemical
- Management and cultural practices

Feed the Future also collects information on the following USAID Global Climate Change Indicator:

4.8.2.26: Number of people implementing risk-reducing practices/actions to improve resilience to climate change as a result of USG assistance

This indicator tracks adjustments made to management of resources or implementation of an adaptation action that responds to climate-related stresses and increases resilience. There is strong scientific and evidence-based information that stakeholders (in the case of this indicator defined as "producers") involved in sectors such as agriculture, livestock, fishing, other areas of natural resources can mitigate the effects of climate change by using appropriate new and tested management practices or implement measures that reduce the risks of climate change impacts.

Risk-reducing management practices in agriculture and livestock might include:

- changing the exposure or sensitivity of crops (e.g., switching crops, using a greenhouse, or changing the cropping calendar);
- soil management practices that reduce rainwater run-off and increase infiltration;
- changing to improved grazing practices;
- adjusting the management of other aspects of the system;
- applying new technologies like improved seeds or irrigation methods; and
- diversifying into different income-generating activities or into crops that are less susceptible to drought and greater climatic variability.

While many management practices and technologies exist and can be diffused, others may not be well suited or must be adapted to perform under emerging climate stresses. Improved management and new technologies are available and others are being developed to perform better under climate stresses. Resource management experiences from other parts of the world may be useful as climate conditions shift geographically.

(3) Measuring Productivity

Feed the Future uses the following indicator to track the short term outcome of climate smart technology and management adoption on productivity:

4.5-16, 17, 18: Gross margin per hectare, animal or cage of selected product

The indicator is disaggregated by commodity and sex of farmer, but does not provide disaggregation on technology type that led to changes in productivity. Implementing mechanism indicator reporting on adoption/uptake indicators need to be compared to gross margin indicator values reported by the implementing mechanism to gain further information on plausible indicator value changes due to NRM or GCC technology adoption.

(3.1) Measuring Water Productivity using Gross Margins Data

A critical concern of natural resources management is water productivity. Increasing Agricultural Production per unit of water consumed is an important way to improve food security. When collecting Gross Margins data, water productivity can easily be calculated by measuring a sixth data point -- water consumption in cubic meters. It is strongly recommended that data also be gathered on the m3 of water consumed since the inclusion of this sixth data point in addition to the five data points used for Gross Margin allows for the calculation of water productivity. Provision of data on water consumption should be mandatory for Implementing Partners to report in irrigated areas, and strongly encouraged in rain-fed areas. However, current constraints on collection of data on water consumption in rain-fed areas are acknowledged.

Please refer to the Feed the Future Indicator Handbook for full definitions and proposed data collection methodologies. Technical questions regarding the changes can be directed to Bureau for Food Security M&E Specialist, Tatiana Pulido (tpulido@usaid.gov).

There are additional standard indicators available for monitoring and reporting on natural resource management and climate change adaptation and mitigation results in the Department of State Standard Program Structure (SPS), specifically under program area 4.8: Environment, Program Element 4.8.1: Natural Resources and Biodiversity, and Program Element 4.8.2: Clean Productive Environment. GCC standard indicators are located in 4.8 and 4.8.2. For instance, indicator 4.8-7: “Greenhouse gas emissions, estimated in metric tons of CO2-equivalent, reduced, sequestered, and/or avoided as a result of USG assistance” can be used to capture climate change mitigation benefits. Missions are encouraged to review Feed the Future and SPS NRM and CC indicators to capture results information necessary for performance management objectives.

Evaluating Feed the Future’s Impacts on NRM and CSA

In addition to including new approaches to track performance and change related to NRM programming, Feed the Future encourages field missions to invest in rigorous performance and impact evaluations to study how programs are being implemented and impacting issues related to NRM and CSA. The following is a list of questions that demonstrate the focus of potential future CSA and NRM-related impact evaluations under the Feed the Future Learning Agenda:

- What are characteristics of effective, efficient and sustainable vehicles for promoting adoption of innovation (technology, practices, behaviors) and diffusion of products and new technologies among the poor, women, and socially marginalized? What are the most binding constraints in promoting technology adoption and the most effective interventions for dealing with these constraints?

- What are approaches that successfully address long-term natural resources management objectives while effectively increasing productivity and profitability?

- Which agricultural productivity interventions have had the greatest impact on resilience of households and individuals to recover from (regain consumption levels and rebuild assets) or withstand (maintain consumption levels and protect assets) common and extreme shocks?

- Have interventions changed risk-reduction strategies pursued by men and women to cope with shocks (health-related, agro-climatic, economic, or socio-political)?

- What is the economic impact (reduced input costs, increased productivity, and overall profitability) of improved soil and water management investments in Feed the Future?
- What agricultural technologies/management practices have the most significant impact on climate resilience? On improved biophysical condition of land and water?

Missions are strongly encouraged to consider these and similar questions for developing impact evaluations on their Feed the Future investments. For more information on how Feed the Future will carry out impact and performance evaluations, please see Volume 4 and Volume 10 in the Feed the Future M&E Guidance Series.