MONITORING AND EVALUATING THE FOOD SECURITY AND NUTRITION EFFECTS OF AGRICULTURAL PROJECTS

F. James Levinson[1] and Anna Herforth[2]

[1] Tufts University
[2] Cornell University

Abstract

The monitoring and evaluation of agricultural projects for their impact on household food insecurity and nutrition is important given the paucity of data documenting successes and failures in such projects, and because possible adverse effects in such projects need to be identified and addressed rapidly. Recognizing, however, the lack of capacity and/or reluctance of some agriculture project managers and planners to incorporate nutrition considerations in their project planning or their management information systems, a feasible alternative approach is needed – one capable of meeting agriculture-nutrition M&E objectives without encumbering project managers.

There may be a role for external M&E teams comprised of staff skilled in agriculture-nutrition linkages (Ag2Nut teams). These teams could identify sensible indicators to measure nutrition-relevant impact based on the type of activities in the program, carry out the key M&E necessary for tracking progress, and feed back to the program management; they also could support nutrition-sensitive program design or adjustment.

The teams could carry out M&E for food security and nutrition at geographically representative sentinel sites, where baseline data are followed by the collection of quantitative and qualitative data at six month intervals. Data collected in these areas plus comparable control sites would include (a) information indicating participation and the extent to which households and individuals within households have been reached/affected by the project, (b) data on household food insecurity levels and on dietary quality, (c) where appropriate, data on young child nutritional status (collected annually), (d) information on women's empowerment (qualitative and quantitative); (e) information which might indicate harm to food security or nutrition (e.g. increased time constraints, or inadequate protection of natural resources), and (f) data on a subset of data of primary interest to project managers.

Ag2Nut teams would work with local agriculture staff in initial projects to test the approach while developing prototypes, training modules and TA mechanisms. Where Ag2Nut teams also are sufficiently involved in project design, and where explicit understandings exist that harmful effects will be quickly addressed by project management, such systems have the potential to move this type of nutrition-sensitive intervention forward. In addition, they offer an opportunity to build capacity among program managers to plan for and to measure food security and nutrition effects of programs.

The approach offers a means of assessing the effects of operational nutrition-sensitive agriculture projects that are rolling out in the immediate term, thus enabling learning from substantial investments. It would also enable agriculture projects to understand their impact on food security and on nutrition, two goals that

are often explicitly sought, particularly in the current environment where there is increasing desire to improve impact on nutrition.

I. Introduction

Although efforts to improve food security and nutrition through agricultural projects have been attempted for many years, the issue is now receiving high level international policy attention for the first time. The SUN movement has identified the need for nutrition-sensitive development through agricultural investments, UN and bilateral agricultural programs including those supported by USAID's Feed the Future, and Agence Française de Développement (AFD) explicitly seek to improve nutrition, dozens of meetings and papers have been put forth by international development institutions and high-level UN bodies, and an Ag2Nut Community of Practice, with monthly conference calls, emails and a website to update interested persons on new developments has, at the time of writing, over 600 members from around the world.

Recent reviews point out that the evidence base for agriculture projects' impact on nutrition needs to be strengthened (Masset et al. 2012, Webb Girard et al. 2012). The evidence base needs not only to determine *whether* agriculture projects affect nutrition overall, but *how*. For example, past reviews focused on elements of projects that made them more or less likely to have positive nutrition impact; yet all of these reviews indicate the need for stronger methodological designs in future Ag2Nut evaluations (World Bank 2007, Berti et al. 2004, Leroy and Frongillo 2007, Herforth et al. 2012). Additionally, it will be useful to assess food security and nutrition impacts not only in those projects that are focused primarily on improving nutrition, but also in more conventional production-oriented projects that may, nonetheless, have been justified partly on the basis of their potential contribution to food security and nutrition. As an example, earlier literature looking broadly at agricultural commercialization projects found limited impact on child nutritional status, but did not assess more proximal factors such as dietary quality or food security (von Braun and Kennedy 1994).

The monitoring and evaluation of agricultural projects for their impact on household food insecurity and nutrition is important given the paucity of data documenting successes and failures in such projects, and because possible adverse effects in such projects need to be identified and addressed rapidly (Levinson 2011, Herforth et al. 2012).

The idea of nutrition-sensitive agriculture has captured the imagination of many professionals in the nutrition community and a growing number of agriculturalists; it has been the topic of over 50 publications by international development institutions, most of them published in the last five years (FAO, 2013). However, the idea of nutrition-sensitive agriculture has not yet been internalized by agriculture project planners and managers. Explanations for this are not difficult to discern.

With a decline in funding for agricultural development in low income countries, agriculture planners are hard pressed to generate adequate resources for their projects. Given internal pressures on these projects to increase the production of particular commodities and to generate increased income for their producers, project managers are, not unexpectedly, reluctant to add additional dimensions to their projects, despite pressure from environmental and women's interests, and now nutrition.

With respect to monitoring and evaluation, agriculture project planners and managers are facing considerable difficulty even with their existing orientation. An important FAO/World Bank analysis (2010) found agriculture project M&E efforts riddled with many of the same problems plaguing development problems more generally: (a) externally imposed obligations, but with findings rarely integrated into operational systems, (b) unmanageable data collection and reporting demands, (c) primary attention to the delivery of goods and services rather than project outcomes, and (d) inadequate institutional capacity.

With this panoply of problems, agricultural planners and managers are less than eager to include additional elements in their M&E systems. Yet the agricultural sector is among the most important in its effects on nutrition, and much can be learned from programs currently being funded. Recognizing the existing constraints in agriculture M&E, and the traditionally lower prioritization of nutrition-related issues in agricultural planning, there may be value in examining alternatives to incorporating nutrition indicators into mainline agriculture project management information systems in the short term.

II. An Alternative Approach

Given the above, the monitoring and evaluation of the nutrition and food security dimensions of nutrition-sensitive agriculture projects should seek to accomplish the following:

a. Provision of high quality data on the food security and nutrition effectiveness of nutrition-sensitive agriculture projects, making sure, at the same time, that up-to-date monitoring data on the delivery of project services (activities and outputs) and on intermediate outcomes (in these projects, progress in generating income, increasing production, expanding diversity) is being collected through the project's management information system;
b. The collection and analysis of such data while assuring that agriculture project managers not feel encumbered by the process;
c. Provision to project managers of valuable up-to-date information on other core objectives in their projects, in addition to food security and nutrition information. This acknowledges that food security and nutrition improvement goes hand in hand with environmental and

economic sustainability, objectives which are often of core interest to agriculture program managers.

An ideal means of accomplishing the above is the establishment of sentinel sites within the overall project area. Such sentinel sites need to be geographically representative, but include large enough samples to have statistical power. Sentinel sites have long been used in public health to evaluate trends and determinants of uptake, and to monitor performance of interventions (CDC), and are currently being used in the USAID-funded N-CRSP project to examine behavior change communication. Data would be collected by staff external to the project, and would not be included in the project's formal management information system.

Clearly, the skills necessary to organize such a system, and to collect food security and nutrition data are rarely available among agriculture project staff (even if there were an inclination to incorporate such a system internally.) Accordingly, it is suggested that teams with nutrition-sensitive agriculture project M&E skills (heretofore referred to as Ag2Nut M&E teams), be contracted with external support, prior to project initiation, to undertake these tasks, working closely with local agriculture staff in initial projects. Such teams could (a) create much needed initial successes; and (b) develop prototypes, training modules and TA mechanisms for subsequent utilization. In addition, it would be beneficial, where possible, for Ag2Nut teams to be available to support nutrition-sensitive program design, or at a minimum program adjustment as suggested by M&E data.

III. Sequence and Data to be Collected

Once sentinel sites are identified and data collection systems organized, the team, prior to project initiation, would collect baseline data both from these sentinel sites and from comparable non-project sites serving a control groups. This would be followed at six month intervals (one year in the case of anthropometric measurements) by the collection of the monitoring data indicated below. This monitoring data falls into several categories:

- Basic socio-demographic information
- Information indicating participation and the extent to which households have been reached/affected by the project
- Data on household food insecurity levels and on the dietary quality
- Data on child and maternal nutritional status, where appropriate
- Information on women's empowerment (qualitative and quantitative)
- Information on any harmful effects of the project on food security or nutrition.
- Data on a subset of indicators of primary interest to project managers

Specific data on the last five of these are enumerated below:

A. *Information indicating participation and the extent to which households have been reached/affected by the project*

One of the oversights of past agriculture-nutrition research has been the failure to report data on participation and program reach (Masset et al 2012). It is important to know which households, and which individuals within households, are participating in the project, and whether the program inputs are reaching the targeted households or individuals as planned. As examples:

a. If the project seeks to generate employment, have previously un- or underemployed individuals been employed?
b. If the project is providing inputs (free or subsidized) to small producers, are the food insecure households being included?
c. How does participation and satisfaction differ by gender?
d. How do participating households compare to non-participants; does the project reach food insecure households? [3]

B. *Data on household food insecurity levels and dietary quality*

In the case of most agriculture projects, positive effects on household food security may be more readily accomplished than effects on child nutritional status. Agriculturalists are also more likely to be able to relate to these effects than to nutritional status data.

No one indicator can measure food security completely. Food security is typically thought of as comprising four pillars: availability, access, utilization, and stability. One useful, although sometimes challenging way to assess household food security is using standardized experiential measures that have been validated for a region. A model for such measurement is the 15 item standardized household food insecurity measurement scale recently validated for Latin America by FAO together with academic affiliates (FAO and EU 2012). Comparable scales would be useful for sub-Saharan Africa and for South Asia.

A second valuable indicator type captures diversity of foods accessed by the household, recognizing that food security necessitates access to nutritious diets, not only staple calories. This often forgotten element of food security can be included relatively easily using a household dietary score (Swindale and Bilinsky 2006, FAO and EU 2012). Assessing food diversity also can be coupled with qualitative data capable of providing valuable insights to guide future food security-oriented action.

Food consumption effects, including dietary quality of nutritionally-vulnerable household members, is also important to collect. Some food consumption indicators would be project-specific, but it would be important to measure overall dietary

[3] Food insecurity scoring and height for age measurements would be carried out on all households in the sentinel site areas at baseline.

quality using indicators such as individual dietary diversity scores, which are positively correlated with micronutrient adequacy, calorie adequacy, and nutritional status. These scores can be measured using qualitative 24-hour recall (FAO and EC 2011), a food consumption score technique (WFP), or a food group questionnaire (Swindale and Bilinsky 2006), depending on the interviewer skills and level of information sought. Metrics for sustainable diets, as developed, could also be incorporated (Fanzo et al. 2013).

C. Data on Nutritional Status

While recognizing that changes in nutritional status are less likely to result directly from agricultural projects, it may be warranted in some cases to measure anthropometric data on children and/or women, particularly where agriculture programs are taking place in conjunction with health, water and sanitation, social protection, or education initiatives.[4] But it is important to analyze nutritional effects via impact pathways – i.e. the specific means by which project services are expected to affect nutritional levels, rather than randomly measured.[5] Accordingly changes in height for age (stunting or chronic malnutrition levels) for children under age two, anemia levels, and in some cases biochemical or anthropometric indicators related to chronic disease, have to be related to project aims and inputs through specific pathways. Because anthropometric indicators usually change more slowly than other indicators more proximally related to agriculture, these data should be collected annually rather than semi-annually.

D. Information on women's empowerment (qualitative and quantitative)

It has been clearly shown that ensuring women's participation and access to productive resources and information can substantially improve agricultural productivity (FAO SOFA 2011). Since women's empowerment is a key instrument for improving nutrition (FAO 2013), information on women's participation, time use, perceived returns on their labor, discretionary income and decision-making power would be important. Although some quantitative indicators are under development (such as the Women's Empowerment in Agriculture Index being

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[4] These data also could show synergies between multisectoral project components (e.g. does improvement in food consumption in addition to WASH inputs have a greater effect on nutritional status than either alone?)

[5] An example of such a pathway is that increased efficiency of particular types of agricultural work carried out by women would improve the nutritional status of children by freeing up time for childcare and feeding, and/or reduce caloric expenditure by women thus improving their nutritional status. Another pathway is that increased diversity of production coupled with targeted counseling on consumption and feeding could improve the micronutrient status of young children.

developed by IFPRI, USAID, and Oxford[6]), much of this information is still most effectively obtained qualitatively, through interviews or focus groups.

E. Information on any harm to food security or nutrition emanating from the project

Information collected under parts A, B and C, most of it collected at six month intervals, is likely to help identify harmful effects on food security or nutrition resulting from the project. Harmful effects may be more likely in projects involving cash crop production or those requiring major new inputs . Overall, harmful effects emanating from agriculture projects (with effects compared to control areas) may include any of the following:

- Employment levels have remained static or deteriorated;
- Small producers have been excluded;
- Women are not able to participate;
- Household food insecurity has deteriorated (overall or seasonally);
- Intra-household equity of income has declined;
- The labor burden of women has increased;
- The debt burden of vulnerable households has increased
- In irrigation/water use projects, changes in water-borne diseases;
- In livestock projects, changes in zoonotic disease;
- When agrochemical inputs are used, possible risks to health (e.g. using empty containers for drinking water).

F. Data on a subset of indicators of primary interest to project managers

Working at the sentinel site level, the collection of particular types of data of value to agriculture project managers, may be easier to collect than through traditional agriculture management information systems. Collecting, analyzing and reporting such information to project managers on a regular basis is not only likely to enhance overall project effectiveness, but will also strengthen relationships between project management and the Ag2Nut M&E team.

Valuable data which particularly lends itself to collection at sentinel sites includes that listed below. A portion of this quantitative data collection should be accompanied by the collection of qualitative data to better understand the local context and dynamics of project effects:

- percentage of households considering themselves better off now than 12 months ago
- percentage of the labor force underemployed or unemployed
- access, use and satisfaction with services provided under the project

[6] Available at http://www.ifpri.org/publication/womens-empowerment-agriculture-index

- changes in farmer income
- productivity and marketability of farm products

IV. The larger context: Conditions for success

While such sentinel site-based data collection is likely to be highly useful, positive food security and nutrition effects may be unlikely unless the project itself includes (a) explicit food security and nutrition objectives, and (b) programmatic components that address these objectives. Accordingly, important conditions of these cooperative efforts would seem to be the following:

- That Ag2Nut M&E staff is itself sufficiently involved in project design, assuring that the project's food security and nutrition objectives are realistic and "evaluable," and that the project includes elements which, based on findings to date, are particularly likely to lead to decreases in food insecurity and undernutrition, i.e. employment generation, active encouragement of production and consumption of a diverse array of foods, and active assistance to the agricultural work carried out by women;[7]

- That good quality data can be sensibly aggregated and presented to project management in timely fashion;

- That there is an explicit understanding that harmful effects identified by sentinel site teams – or data indicating shortcomings in project implementation – will be directly and seriously addressed by project management;

- That Ag2Nut M&E teams are prepared with mitigation plans in cases of harmful effects

For this approach to be viable, adequate staff and funding are needed. There is a need to identify Ag-Nut M&E teams capable of participating actively in an initial stream of nutrition-sensitive agriculture projects. The approach is predicated on the fact that many current agriculture investments do not include an approach to measure nutrition or food consumption impacts. Thus funds for nutrition-relevant

[7] This attention to women has at least two important dimensions: (a) In most countries, women have the responsibility for producing food in home gardens, food most likely to be consumed by the household rather than sold – production which need to be increased quantitatively and greatly diversified; and (b) The agricultural work carried out by women is often arduous, problematic for reproductive age women where the health status of these women is of critical importance, and where women's energy also is needed for pregnancy self-care and child care. Efforts to increase the efficiency of women's work (which also may include food preservation and processing) and reducing the required energy expenditure are required.

M&E may not be built into the programs themselves, requiring a source of external funding for this approach.

One of the challenges in this, as in any multisectoral M&E effort, is to collect data that are meaningful enough to be useful, and brief enough to be usable. As noted, data need to be collected and analyzed quickly and with minimal complication. This is particularly important for sentinel sites where (a) respondents will be contacted often, and M&E systems must avoid overburdening them with long questionnaires, and (b) the premise is that such M&E support will allow program managers to adjust programs where necessary, based on the emergent results.

V. Assessment of cost-effectiveness: emphasizing win-wins and sustainability

Unlike nutrition-specific projects, cost-effectiveness analysis in nutrition-sensitive agriculture projects may involve too many assumptions to be useful. The timescale of effects considered could vary from an immediate impact on food intake (such as emergency programs seek to achieve), to a long-term impact from a sustainable intervention (Herforth et al. 2012.) The costs also will vary enormously among agricultural projects, and marginal costs are difficult to define. Trying to define specific marginal costs associated with "the inclusion of nutrition" minimizes the importance of the projects' primary production objectives, and the potential for integrated win-win projects.

Instead, projects should be reviewed jointly by project managers and Ag2Nut M&E teams, and should be considered "successful" and worthy of replication if they are effective in meeting both production and food security/nutrition objectives and are found to be environmentally and economically viable for producers and funders. Furthermore, if they are designed in a way that is likely to be sustainable (e.g. new techniques used after input delivery stops, or new market linkages brokered), true cost-effectiveness will be significant.

VI. Conclusions

This paper makes the case (a) that nutrition-sensitive agriculture is of major importance in efforts to reduce food insecurity and malnutrition; (b) that monitoring and evaluating such projects would yield valuable information from current investments; (c) that, despite major international attention and active support from nutritionists and many agriculturalists, the absence of buy-in from agriculture project planners and managers coupled with existing problems in agriculture project M&E make simple inclusion of food security and nutrition indicators in such projects unrealistic.

Instead, the paper proposes an M&E system using sentinel sites and operated by Ag2Nut M&E teams with data collection complementary to the project's

management information system. Baseline and semi-annual data needed from such sentinel sites is specified along with necessary conditions for success, among them participation of Ag2Nut M&E teams in project planning.

Careful attention to these processes will permit the development of data collection system prototypes and protocols for staff training. These along with general successes in initial nutrition-sensitive project operations should permit solidified systems for such M&E undertakings in the future.

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