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Sustainable farming systems for food and nutrition security

About this online discussion

This document summarizes the online discussion *Sustainable farming systems for food and nutrition security*, which was held on the FAO Global Forum on Food Security and Nutrition (FSN Forum) from 23 October to 10 November 2017.

The discussion was facilitated by Alan Dangour, Professor in Food and Nutrition for Global Health at the London School of Hygiene and Tropical Medicine and Nutrition-Sensitive Agriculture Pillar lead for LANSA Consortium. Acting as co-facilitators were Aliza Pradhan, Agronomist and Coordinator of the M.S. Swaminathan Research Foundation Farming System for Nutrition study in India under LANSA, and Md Sirajul Islam, Programme Head of Agriculture and Food Security Programme, BRAC Bangladesh and Agriculture Expert for Agricultural Value Chain Study under LANSA.

Participants were invited to share their views on the role played by the nexus between agriculture, food security and nutrition, and the environment towards advancing the realization of the Sustainable Development Goals.

Over the three weeks of discussion, participants from 14 countries shared 45 contributions. The topic introduction and the questions proposed, as well as the contributions received, are available on the discussion page: http://www.fao.org/fsnforum/activities/discussions/sustainable-farming-systems

Introduction

Participants reached a broad consensus that the role of sustainable farming systems for food and nutrition security is a topic of current relevance, and that farmers increasingly suffer from a variety of environmental threats such as untimely and torrential rain, droughts, flooding, landslides, avalanches, earthquakes and epidemics (Dhananjaya Poudyal, KV Peter).

In this context, climate change poses a particularly serious threat to the fight against hunger, malnutrition, disease and poverty, mainly through its impact on agricultural productivity (Muraleedhar Prasad).

During the discussion, the important role of agriculture as a major provider of environmental services also emerged, with participants pointing to its important role in sequestering carbon, managing watersheds and preserving biodiversity. Conversely, it was pointed out that agriculture is also a major consumer of natural resources and that sustainable

farming systems should therefore include resource-conserving technologies (Muraleedhar Prasad, Alan Dangour).

Participants however differed in their views of which route to follow in order to move towards more sustainable practices.

While the majority advocated for a stronger emphasis on traditional techniques and crops, others identified the obsolete nature of current farming systems as a factor contributing to food insecurity.

Documenting the impact of farming systems on the environment

Participants had little information to share regarding any systematic documentation of the impact of farming systems on the environment. In fact, it was argued that documentation of these impacts across the value chain of the system is quite often lacking, even in developed countries.

One of the oft-neglected aspects of designing agricultural policies and strategies involves considerations of environmental and natural resource sustainability. To address this, it is important to understand what factors shape policy processes and how one can steer them to become inclusive of aspects related to the impact of farming systems on the environment (Suresh Babu).

To ensure a valid assessment, it is essential to apply a transdisciplinary life-cycle approach to study the impacts, in particular on biodiversity, water and climate, of every major food crop and food system. Adopting a three-pronged approach to understanding the real causes, including capacity building of key actors, policy advocacy and on-the-ground model-building, can help assess the status of farming systems vis-à-vis nutrition, livelihoods and the environment (Anil Kumar).

Growing rice under constant threat of floods

Recently we conducted a study in the Haor region in northeastern Bangladesh.

The livelihoods of the people in Haor are dependent on rice cultivation, which they have passed down from generation to generation.

However, to cultivate rice they must cope with flooding lasting up to six months. During this period, they migrate to other places to find alternative work; otherwise they remain jobless.

Sometimes, the floods ravage their paddy fields before the harvest, affecting their food consumption, nutritional status and ultimately their living standards.

When talking about sustainable farming systems for nutrition in areas like Haor, we really need to understand the potential for increasing the resilience of farming systems in those areas given the seasonal vulnerability and remoteness of the areas.

Given their limited scope for growing diversified crops, as well as their everyday struggle to secure shelter, earnings and other basic needs, it is not surprising for people who have grown up in such vulnerable conditions to consider nutritional diversity as a luxury (Barnali Chakraborty).

Evaluating the impact of homestead food production on food security and nutrition

We are currently conducting a four-year cluster-randomized trial in Sylhet, Bangladesh, called Food and Agricultural Approaches to Reducing Malnutrition (FAARM), funded by the German Ministry of Education and Research.

We evaluate the impact of the Homestead Food Production programme of the NGO Helen Keller International (HKI) on food security, nutrition and health. The programme works with small-scale farmers, training them in vegetable gardening, poultry rearing and marketing, as well as nutrition, child care and hygiene.

Soil fertility was a key constraint in FAARM home gardens, and therefore we explored the feasibility of urine-biochar as a low-cost organic fertilizer in the Biochar-Urine Nutrient Cycling for Health (BUNCH) study, together with HKI, JPGSPH and Ithaka Institute (funded by LANSA).

The farmers produced biochar locally in soil-pit kilns from crop residues and mixed it with cow urine. It turned out to work quite well and we are now scaling up.

After the flash flood in April that destroyed the Boro rice crop in our area, we are now collecting data on how badly the families were affected, their food security situation and their coping strategies.

As part of FAARM, we have been collecting detailed nutrition data on a rolling basis and will thus be able to assess the effects on households and particularly on children (Sabine Gabrysch).

Citing evidence from experiences primarily in India and Africa, participants argued that the dominant agrifood regime has failed to ensure increased food and nutrition security (Anita Pinheiro, Florence Egal). This is especially true when it comes to smallholder farmers who often lack access to quality seeds for nutrient-rich crops, possess inadequate knowledge, and are held back by poor extension services and weak market links (Mohammad Abdul Mazid).

The majority of participants felt that sustainable farming systems require proper land-use planning and cropping patterns. Monocropping practices were identified as one of the major risk factors for sustainability due to decreased soil fertility and vulnerability to pests and diseases (Takele Teshome, Rajendran Tp).

The access and utilization dimensions of food security

Although yields may be decreasing in some cases, availability of food is generally not the main cause of the unsatisfactory nutritional status of rural dwellers.

The issue lies in the lack of access to safe and nutrition food, and in the way this food is prepared and consumed. This is caused by volatile economic conditions such as high inflation and the lack of food safety regulations and knowledge. Moreover, the absence of safe drinking water and sanitation facilities is a further source of illness and resultant malnutrition (Umekulsoom Inam).

Biological agents to manage plant diseases and pests

Food safety concerns begin with farm production of food commodities. Farms are therefore one of the key entry points for the introduction of management practices that allow for minimizing potential contamination with excessive residues of harmful chemicals in food and water (Muraleedhar Prasad).

It could be advisable to incorporate biological agents to manage plant diseases, as fungicides and pesticides widely employed in commercial farming systems have a negative impact on the environment and could facilitate the emergence of particularly resistant strains of pathogens. To ensure the uptake of biological agents, mechanisms need to be put in place to provide these to farmers at competitive prices (Aqleem Abbas).

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Linking research and policy regarding sustainable agricultural systems for nutrition

Participants agreed that in order to achieve any progress in creating sustainable farming systems, it is imperative to involve policy-makers.

This calls for a process of continuous engagement with policy-makers at multiple levels, keeping them informed, conveying evidence from research in simple, understandable terms, and being clear on costs and time required (Bhavani R Vaidyanathan).

It is also urgent to carry out scientific research that reviews promising local practices via interdisciplinary teams – including lawyers – and participatory processes with a view to generating practice-based evidence to inform policy (Florence Egal).

As smallholder farmers often cannot afford the cost associated with adopting improved farming practices, governments play an important role in providing financial and practical support. In doing so it is important to avoid skewing the social relations within communities by favouring specific individuals at the expense of others (Daramola Tolu).

In countries such as India, Targeted Public Distribution Systems (PDS) are an important channel through which vulnerable populations receive a monthly quota of basic foodstuff and production assets. It is important to include these in the push for more sustainable farming systems (Priya Rampal).

In more general terms, this means that it's crucial to consider thoroughly the implications and consequences of policies on different target groups before they are implemented (Milly Monkhei, Vethaiya Balasubramanian).

Participatory approaches

Broad and facilitated participation from all stakeholders involved is crucial for the successful adoption of agro-ecological practices. In this context, social media platforms can play a very important role to ensure participatory dialogue (Anita Pinheiro).

Failed uptake of row planting in Botswana

The failed effort to get farmers to adopt row planting is an example of conflicting efforts through policy dispensation. Row planting is a technology meant to increase yield per hectare of food staples (sorghum, maize and legumes). In the drive to improve smallholder productivity, the government implemented a policy by which smallholders were only given seed if they took up this new method.

However, row planting did not align with the smallholder's broadcasting method, which ensured that many crops of different nutritional value were planted in each hectare. With broadcasting, smallholder farmers were assured sustainable nutrition from a variety of crops that provided nutrition diversity, but with row planting and monocropping, the technology compromised nutrition diversity at the household level for smallholder farmers (Milly Monkhei).

Towards capillary food production in Kerala

The ongoing transitions in the agrifood system of Kerala, India involve extending food production from farms to gardens and replacing hazardous chemicals with locally available or locally developed measures.

In this way, food production is becoming a routine in many households, schools, and government and private institutions. This not only enhances the resilience of the entire locality to withstand the externalities of a food-dependent economy, but also helps to strengthen local-level production for local-level consumption (Anita Pinheiro).

Government schemes in India

In 2004, the Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) gave Indian states the flexibility to utilize public funds for the scheme/crop of their choice.

In 2007, the Additional Central Assistance Scheme (RKVY) incentivized states to draw up plans for their agriculture sector more comprehensively, taking agroclimatic conditions, natural resource issues and technology into account, and integrating livestock, poultry and fisheries more fully (Priya Rampal).

Increasing farm size in a "smart" way

When designing ways to increase the effective farm size through consolidation of smallholdings, one of the most important considerations is to ensure farmers do not lose title to their lands.

Some examples of increasing effective farm size include a kind of "village farming" in China, the "small farmers, large farm" approach in Viet Nam, and professionally managed groups of smallholders in Indonesia.

Farmers in such large virtual farms should have decent access to good quality water resources, favourable land tenure systems, appropriate technologies, training and technical support, credit, insurance, and adequate rural infrastructure (i.e. health, education, roads, transport, and processing and storage facilities).

Such well-supported large virtual farms can then adopt precision farming methods to produce adequate quantities of good-quality produce for efficient marketing at attractive prices (Vethaiya Balasubramanian).

Biofortification

Considering the high prevalence of micronutrient deficiency, biofortification can be a valuable and cost-efficient approach. In the case of zinc deficiency for instance, biofortification through crop breeding and application of zinc fertilizers can increase the concentration of zinc in wheat. These approaches are particularly effective and sustainable when linked with local farming systems (Nicola Lowe, Takele Teshome, Mohammad Abdul Mazid).

Training and education

Small-scale farmers need to be informed about the need to transition towards more nutrition-sensitive farming systems and the benefits, both economical and health-related, that can be gained from it.

It is necessary to develop farmers' and consumers' capacity on nutrition-related topics such as balanced diet, importance of hygiene and sanitation, nutritional value of different foods, and food requirement at different stages of the life cycle, as well as the different ways of linking agriculture to nutrition (Aliza Pradhan, Daramola Tolu).

How to increase agriculture sector resilience under environmental stressors, especially among smallholder farmers

Participants engaged in a rich exchange on measures needed to increase the resilience of agriculture. Consensus emerged that the trend towards monoculture that often replaced indigenous farming systems has negatively affected the resilience of farmers and introduced or increased environmental stresses.

A push towards more diverse farming systems which promote local varieties tolerant to drought, flood, heat, or pests prevalent in a specific region might prove beneficial, even if yields can be lower in absolute terms. This should include a move away from staples towards the growing of varieties of pulses, fruit and vegetables, which are rich in micronutrients (Sabine Gabrysch, Rajendran Tp).

Such an approach should also favour agro-ecological methods that reconcile food production with biodiversity, soil health and water protection (Sabine Gabrysch, Mahesh Maske).

In this context, a systematic review of indigenous farming systems would be beneficial, as these are usually low-input and risk-adverse (Florence Egal).

Other participants questioned the value of resilience as a method of assessing the sustainability of a certain farming systems, as not all farming system face shocks and the interventions needed to increase resilience differ greatly from one context to the other (Suresh Babu).

Climate-smart agriculture

Climate change is a significant and growing threat to the food security and nutrition of vulnerable populations in many countries. Farmers in many agricultural regions, especially in rainfed areas, already appear to have experienced declines in farm production because of climate change. Climate change affects food production, availability and prices, impacting overall calorie consumption as well as consumption of healthy foods, such as vegetables, fruits and animal-source foods (Mahesh Maske, Umekulsoom Inam).

Climate-smart agriculture is increasingly seen as a means for achieving the triple objectives of adaptation to climate change, mitigation of its effects, and food security. In climate-smart farms, farmers should use stress-tolerant or stress-resistant (i.e. to floods, drought, pests and diseases) varieties with appropriate production technologies that further reduce such stresses. In addition, farmers need to improve cropland management practices and restore organic matter into the soil. Increasing soil organic matter content in farms not only increases carbon sequestration – a climate mitigation function – but also enhances soil quality, water-holding capacity, nutrient use efficiency, and finally leads to higher crop yields (Vethaiya Balasubramanian, Sirajul Islam).

Improving access to information

Rural farmers often have little access to information and advisory services for decision-making on climate adaptation. In fact, agriculture promotion efforts often act in parallel streams, with the scientific, political and administrative dimensions being treated as separate areas of work (Deepak Sharma).

It is therefore important to ensure that the information necessary to forecast variability trends reaches the farming community level or village hubs. These efforts should also strive to integrate indigenous and scientific knowledge (Aklilu Nigussie).

Creating an innovation platform using local languages and linking the different actors of production system, including farmers, extension personnel, researchers, input dealers, etc., could help farmers in taking informed decisions (Md Kamrul Islam, Deepak Sharma).

The cost of using outdated farming systems

Insufficient technology transfer to smallholder farmers, due to their geographical isolation as well as ineffective government and NGO knowledge-transfer initiatives, has caused many producers to stick to suboptimal practices and approaches.

This is especially problematic in the case of marginal paddy farmers living under constant threat of flooding and droughts.

When these farmers face severe crop shortage or crop failures, they often pledge their arable land for money, quickly become landless, and transition into agriculture labour or decide to migrate to urban slums for low-skilled jobs (Sania Akter Akter).

Nutri-gardening

Nutri-gardening is the comprehensive year-long package of growing nutrient-dense and naturally fortified fruits and vegetables by engaging rural women to enhance diet diversification and improve nutritional status in the household.

Nutri-gardens are established in homestead, gher/pond dyke areas and other fallow and unutilized land, by which proper utilization of fallow land is ensured and crop area is increased.

Nutri-gardens are an important source of income for rural households from the sale of garden products. Women play a vital role in providing better nutrition for their family by producing their own nutritious foods in nutri-gardens (Sirajul Islam).

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WEBSITES

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Examining the effectiveness and acceptability of the use of bio-fortified crops in alleviating micronutrient deficiencies in Pakistan
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