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AGRICULTURE GLOBAL PRACTICE NOTE 02

Fostering Agriculture–Nutrition Links

Recommendations for Agriculture Extension Curriculum Reforms in India

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Malnutrition continues to be a major development challenge in the South Asia Region. Given its size, India hosts the majority of the malnourished. Around 300 million people in India do not have access to a food supply that sufficiently meets their basic energy needs (World Bank 2012. *Nutrition at A Glance: India*. Washington, DC: World Bank Group). Despite recent economic growth, poverty remains high, and malnutrition is now manifest in all its forms with overweight and obesity increasing alongside persistent undernutrition and micronutrient deficiencies. The progress made between 1970 and 2010 in reducing malnutrition was largely due to improving access to safe water, female education, and female empowerment, the latter 2 especially key in South Asia. The factor that made the least progress between 1995 and 2010 is increasing quantity and quality of food, clearly a responsibility of agriculture (L. Smith and L. Haddad 2014, "Reducing Child Undernutrition: Past Drivers and Priorities for the Post-MDG Era." IDS Working Paper 441).

Nutritional issues in India are complex and require all sectors to play their parts both individually and multisectorally to deliver a multifaceted, multidisciplinary solution. This *Note* focuses on the role of agriculture, and its role in delivering nutrition solutions—an affordable, accessible, nutritious diet for all. When agriculture-nutrition solutions are delivered in a multisector approach the impact on nutritional outcomes is magnified. The key transmitters of agricultural knowledge to farmers are agricultural extension workers, and the key medium of training for the agricultural extension workers are the state agricultural universities. Nutrition knowledge is not currently incorporated in agricultural extension training or delivery in India despite the potential for nutritional impact given the well-established network of extension officers. As part of the South Asia Food and Nutrition Security Initiative (SAFANSI), a review of the existing state agricultural university agricultural extension curricula in three states—Andhra Pradesh, Bihar, and Tamil Nadu—was carried out and the conclusions led to a series of curricula revision recommendations.

CURRICULUM REVIEW

The review focused on both pre- and in-service training to assess the extent of nutrition instruction received by the extension workers and students. It examined what nutritional content was incorporated, particularly in areas such as understanding nutritional issues in local areas, diet diversification to support better nutrition outcomes, and

* *Note:* International Food Policy Research Institute, IFPRI, Washington, D.C.

a better concept of landscape planning with nutrition in mind.

Although agriculture (i.e., food production) is very closely linked to nutrition (i.e., food consumption) in theory, in most education and training situations the two concepts are presented and pursued separately. This *Note* presents the key findings and recommendations based on the case study reviews, face-to-face consultations from the national level to program implementation at village levels, and consultative workshops.

STATUS OF NUTRITION INCORPORATION

The results of the curriculum reviews and Case Studies of State Agricultural Universities (SAUs)

To comprehensively deliver nutrition solutions requires agriculture to deliver an affordable, accessible nutritious food supply, but many other factors also need to be in place. These include, but are not limited to, the health sector delivering health care, nutrition education, social protection systems ensuring minimum levels of income and protection against shocks to support purchase of nutritious foods, women having sufficient time and resources to feed children a healthy diet, and many other factors. In India, the coordination and leadership of nutritional education is fragmented. The "everybody's business" has become "nobody's business" and nutrition as a discipline has not been well developed even in the health sector. Common to all the SAUs reviewed was that limited training on nutrition, when available, was either not included in or offered to the agriculture major students, who become the future agricultural extension workers. This undermined the research-extension link and more broadly an enabling innovative environment. In addition, there is very little nutrition training available for existing agricultural extension workers.

Specific lessons emerged from the curriculum review and consultations exercise:

- The topic of nutrition is largely missing in the curriculum of the agricultural universities that train agricultural extension professionals.
- The current extension reforms being undertaken under the rubric of the Agricultural Transformation Management Agencies (ATMAs) are an opportunity to integrate nutrition in the extension process. This will incentivize curricula change in universities given demand from the extension services.
- Mid-career training of agricultural extension workers does not currently include nutrition courses. Given the significant recognition from national to state level of the critical nutrition challenges facing India, there is opportunity to incorporate nutrition in in-service training in the extension system.
- Farmer training in farm science centers (KVKs) at the district level has no systematic way of incorporating nutrition training at the block, community, and farmer level or at the extension worker level, despite recognition that it is needed.
- At the university level, nutrition is taught in home science colleges, but the graduates of these programs do not work in the extension services.
- Nutrition as a development challenge needs to be taught in both agricultural and social sciences, given the slow progress made in reducing malnutrition levels.
- Curriculum development in nutrition related to agricultural extension needs to be context specific in problem identification and solution at district and block levels. This requires close collaboration between the SAU agricultural departments and the KVKs to identify critical curriculum needs.

TAMIL NADU CASE STUDY

Major nutritional challenges in Tamil Nadu include high levels of child malnutrition among the poor and tribal populations, micronutrient deficiencies, including anemia, among the women, especially pregnant and lactating mothers. These challenges are more pronounced in the rural areas, particularly the rain-fed regions of Tamil Nadu. The extension system does not disseminate nutrition-related information, but it continues to focus on production-oriented messages and recently has moved toward water conservation and marketing. No capacity currently exists in the extension system to disseminate nutrition messages. Some district-level extension officers, however, are undergoing food security and nutrition training through mid-career training programs.

In Tamil Nadu Agricultural University, the links between nutritional and agricultural learning are weak. For example, the Horticulture and Home Sciences Departments offer courses on nutrition topics such as nutrition classification and nutritive value of horticultural crops, and laboratory classes on nutrition and kitchen gardens. In addition, there are courses in fundamental

and therapeutic nutrition along with six food science courses. However, most future extension officers pursue bachelor's degrees in agriculture, a department that does not offer any nutrition classes, or encourage students to take courses from other faculty. This lack of coordination creates gaps in knowledge of the nutritional benefits and health outcomes delivered by, for example, a diversified agricultural landscape, in the extension system. It is important that university curricula provide a setting to introduce future extension agents to nutrition information so that they can disseminate these messages into the community and lead the extension community in advocating policies and services that promote good nutrition.

The SAUs are not the only opportunity for strengthening nutrition and agriculture links in extension curriculum. District KVKs can also provide more multidisciplinary training to mid-career extension officers as well as those involved in agriculture interventions on the ground. In Tamil Nadu, KVKs could provide a variety of courses specific to the nutritional challenges faced in the district. These courses could cover topics such as the value addition of food, how to grow a nutritious kitchen garden, and nutrition programs specific to the needs of men, women, and children. Ensuring that context is locality specific will help make the nutrition curriculum more demand driven.

UNITED ANDHRA PRADESH CASE STUDY

In united Andhra Pradesh, although the nutritional status of children has shown improvement, chronic malnutrition and acute undernutrition in children is still widespread. In addition, micronutrient deficiency in the state is estimated to have risen. Major nutritional challenges in the agricultural communities of Telangana and Andhra Pradesh include under-five child malnutrition, infant mortality, maternal and child anemia, acute undernutrition, diabetes and obesity. Overall, the state also suffers from poor dietary habits leading to long-term health problems.

Although the extension curriculum at the SAU is comprehensive in terms of agricultural aspects, little to no nutrition-related content is included. There are no nutrition courses required in the two-year diploma program in agriculture that most of the agriculture extension workers undergo for their training. Recommendations for curriculum revision include an undergraduate course in the fundamentals of human nutrition. It is also recommended that the existing undergraduate courses in agricultural economics include content on the per capita availability of food and food consumption trends as well as concepts on household food security that include health impacts of food, diet diversity, and their subsequent impact on nutrition. In addition, content on women's agricultural labor and workload should be included along with the consequences for nutrition. Post graduate courses on extension education should highlight the importance of crop diversification and the health benefits. The SAU also offers a Rural Work Experience program. It is recommended that this program include nutrition-oriented activities to give future extension agents more practical experience on nutrition issues. It is highly recommended that the curriculum of non-formal education activities, such as in-service training courses for extension agents, include content such as household food security, national policies affecting food and nutrition security, nutrition policies, and methods of preventing and combating micronutrient malnutrition.

Since ATMA officials are trained through the state extension training centers, the trainers in these centers have to be trained in nutrition courses as well. To begin with, the curriculum taught to the diploma level could be introduced for state-level training programs of extension officials in the ATMA. At the district level, there is a close collaboration and coordination of food and nutrition training activities of the KVKs and the ATMA training programs through farmers' field schools. The food and nutrition program officers of KVKs should offer the specialized nutrition courses to the block technology officers and the farmer friends in the ATMA system.

BIHAR CASE STUDY

Bihar, with a population of approximately 83 million, is the third most populous state in India. More than 50 percent of children are malnourished and the number of children showing signs of wasting is increasing. In addition, the prevalence of anemia among children is as high as 88 percent and is approximately 60 percent amongst pregnant women. The chronic energy deficiency in women is a major nutritional challenge in Bihar. It is especially important in terms of the agricultural sector as rural women are the primary agricultural labor for the farm households. In Bihar, the percentage of women suffering from energy deficiency is approximately 40 percent, significantly higher than the national average, and micronutrient deficiency, or "hidden hunger," is often overlooked by nutrition interventions as well as agriculture interventions.

In Bihar, the major areas of nutrition education for extension programs include breast-feeding practices, kitchen gardening, community farming of horticultural products, and water, sanitation, and hygiene. Like in the other SAUs, there are a limited number of courses related to nutrition, but these are not offered to the students who are aiming to become agricultural extension workers. The College of Home Sciences at the faculty of agriculture has a comprehensive approach in improving rural livelihoods through educating general field advisers with pragmatic skills on various topics, including nutritional specialists, but the courses are not taught to the agriculture majors. The research carried out at the College emphasized practical solutions to the nutrition security within the local communities, such as add-in-water baby formulas with balanced dietary content. The nutrition-extension link in the case of the Bihar SAU exists, but the scale is insufficient to address the state-wide challenges. The main practical means to disseminate research information from the college to the ground is through the students' mandatory six-month practical trainings that are carried out in the auspices of the KVKs. The college has, in addition, training for mid-career experts working with nutrition, such as the lady advisers. However, there are concerns related to the mid-career training on nutrition as the basic nutritional knowledge of the employees working with nutrition may not be sufficient. The current curriculum at the SAU includes little nutrition content in the agriculture education.

However opportunities exist to reintroduce nutrition course in the university, diploma, and postgraduate curricula. In order to meet the nutrition education needs to increase the impacts on the ground, the curricula should include content relevant to nutrition problem identification, provision of nutrition solutions, nutrition planning and coordination, program implementation and delivery, monitoring and evaluation, and impact assessment.

RECOMMENDATIONS

Achieving sustainable nutrition improvement in India requires a strategy that incorporates all sectors. For the agriculture sector, a strategy will need to incorporate relevant nutrition content in the agricultural curricula, both within the SAUs, and within in-service-training of extension workers. A key actor in this will be the National Institute for Agricultural Extension Management (MANAGE), an organization run by the central Ministry of Agriculture, responsible for training and educating future and current extension officers. At the local level, the Agricultural Transformation Management Agencies are a key outlet for the dissemination of locality-specific nutrition messages at the block and village levels, given block-level extension officers are the primary sources of agricultural advisory services in the field. To be effective across all the levels, cooperation and coordination from the national to village level will be essential. Our conceptual framework for the strategy consists of a multidisciplinary and nutrition-smart extension curriculum to strengthen agriculture-nutrition links. The goal is strengthened agriculture-nutrition links, resulting in increased production and household income as well as more diversified diets for improved nutrition. The recommendations include the following:

- The agricultural education system should be redesigned to enable solution designers, who can analyze the nutritional landscape such as women's nutritional needs, workforce nutrition, fetal growth, stunting during the first two years, and metabolic fitness and design agricultural responses.
- In order to reach rural communities through the existing extension systems, there is a need to think along the lines of developing "massive open courses," which can be available online and offline, for training frontline extension workers as well as communities.
- The curricula to be developed need to take into account issues related to identifying problems, developing contextual solutions, implementing interventions, monitoring and evaluating the programs, and finally to refining the nutrition programs and policies at the central and state levels.
- Efficiency gains can be made by reviewing links between ongoing capacity-building efforts of the individuals and NGOs that implement nutrition programs and the existing knowledge base of universities and research institutes, and pursuing integrated comprehensive training approaches.
- Platforms like Krishi Vigyan Kendras and Agricultural Produce Market Committee markets are key potential hubs for dissemination of nutrition related messages. State agricultural universities, state departments of agriculture, and KVKs will need strategic guidance on where and how much to invest to achieve appropriate curriculum change and integration of nutrition in extension programming.

Finally, extension efforts must recognize women farmers, and deliver programs directly to them for two reasons. First, women in most households are intimately involved in the production and preparation of meals and feeding their family, and so they have the most direct control over nutrition. Second, female-headed households in India typically have a higher incidence of malnutrition and food insecurity. Thus gender mainstreaming within agricultural extension and the nutrition curriculum is a key strategy for addressing rural malnutrition.

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